"Entrepreneurial inference in the high-technology start-up: a model for optimised decision making and principled praxis"

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"Whereas once I was blind, now I can see."
                    John 9:25

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Figures

Tables

Tables (continued)

* These tables are an abridged version of the main table, and show only the lead/dominant conceptual indicators. The unabridged versions may be found in Appendix RQx:SCyy

List of Abbreviations

AI………………....	Appreciative Inquiry
ANT………………...	Actor Network Theory
BPR………………...	Business Process Re-engineering
CAQDAS…………...	Computer Assisted Qualitative Data AnalysiS
CP v.pp……………...	*The Collected Papers of Charles Sanders Peirce* Abbreviated as: CP volume.Paragraph; date
CPR A/B page………	*The Critique of Pure Reason,* according to Kant (1781-87) where A page and B page refer to the paging of the first and second original editions.
CPrR A/B page……..	*The Critique of Practical Reason,* according to Kant (1781-87) where A page and B page refer to the paging of the first and second original editions.
CSH………………...	Critical Systems Heuristics
CST…………………	Critical Systems Theory
EO…………………...	Entrepreneurial Orientation
EP v.pp……………...	*Essential Peirce: Selected Philosophical Writings (Vols.1 & 2)* Abbreviated as: EP volume.Paragraph; date
EX *yy*………………	**EX**emplar respondent reference (see Appendix A)
FN *xx:yy*……………	Field Note entry located in Appendix F Where *xx* is year 20*xx*, And *yy* is the field note entry number for that year
GMeMo……….……	*Groundwork of the Metaphysic of Morals,* according to Kant (1785)
GT/GTM………….…	Grounded Theory / Grounded Theory Methodology
ICT………………….	Internet and Communications Technologies
IoT…………………...	Internet of Things
IS…………………….	Information Systems
IT…………………….	Information Technology
KM………………….	Knowledge Management
M *xx:yy*……………...	Conceptual Memo located in Appendix M, where *xx* is year 20*xx*, and *yy* is the memo entry number for that year
MIS………………….	Management Information System(s)
MS…………………...	Management System(s)
NE…………………...	*Nicomachean Ethics* (Aristotle)
OD………………….	Organizational Development
OED………………...	Oxford English Dictionary
OL…………………...	Organizational Learning
OR………………….	Operations/Operational Research
RQ………………….	Research Question
SCOT………………	Social Construction Of Technology
SME…….………….	Small-Medium Enterprise
SSM………………...	Soft Systems Methodology
ST *yy*………………	**ST**artup respondent reference (see Appendix A)
TD…………….…….	Technological Determinism
TQM………………...	Total Quality Management
TSI………………….	Total Systems Intervention

Abstract

This study investigates antecedents to inquiry and creative decision making in situations characterised by unpredictable, rapid technological change; focussing on the kind of change witnessed since the advent of massively interconnected 'Web2.0' technologies. How agents of business creation interact with such technologies are viewed through the lenses of traditional theory, systems theory and process theory; each of which leads to novel theoretical and practical conclusions relating to change and agency.

The 'high-tech' entrepreneur operating in the technologically dynamic setting of the technology start-up was chosen as the agent of analysis. Grounded theory was used to effect a textual analysis of interview narratives provided by fifteen such entrepreneurial respondents, each of whom responded to three research questions relating to change, decision making and creativity.

Three conceptually dominant core categories - *sensemaking*, *structured inquiry* and *principled praxis* - emerged as analysis of the data advanced, suggesting a three-tiered, progressive structure to the inquiry. *Sensemaking* centred around foundational concepts relating to the generation and early formation of enterprise building such as narrative, structure-agency, and habitus; and in so doing exhibited synergy with a number of existing sociological theories concerning group and individual action in organizational settings. *Structured inquiry* focussed on concepts relating to individual and group inquiry and modes of learning in high-velocity, technological settings; and *Principled praxis* emerged as a consolidated 'master conceptual category', premised upon an aggregate/idealised mode of praxis where sense had been made and inquiry was well-defined. The concept of *Principled praxis* therefore represented the cumulative emergent outcome of the research endeavour, from which a theoretical construct of the ideal entrepreneurial mindset could be advanced.

The construct was applied towards the formulation of a set of best-practice decision-making heuristics. Informed by a critical systems approach to the analysis, elements of practical reasoning as well as ethical components guided by the philosophies of Kant and the pragmatism of Peirce contributed to the philosophical justification of the emergent theory. An adaptive form of 'entrepreneurial inference' for the new 'information' economy is hereby proposed; the aim of which is to encourage ethically sound decision making according to a critically informed set of best-practice heuristics.

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Chapter 1 - Introduction

1.0   Introduction

This study focuses on technological change and entrepreneurial action in the context of the high-technology start-up venture. It investigates the impact of emerging Information and Communications Technologies (ICTs) on business decision making and inquiry within 'high-velocity' (McCarthy *et al.* 2010) business settings. How 'Web 2.0' technologies interact with agents of business during the early 'start-up' years of venture creation is of particular interest.

1.1   Background to the study

As a dedicated owner-manager of business I have been actively engaged with the creation and management of new enterprise in the high technology sector since 1995; having encountered most-all of the processes involved over numerous iterations of the 'birth-to-grave' life cycle (Mouzelis 2017; Lester *et al.* 2003; Dodge & Robbins 1992) associated with such ventures.

Business environments have long been subject to rapid, discontinuous and disruptive change (Schumpeter 1934), where demand, competition and technology are in a constant state of flux (Wirz *et al.* 2007). The unprecedented emergence and widespread diffusion of information and ICTs in recent years, however, has perhaps caused the most significant change to business and organizational structure, which has been no more evident than in the case of the high-technology start-up, where evolutionary and revolutionary change is rampant (Teece *et al.* 2016; Tushman & O'Reilly 1996). Here, unless otherwise sponsored by professional investors, the early years constitute a fight for survival and day-to-day sustainability, often overriding any immediate concerns toward profit or growth (Marshall & Williams 2019; Samujh 2011; Boeker & Karichalil 2002).

Large, incumbent organisations have traditionally experienced difficulty *"crossing the abyss created by radical technological innovation that revolutionizes competition in their industry"* (Hill & Rothaermel 2003: 257), and with the advent of the information age, the once-occasional discontinuities that 'punctuated' their peaceful equilibrium (Loch & Huberman 1999) now present themselves so frequently that they have become a permanent feature of the environment, and large firms have been slow to respond (Christensen 2013). This has forced a dramatic redefinition of the competitive landscape,

posing not only serious challenges to the ability of larger firms to react and keep-pace with the dynamics of the digital age, but also a distinct threat to their very survival (Yang *et al.* 2017; Lazonick 2009; Rifkin 1995).

Technology is now advancing at a rate much faster than it can readily be assimilated (Kim *et al.* 2018; Wajcman 2008); not only by users, but by businesses owners and managers whose operational strategies and processes rely upon it. Established owner/managers are discovering that the business 'acumen' upon which they once relied was losing its power and relevance when applied to meeting the demands of an increasingly digitised environment (Oliver & Roos 2005; Utterback 1994). In the name of maintaining business continuity this would often result in managers taking 'creative' short-cuts, leading to ill-informed or rash decisions, raising concerns relating to ethical integrity, responsible management and corporate social responsibility (Fassin 2005).

Utterback (*ibid.*) recognised this phenomenon by explaining how innovative firms were beginning to experience difficulties when attempting to keep pace with market shifts. As the impact of both evolutionary and revolutionary change (Tushman & O'Reilly *ibid.*) took hold, firms encountered difficulties recognising and seizing opportunity in the face of continuous technological change, causing owner-managers and inventors to "*become conservative and defensive as the market expands beyond the original concept [of how the market should be.]*" (Utterback 1994: quoting from abstract)

However, entrepreneurs involved in the creation of new enterprise appeared to engage with problems on a different level to their more established, corporate counterparts (Baum *et al.* 2014; Markman & Baron 2003; Baron & Markman 2003; Bird 1988). This was a cognitive phenomenon that appeared to be driven not only by the normative application of creative inquiry with respect to new products and services, but also out of a basic instinct for survival in a high-velocity, competitive environment (McCarthy *et al.* 2010). Multiple modes of creative thinking – quite different from those exhibited by their executive counterparts – appeared to be at play, and, despite the high rates of failure associated with the novice entrepreneur (Ucbasaran *et al.* 2010; Cressy 2006; Zacharakis 1999), their repeated engagement with the innovative processes involved in 'starting-up' appeared to augment their capacity to deal with and exploit the enabling benefits of emerging technology later on (Gans *et al.* 2000); thereby rendering the experienced entrepreneur more capable in many respects than their corporate colleagues (Sarasvathy 2008; Sexton & Bowman 1986).

This multi-stranded mode of cognitively-based, creative inquiry has been variously referred to by innovation and entrepreneurship scholars as the '*entrepreneurial mindset*' (Bosman & Fernhaber 2018), '*entrepreneurial wisdom*' (Walker 2016; Dunham & McVea 2008), or '*entrepreneurial orientation*' (EO) (Wales 2016; Lumpkin & Dess 1996); and while much has been written concerning the normative aspects of creativity relating to service/product research and development in larger organisations (e.g. Christensen 2013), the concepts of inquiry and creativity as dynamic, technology-assisted foundational/generative 'processes' within the transient context of the start-up venture have yet to receive any serious scholarly attention.

1.2   Research questions

This study focuses on the problem of increasing technological agency[1] and its impact on decision making and inquiry in the conception, management and operation of 'start-up' business ventures. The research questions driving the study may be summarised thus:

> **RQ1.** How do entrepreneurs accommodate the changes brought about by technology in the information age?

> **RQ2.** How do entrepreneurs approach decision-making and inquiry in unpredictable and complex technological environments?

> **RQ3.** How do moral standards and ethics inform entrepreneurial decision making, if at all?

In contrast to other approaches, where the research questions tend to be more tightly specified, grounded theory prescribes that they should remain intentionally 'vague' (Strauss & Corbin 1990: 37-40) so as to allow maximum latitude for the elaboration and development of subsequent theory. Further information concerning the staged elaboration of the research questions as part of a comprehensive grounded theory approach is provided in §3.8.1.

When considered together, the above research questions hope to bring a fresh degree of clarity and understanding to future business inquiry. By encouraging managers to '*think and act like an entrepreneur*' (Thornberry 2003; Cone 1989; Gerber 1988), and by acting

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[1] *'Agency' here refers to the 'capacity to act' in the presence of knowledge, power and context, and should not be confused with economic theories of agency.*

reflexively and with purpose (Gaddefors 2007; Webb 2004), the study aims to offer heuristics that reconstruct and restore the much-needed guiding-narratives and ethical/moral dimensions that appear to be very much absent in contemporary 'information age' management praxis.

1.3   Scope of the research

This study takes the start-up venture as its core unit of analysis and situational focal point. The start-up environment is uniquely characterised by radical change and unpredictability, and so the demands placed on those challenged with creating and managing such entities must be recognised as unique. This section outlines the rationale for this particular choice of organisational entity and operating environment, and the entrepreneur – as the corresponding agent of choice for this setting – will be discussed further as part of the literature review in Chapter 2.

1.3.1   Questioning the 'SME' status of start-up and micro-businesses

Much of the extant literature focuses on the case of the SME (Small-Medium Enterprise) classification of business entity, where entities falling into the 'S' division of 'SME' include firms with up to 49 employees; businesses that differ significantly in terms of structure, strategy and governance when compared with those (micro-)businesses at the lower end of the very same bracket, with no more than ten employees. Paradoxically, it is those micro-businesses, when operating during their early 'start-up' years, that represent the majority of new economic activity, and have traditionally been identified as crucial contributors to macro-economic activity. Why micro-businesses – and the start-up in particular – may have been neglected as objects of research is not clear (Samujh 2011): it may be that business entities of such size are not recognised or taken seriously as organisations due to their lack of established presence in terms of size, structure, experience, longevity etc. (Gilbert *et al.* 2006; Stinchcombe 1965); or perhaps they are not worthy of committed research due to the high associated mortality rates and transient existence. Such attitudes have done little to promote further understand of the start-up category, which almost without exception[2] begins life as a micro-business, but given its significance in wider economic terms, should be given the attention it perhaps deserves.

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[2] *This study focuses solely on the case of the independent start-up, as explained in §1.6.1*

1.3.2 The start-up as organization?

As this study is located mainly within the wider field of organizational analysis, the exact organizational status of the start-up venture may be challenged on account of its lack of management, presence, structure etc., as highlighted by Stinchcombe's (1965) work concerning the 'liability of newness', and later work on the related concepts of 'liability of smallness' (Abatecola *et al.* 2012; Gilbert *et al.* 2006) associated with very small firms. Despite such perceived deficiencies, the capacity and potential to belong to some future category of developed business structure is nonetheless present in all new ventures; to be realised once the formative 'start-up' years have been successfully navigated (Galbraith 1982).

The micro-business represents the predominant classification of business entity in to which all business start-up ventures fall, and it is this structure - as driven by the entrepreneur - that will be used as a 'vehicle of discovery' to reveal emergent concepts specifically relevant to business inquiry in a digital age. Despite its size, the start-up represents an often-marginalised, yet crucial first-step in the organizational life cycle that describes the birth-to-death timeline, from creation to dissolution, of business evolution. A number of organizational life cycle models have been postulated (see, for example Lester *et al.* 2003), indicating that between three and ten stages are involved in the cycle. Common to all, however, is the start-up: a transient phase of business growth, as well as a recognised micro-business.

The start-up is commonly recognised as the generative stage through which most-all businesses pass in order to achieve their longer-term aspirations[3]. It is the first in "*a predictable pattern characterized by sequential and progressive stages*" (Dodge & Robbins 1992: 27) where "*the starting point is a struggle for autonomy in the creation and development of a viable enterprise.*" (*ibid.*) Accordingly, the generative activities referred to as 'entrepreneurial' – as enacted by 'the entrepreneur' - are afforded primacy on account of their criticality to the early stage survival and long-term success of ventures.

The body of literature on business inquiry and decision making relates mostly to the case of larger businesses. As a result of bias towards established larger organisations, the more volatile, smaller companies falling under the classification of 'micro-business' –

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[3] *Although firms with zero employees and those brought in to existence via merger, acquisition or takeover bypass this stage completely.*

especially those at the start-up stage – have tended to be marginalised and under-researched (Samujh 2011). What's more, the conceptual anchor points to which productive research are traditionally secured tend to be ever-shifting on account of the underlying transience built-in to the assumed temporary status of the start-up entity; thereby offering few foundational principles upon which researchers may base original research. This is paradoxical, considering that the start-up/micro-business – representing some 98% of the active trading entities in the UK (see Table 1.1) during 2018 – is widely recognised as the principle generative vehicle responsible for new enterprise, and therefore represents something of significant import to the (UK) economy at large.

Table 1.1   *Estimated UK private sector businesses by employment & turnover, 2018*

	Businesses	Employment	Turnover[1]
		thousands	*£ millions*
All businesses	5,667,510	27,027	3,861,613
SMEs (0-249 employees)	5,660,000	16,284	1,993,507
Small businesses (0-49 employees)	5,625,165	12,885	1,398,503
With no employees[2]	4,278,225	4,643	274,917
All employers	1,389,285	22,384	3,586,696
of which:			
1-9 employees	1,137,290	4,159	533,323
10-49 employees	209,650	4,083	590,263
50-249 employees	34,835	3,399	595,004
250 or more employees	7,510	10,743	1,868,106

Source: BIS UK Business Population Estimates, 2018

[1] Turnover figures exclude financial and insurance activities, where turnover is not available on a comparable basis.

[2] "With no employees" includes sole proprietorships and partnerships with only the self-employed owner-manager(s), and companies with a single employee, who are assumed to be directors.

1.3.3 Start-up and micro-business mortality

Small and Medium Enterprises (SMEs) are widely considered to form the economic backbone of many developed nations. The majority of those business entities are micro-businesses with fewer than ten employees. SME's and micro-businesses together employ almost 90 million people in the EU, yet fewer than half of these firms – most of which are start-up ventures – survive for more than five years. At the time of writing (2018), The UK is host to some 5.7 million SMEs.

Despite being widely recognised as the 'powerhouse' of the modern economy, innovative start-up ventures – especially those in the high-technology sector – have been failing and continue to fail at a disproportionate rate (see Ucbasaran *et al.* 2010; Cressy 2006; Zacharakis *et al.* 1999). The reasons provided for such adverse mortality rates are many and varied (Ropega 2011; Laitinen 1992), with each pointing the finger of failure at one or more antecedent factors, such as lack of strategy (Eisenhardt & Sull 2001), finance (Laitinen 1991), inadequate marketing (Parry *et al.* 2012), or simply being in the wrong market at the wrong time (de Jong 2018).

Table 1.2   *SME Mortality Rates, UK: 2012-17*

Count to nearest thousand

	Active	Births		Deaths	
	Count	Count	Rate (%)	Count	Rate (%)
2012	2,373	269	11.4	252	10.6
2013	2,449	346	14.1	237	9.7
2014	2,551	350	13.7	246	9.7
2015	2,699	383	14.3	282	10.4
2016	2,834	414	14.6	288	10.2
2017	2,926	382	13.1	357	12.2

Source: Office for National Statistics.

While many new business owner-managers or founding members simply describe themselves as 'being in business' (see memo entry **M14:12**, Appendix M), the very actions associated with new venture creation nonetheless confer entrepreneurial status – however temporary – to their generative actions. Recognised by Carland & Carland (1993), exactly what differentiates the entrepreneur from entrepreneurship is in need of further clarification, but for the purpose of this research, the entrepreneur will be the *de facto* agent of enterprise creation, and entrepreneurship will refer to the unique way in which these agents operationalise their venture(s) in to existence.

While the creation of innovative new enterprise has long been associated with the entrepreneurial brief, it is commonly assumed that once the start-up/entrepreneurial phase has passed, entrepreneurial activity is replaced by executive management teams who take control of the firm on its journey towards becoming a professionally managed business (Terpstra & Olson 1993). The suggestion here is that, with few notable exceptions, entrepreneurial activity is located primarily within the domain of the start-up, abruptly

ending once the start-up phase has passed (Decker *et al.* 2014; Teece 2012), with the many facets of entrepreneurial remit being devolved to 'professional management teams' (Olson 1987). This position is challenged, where it will be argued that what this study will later refer to as *entrepreneurial inference* should feature as a continuous presence in all contemporary firms wishing to survive the turbulent dynamism of an emerging and unpredictable digital economy.

Owing to their relatively high mortality rate and the volatility of the environment in which they operate (Dans 2001), and where recently, almost as many new ventures die as are born each year (Table 1.2 & Figure 1.1), researchers have tended to direct their attention towards the 'steady-state' enterprise of larger, more established corporations. Given the small firm's lack of structure, operating experience, and comparatively high turnover when considered in terms of mortality, such levels of instability and the difficulties faced when studying dynamic, short-lived research targets make the reasons for academic bias in favour of larger, more established firms as described by Samujh (*ibid.*) all too apparent.

Source: Office for National Statistics
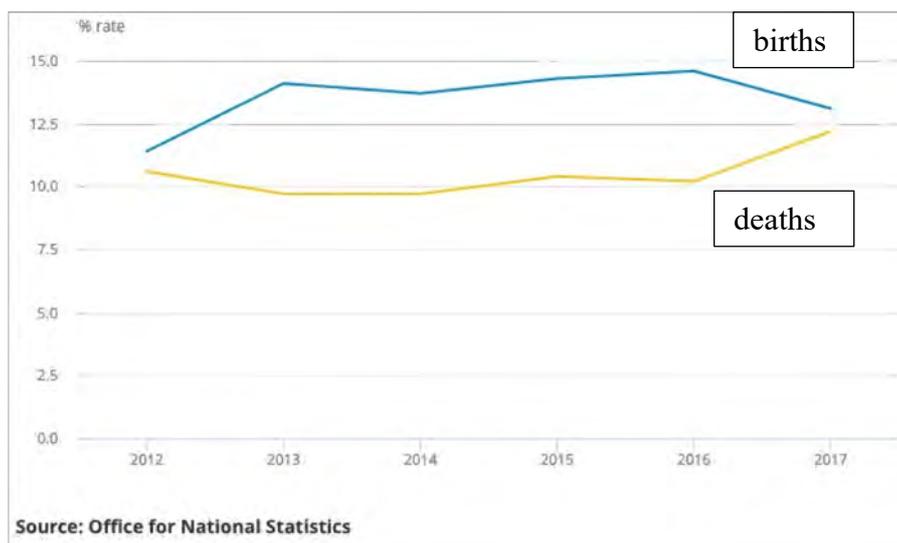
Figure 1.1   Graph of UK SME Mortality: 2012-17

As pointed out by Shaarani (2018) and Wirtz *et al.* (2007), several authors (e.g. Cantamessa *et* al 2018; Mills 2002) continue to blame the high rate of business failure on the absence of sound strategy. This concurs with Porter's (2001) original contention, arguing that failed companies in so-called 'high-velocity' environments did not embark on a coherent long-term strategy, stating that "*many of the pioneers of internet business, both dotcoms and established companies, have competed in ways that violated nearly every precept of good strategy*" (p.62).

However, Wirtz *et al.* (2007) counters the 'lack of strategy' argument by emphasizing Eisenhardt & Sull's (2001) resource- and capabilities-based, inside-out perspective, declaring that "*an entrepreneurial attitude and the mastering of key capabilities will provide the necessary agility and flexibility to succeed in dynamic and complex environments*" (Wirtz *et al.* 2007: 296). As repeatedly pointed out in Mintzberg & Ahlstrand (2008, 1987) and Lampel & Mintzberg (2013), lack of strategy implies lack of process, and so a perceived lack of strategy exhibited by start-up entrepreneurs – which is to be expected in new, independent ventures – may be more indicative of a lack of process.

1.3.4 The significance of 'Web 2.0'

Frequent mention will be made of 'Web 2.0' technologies during this study, and a brief introduction is necessary here in order to explain the future strategic importance of the phenomenon, and its relevance to the research (O'Reilly 2009; Murugesan 2007).

Preceded by the static 'one-way' (asynchronous) interactions of the 'Web 1.0' web-sites that predated the technology market crash (Maness 2006), 'Web 2.0' refers to the second generation of Internet and World Wide Web technologies that began to appear in 2005. Recognised as both a usage and a technology paradigm (Murugesan *ibid.*) that focuses on the ability of users to dynamically collaborate and exchange live information synchronously via tablets, smartphones, and other 'smart' devices, they now feature heavily as part of the social fabric of contemporary society, and, although popular across all age groups, have exhibited an explosive uptake, particularly amongst younger users.

The implications for Web 2.0 technologies in a massively interconnected world represents a formidable step change in the way humans interact with their technological environment (Golding 2011; Cook 2008); and when assimilated with 'Big Data'[4] hosted in a 'cloud' environment [5], stand to represent the driving force behind the next technological revolution; awkwardly referred to as 'the Internet of Things' (IoT)[6]. The full impact of Web 2.0 has yet to be appreciated, but it has already received widespread attention from educational researchers (Greenhow *et al.* 2009; Anderson 2007), who imagine a world in which near-infinite internet bandwidth will become available

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[4] *Big Data: Extremely large datasets that are analysed computationally to reveal patterns, trends etc.*
[5] *Cloud: A disparate network of connected computing resources, where storage and processing are shared across many devices. As resources are scattered, local failures do not affect service provision.*
[6] *Internet of Things (IoT): Everyday objects are embedded with smart devices, connected to the Internet*

ubiquitously via wireless internet access (WiFi), permeating every location on the planet, and where all 'things' will become seamlessly interconnected and interoperable with each other, regardless of physical location.

Researchers are beginning to recognise the long-term strategic implications of the changes that are – and are likely to be – ushered-in by Web 2.0 technologies and the new round of technological advances that will doubtlessly follow (Stankovic 2014; Wirtz *et al*. 2010; Andriole 2010; Lytras & Damiani 2008).

1.4   Aims and objectives

This study applies contemporary systems and process theory, as well as the philosophies of reason and pragmatism to reframe business inquiry and decision making for entrepreneurs in an information economy. By analysing the processes that drive creative inquiry, the aim is to improve approaches to problem solving, where the tools and heuristics proposed will go some way towards revitalising not only decision making in start-up environments, but also the dormant *intra*preneurial function within incumbent organizations (Antoncic & Hisrich 2003; Hisrich 1990); all of which may benefit the longer term viability of those organizations that choose to adopt them.

An ethically guided mode of practical business inquiry is also proposed for uptake by nascent entrepreneurs and the experienced manager alike (Dees & Starr 1990), where a sustainable, ethically informed and inclusive approach to business is advanced, aiming to locate business purpose and morality at the heart of every enterprise.

The objectives of this study may be stated as follows:

1. Investigate whether entrepreneurial inquiry in its generative 'start-up' mode may be recast for strategic application by others operating in a technologically saturated 'knowledge' economy;

2. Show that a systems approach to research and practice can enable inquiry to cope with the dynamism, complexity and uncertainty of a rapidly evolving technological background;

3. Apply the philosophies of Kant and Peirce towards the formulation of a morally and ethically sound practical reasoning, underscored by a pragmatic approach to business inquiry.

The research takes a step-back from the existing causal theories found within the domain of innovation and entrepreneurship (McKelvey 2004) by adopting a 'whole-systems'

approach to the analysis of the complexities embodied within the start-up environment (O'Connor 2008), and when considered against a technologically dynamic background.

In summary: the entrepreneurial mindset, as situated in the context of the start-up phase, is deconstructed and analysed for concepts that may contribute towards an ideal set of processes for decision making. A processual view of 'start-up inference' is seen to emerge, which is then applied to a wider framework incorporating the philosophical dimensions of inquiry based on pragmatism, practical reasoning and a sound moral/ethical awareness.

1.5   Research design & approach

1.5.1 Philosophical considerations

This research is entirely qualitative in its methodological approach. Flick (2009) describes qualitative research as a naturalistic interpretative approach, concerned with exploring phenomena *'from the interior'*. In order to carry out qualitative research, a consideration of the philosophical assumptions as well as the interpretive framework is required. Creswell (2007: 17) outlines four philosophical assumptions which are embedded within the interpretive frameworks used during research:

> * **Ontological** (The nature of reality): Relates to the nature of reality and its characteristics. Researchers embrace the idea of multiple realities and report on these multiple realities by exploring multiple forms of evidence from different individuals' perspectives and experiences.
> * **Epistemological** (How researchers know what they know): Researchers try to get as close as possible to participants being studied. Subjective evidence is assembled based on individual views from research conducted in the field.
> * **Axiological** (The role of values in research): Researchers make their values known in the study and actively reports their values and biases as well as the value-laden nature of information gathered from the field.
> * **Methodology** (The methods used in the process of research): inductive, emerging, and shaped by the researcher's experience in collecting and analyzing the data.
>
> (Creswell 2007: 17)

Although the general approach to this research broadly falls within the critical realist (Collier 1994) school of thought associated with Bhaskar (1975), various ontological positions are adopted during the course of the study, and shift on account of the changing nature of agency during the struggle between the entrepreneurial human agent, and the non-human agency of technology. Furthermore, an idealist ontology is subsequently adopted during the modelling of a best-practice entrepreneurial mind-set when asking the question "how *ought* the entrepreneur act?" and although a hypothetical proposition, it nevertheless requires the temporary adoption of an alternative ontology.

This research therefore rejects the premise that fixed 'laws' governing the social world exist or can indeed be identified (Ritchie *et al.* 2014: 6), because humans are inherently imbued with the agency to choose how they formulate their own worldview; a worldview which they may elect to change at any point in time.

Epistemologically, inductive logic is applied via the grounded theory methodology to discover novel concepts, which are then applied to the formulation of theory. However, Peirce's notion of retroduction, or abductive logic (Fann 2012) is also advanced as the best means of practical inquiry for the idealised entrepreneurial mind-set. Furthermore, a pragmatic theory of truth is advocated, again, in the formulation of the idealised entrepreneurial mind-set, via the constructive application of Peirce's pragmatic maxim.

The ***axiological*** positions adopted during the study are significant, given the history and past-life experience of the author. Although the author has acted purely in his capacity as observer during the execution of the study, guarantees of a value-free position cannot be made concerning the relationship between the researcher and the researched, and how this may influence the connection between 'facts' and 'values' (Ritchie *et al.*: 8); thereby leading to doubts concerning neutrality and the production of an objective or 'privileged' account.

The author therefore proposes a position of 'empathic neutrality' (Ritchie *ibid.*; Hoepfl 1997; Grafanaki 1996), which admits that, although research can never be value free, assumptions, biases and values should be made transparent wherever possible, while also striving to be neutral and non-judgemental in approach (*ibid.*). This is a limitation associated with this particular approach to research, which is hereby declared in anticipation of its inclusion in §1.6.

1.5.2 Theoretical framework

Research has traditionally based its foundational view on the premise that entrepreneurship is a domain of expertise when applied to the generation of new enterprise (Sarasvathy 2014). A number of competing theories have emerged over the years suggesting that the success or failure of new ventures may be attributed to either the psychological, behavioural or cognitive traits associated with entrepreneurship (Baum & Locke 2004; Llewellyn & Wilson 2003), or the environment in which the entrepreneur and/or venture have been situated, given a particular set of circumstances or attributes

(Thornton 1999). This may have been the case previously, but the increasing role of technological agency must now also be considered for the contemporary information age.

Based on the belief that *"technology is a key governing force in society, and that technological change drives social change"* (Smith & Marx 1994: 2) this study considers both a reductionist theory of *technological determinism* – which presumes that technology is one of the key drivers behind the development of social structures – and a theory of the social construction of technology (SCOT), or *social constructivism* (Pinch & Bijker 1984), which argues that technology does not determine human action, but that human action shapes technology.

The resulting contention is that, in the contemporary period, enterprise creation emerges from the 'push-pull' tension created between competing constructivist *and* determinist pressures, as mediated by the agency of the entrepreneur operating in a 'high-velocity' environment. The rate and direction of change in structure, process and technology described here belongs to a theory referred to as 'environmental velocity'; a concept first introduced to the management and organizational literature by Bourgeois & Eisenhardt (1988) as part of their study of decision making in the microcomputer industry.

Based on the above discussion, the entrepreneur in a 'high-velocity' 'start-up' setting is no longer seen as the sole agent associated with the creation of new business, but is a rational co-creator of new enterprise, leveraging technology as an enabling partner wherever it may advance the cause of the enterprise. At the time of writing, 'Web 2.0' (see §1.3.4) technologies are perceived as the main drivers behind rapid change. However, as history readily demonstrates, such technologies are subject to frequent paradigmatic shift, and so Web 2.0 must also ever be viewed as a transient phenomenon, which will inevitably be supplanted by 'Web 3.0'; the meaning of which is presently undefined.

Focal to the study is the uniquely generative ability of the entrepreneur to co-create new enterprise within a highly volatile technological environment. The vehicle via which this is effected is the high-technology start-up venture. The three elements: agent, environment and structure are considered in context, and theoretically deconstructed using Latour's (2005) actor-network theory (ANT), which is applied towards an investigation of the aforementioned push-pull interplay of agency between entrepreneur and technology, as nurtured by the evolving structure of the start-up. ANT explains the infrastructure of actor-networks, how they are formed, and how they fall apart; it

embodies systematic approaches to ways of considering the infrastructure surrounding technology and is therefore well suited to the analysis of environmental interactions with agency – both human and non-human.

With further consideration to contemporary sociological theory, the relevance of Giddens' (1984) post-empiricist structuration theory, from constructivist and determinist perspectives is also analysed and discussed. The interplay of agency is explained by Bourdieu's concept of the *habitus* (Rooksby *ibid.*) as dynamically enacted within the social field of the high-technology start-up. *Habitus* is compared and contrasted with the concept of *tacit narrative*, and how it relates to the construction of tacit knowledge in the context of the learning organization; with the merits of each being considered as they interact over time, and in context. This allows the theorising to draw not only on sociological theory for interpretation, but also on the epistemological fields of knowledge management and organisational learning.

1.5.3   An inductive approach via Grounded Theory

An inductive approach to inquiry is adopted, where concepts, insights and understanding are developed and encouraged to emerge from patterns in the data. This is in contrast to the deductive inquiry mostly associated with other [quantitative] methodologies, where data is used to assess preconceived models, hypotheses or theories (Taylor *et al.* 2015).

Originally conceived by Glaser and Strauss (1967), grounded theory represents a fundamental approach to constructing theory from data and includes the study of one or more cases. As pointed out by Eisenhardt (1989: 532), development of theory is a central activity in organizational research, where authors have "*traditionally developed theory by combining observations from previous literature, common sense and experience,*" adding that "*the actual data, however, has often been tenuous*". Supporting the general view that the data alone is not the only contributor to empirical strength or validity, Eisenhardt quotes Glaser and Strauss (1967), who suggest that, "*it is the intimate connection with empirical reality that permits the development of a testable, relevant and valid theory*" (Eisenhardt 1989: 532), thereby indicating that the whole approach of grounded theory is significantly more powerful than the sum of the individual elements that contribute to it, and, in essence, underlines a systems-like approach to inquiry.

As this research is concerned with the transition from a mechanistic to information paradigm, grounded theory offers an appropriate choice in so much as it promises an intuitive, as opposed to mechanical, process where the theorizing has been described by Lofland (1995) as being based on '*emergent analysis.*' One of the essential elements of the approach is conceptualisation as a basis for constructing new theory. Distinct from grounded theory, the majority of qualitative research methods require that "*the research problem and its resolving require they be preconceived before research begins*" (Glaser 2016: second para.).

1.5.4 Interview protocol and research participants

The semi-structured interview was used as the instrument of choice for data collection. The empirical datasets were gathered in an attempt to capture as much of the 'lived-experience' (van Manen 2016) of the practising entrepreneurial mind-set as possible.

The purpose of the question-set was to elicit from the participants a recollection of their experiences – positive and negative – of time spent as an entrepreneur within the 'start-up' setting; paying particular attention to their various interactions and encounters with technology, in the day-to-day operation of business.

The interview participants were located in the United Kingdom and the United States, with 'exemplar' narratives being sourced from Silicon Valley executives, where Silicon Valley was identified as representative of an exemplar 'technopole' (Castells 2014; Saxenian 2007, 1996; Jennings 1995; Sternberg 1996). The exemplar participants provided a rich source of longitudinal empirical data, having successfully navigated and survived the formative start-up years in their capacity as practising entrepreneurs.

The non-exemplar (UK-based) data provided by the interview data was drawn from regions classified as 'less developed' by the European Union, designated under the EU cohesion policy as having 'Objective 1' investment status (Hooghe 1996); meaning that these areas have traditionally been subject to severe decline, owing to diminished industrial activity. The respondents contributing to this study were based in Sheffield and The North-West.

1.5.5 The systems approach

When formulating the basis for this research, questioning how such a diversely rich and complex set of problems could best be addressed suggested that a holistic, critically rich approach was required in order to take a step back from the combined complexities of the start-up environment when considered against a backdrop of technological change.

The systems approach provides a clear idea of the generative processes behind the creation of new ventures, as it takes a holistic 'whole-system' view of the start-up environment. The complexity and levels of uncertainty associated with the environment are too intractable, open-ended and 'wicked' (Head 2008) to be dealt with by traditional linear approaches, and so by focusing on the relationship between components, rather than on the components themselves, a better understanding may be obtained via a systems approach.

During the course of this study, a systems approach will be deployed at two points:

> i)   To gain a better understanding of creative discovery and problem solving against a changing technological background;
>
> ii)   To help formulate a best-practice framework for critical decision making in a digital economy.

The systems approach, its philosophical underpinnings and relevance of application with respect to this study is covered in greater detail in §2.9.

1.5.6 Process theory

A process philosophy informed by theories of process identifies metaphysical reality with change and development, and refers to all worldviews holding that process, or *becoming*, is more fundamental than unchanging being (Chia 2017). Process theory is based on the conviction that the central task of philosophy is "*to construct a cosmology in which all intuitions well-grounded in human experience can be reconciled*" (Griffin 2005: 359).

In contrast to Aristotle's classical model of change as being accidental, and therefore non-essential or illusory, the philosophy of process – also referred to as the *ontology of becoming* – appeals to process over substance, embodying a full reality that is related to change, making possible a dynamic theory of knowledge.

Process is not to be regarded as a competing paradigm, philosophical position or doctrine, but more of a disposition or orientation (Hernes 2014) that may be developed in more than one direction. Possible scenarios may therefore be explored as "*situated sequences of activities and complexes of processes unfolding in time*" (*ibid.*: 9). Process refers to a system of ideas that describes how entities develop over time (Hernes 2014; van de Ven 2007), finding application in many fields characterised by change. Unlike theories of *variance* which are based on the variance exhibited across one or more independent variables that focus on *why* something happens, process theories focus on *how* something happens and therefore implicitly link the physical dimensions of structure with the temporal dimensions associated with change. As noted by Poole & Roth (1989) it is especially suited to the field of organizational change, as it may be used to explain how inquiry proceeds and decisions are ultimately made.

A process worldview is closely allied with the pragmatic maxim of Peirce, which, simply stated, explains that if an idea cannot be lived in practice, then it should not be affirmed in theory. Furthermore, as process is never deterministic, it stands that free will is essential and inherent to the universe, and so also exhibits a degree of coherence with Kantian universals and the good will. A process perspective clearly highlights the need for further investigation in to the relevance of the Kantian and Peircean schools of philosophy to this study.

In summary, approaching this study from a process philosophy perspective stands to serve a number of functions: it supports a practice-oriented approach to the elements of entrepreneurial agency that will be considered during the analysis of data and theory building; it is consonant with Peirce's pragmatist philosophy (via the pragmatic maxim) and Dewey's metaphysical pragmatism, and therefore will support claims underpinning the importance of [Kantian] practical reason when considered as a foundation for principled entrepreneurial action; it supports the notion of the start-up as a pre-organizational entity, always in a state of *becoming* on account of the exogenous and endogenous environment in which it is situated, and it offers a conceptual bridge to facilitate further discussion relating to time, change and substance; permitting notions of accrued experience, history and a full appreciation of the temporal element to be included.

1.6 Scope and limitations

All studies contain limitation that narrow the scope of research. Numerous limitations are inherent within any research project, particularly with respect to the social sciences. The limitations with respect to this research project are outlined here.

1.6.1 The independent start-up venture

It is the case that many start-up ventures are sponsored by external, professional investors who help the novice entrepreneur bypass many of the initial barriers to entry by providing not only the necessary capital funding, but also provide a ready-made board of executive directors. As professionals, it is the responsibility of the 'inserted board members' to ensure that the venture grows and expands in accordance with the wishes of the investing party(ies).

This study focuses only on those start-ups that retained their independence, at least during the formative years. Other than small amounts of 'soft-funding' received from the so-called 'three F's' of funding: *Family*, *Friends*, and *Fools*, the start-ups contributing to the empirical basis of this study were free from any professional intervention, sponsorship or investment, whether provided by venture capitalists, business angels, technology incubators, or otherwise.

1.6.2 Respondent bias

All interview respondents occupied positions of management within either an ICT start-up or an established high-technology corporation, reflecting differing degrees of experience in the field over varying time spans.

Accompanying each personality was a sense of pride and confidence which often resulted in a reluctance on the part of the participant to disclose or admit to the many and various problems they had encountered when dealing with new technologies. Potential for this bias was mitigated wherever possible by assuring participants of the strict ethical guidelines relating to data collection, privacy, categorisation and identity.

1.6.3 Researcher/Author bias

Much of the original impetus for this research arose from observations based on the author's lived experience and career as professional practitioner in the field made over a period of twenty years. Such experience therefore represents a potentially rich source of

first-hand, longitudinal data, based on real-world events as they unfolded during the years that are of particular interest to this study.

While the study does not set out to be based on an auto-ethnographic approach, it will no doubt be influenced by the lived experience of the researcher. Although it could be argued that such empirical evidence carries little validity, it is the author's contention that such data is equally as valid as the interview data supplied. The topic of researcher bias, and how the experience was able to be 'bracketed' while at the same time remaining 'open' is discussed further in §3.14.1, *The epistemology of Grounded Theory.*

1.6.4 Geographical bias

This study focuses on entrepreneurship as it related to the United States and United Kingdom during the period 1995-2015. Both countries belong to a group of developed nations defined by GEM as 'Innovation-driven', and the study does not take in to account the kinds of factor- or efficiency-driven modes of entrepreneurship typical of countries in the continents of Africa, South America, the former Soviet bloc, and the developing nations of Asia.

1.7 Gaps in knowledge

This research aims to address a number of gaps existing in contemporary theory and practice. Although Chapter Two provides a comprehensive analysis of the existing state of knowledge with respect to the themes covered, an introductory overview of each, and the perceived gaps within them, is provided here.

1.7.1 The nature of technological change

The theories and philosophies concerning technological change relate mostly to change as it occurred during previous industrial paradigms. The second industrial revolution was driven by a predominantly positivist outlook characterised by the scientific management theories of Taylorism (Maier 1970) and the labour efficiency drives of Fordist (Lipietz 1993) assembly lines and process workflows. Here, hierarchy via a mechanistic, command-and-control culture dominated (Seddon 2003; Burns & Stalker 1961). The central debates focussed on how disruptive innovation arising from rapid technological change would soon displace workers (Lazonick 2009; Rifkin 1995) with little consideration given to the temporal dimensions of technological change, or the resulting impact it was likely to have on the various roles traditionally undertaken by humans.

However, contemporary ICTs, which represent the target subject of this study, present a radically different type of emerging technology whose main characteristics are increasing complexity characterised by massively interconnected 'virtual' resources, coupled with the almost ubiquitous uptake of 'smart' devices ('smart' phones, tablets, gaming consoles etc.) against a backdrop of ceaseless and accelerating change. This research targets ICTs, but more specifically, the change in dynamic between human and technological agents involved in the type of dramatic technological change that began to unfold during the Internet revolution of the mid-1990s until the early 2000s (Web 1.0); paying particular attention to the phenomenon of Web 2.0, which is generally recognised as having arrived in 2005 (O'Reilly 2009). The impact of contemporary technological change on business inquiry, especially with respect to Web 2.0, has yet to receive the attention of mainstream scholars.

Early research studies viewed technology from a deterministic perspective, where it was assumed to be "*an objective, external force that would have deterministic impacts on organizational properties such as structure*" (Orlikowski 1992: 398). In contrast to this, later researchers focused on the human aspects of technology, seeing it more as a product of shared interpretations or interventions as "*the outcome of strategic choice and social action,*" (*ibid.*) where agency was viewed from a socially constructive capacity. Orlikowski suggested that either view was incomplete however, and proceeded to propose a reconceptualization of technology based on both perspectives; thereby permitting a more dialectical understanding of the interaction between technology and organizations (*ibid.*). One such competing theory based on a combined technological and social determinism offered by Hughes (1994) gave rise to a theory of 'technological momentum'; and while initially encouraging on account of its recognition of temporality via the changing nature of technology and society over time, the change was deemed too slow, lacking the required dynamism needed to keep pace with contemporary twenty-first century technological change.

It appeared therefore that the combined effect of a situated, temporally *dynamic* triad would be more appropriate for further investigation. Drawing on Giddens' (1984) theory of structuration, 'situated triad' refers to the entrepreneur as (rational human) agent; rapidly changing technology as (non-human) agent; and the start-up entity + resources as structure; all of which act together when considered in the context of the entrepreneur engaged in productive venture creation.

When considering the beneficial aspects of technology, the features and potential uses of it as a driving force that encourages its own ongoing uptake suggests a technologically determinist outlook, where the members of a modern progressive society would be expected to adapt and benefit from technological change. This would have been true of the kinds of technologies typical of the pre-ICT 1990s, however, with the advent of Web 2.0 it is now in the complex interplay of users with technology, especially when found in a symbiotic feedback loop, that social determinism also appears; not as a dominating concept, but as a force competing for space in a relentless tide of emerging techno-culture. Here, neither social nor technological forces dominate, but express their 'determinism' in differing measure according to perceived utility and functionality, and so talk of technological or social determinism is rendered meaningless: both concepts are at work. The emerging ICT of the new century therefore expresses itself on two levels: it gives rise to opinion – negative or positive – when considered in relation to its effects on personal and working life, but at the same time also constructs the very social dimensions via which opinions are expressed and communicated (e-mail, social media etc.). Green (2001) argues that the only point at which technology may ever be considered to be neutral is when the sociocultural context and issues circulating the specific technology are removed. It will then be visible to us that there lies a relationship of social groups and power provided through the possession of technologies.

1.7.2 Human vs. technological agency

Technology has been viewed both as enabler and disabler of business but is increasingly referred to as a 'driver' (Yogendra & Sengupta 2002), which may be suggestive of an increasing dominance in its agency. The positive and negative impacts that a continuous change to technology have on the management and performance of organizations cannot be ignored (Brynjolfsson & Hitt 2000), especially when the underlying processes and strategies on which it depends are being driven and informed by the very technologies that are changing.

The need to dynamically align business strategy with IT strategy has emerged as a critical issue for organizations (Rathnam *et al.* 2005), and how strategies may align in the contemporary period is an under-researched area. The underlying dynamism associated with Web 2.0 and other emerging ICTs suggests that research needs to address ways and methods of dealing with, and meeting the challenges associated with, re-defining the underlying processual elements that inform strategy (Mintzberg 1987; Mintzberg &

Lampel 1999), rather than simply describing the environment of change (McCarthy *et al.* 2010) or the expired and mono-dimensional view that technological change serves only to enhance levels of uncertainty within business environments (Utterback 1994; Rosenberg 1998).

Researchers and practitioners alike need to ensure that power and dominion over technological agency remains within the control of the rational human mind, as opposed to any non-human agency (Kurzweil 2000, 2005). This may be achieved, but only by encouraging a culture among business-generating agents that includes an ongoing, critically reflexive approach towards business inquiry, able to fully exploit technological advances, but which at the same time ensure that the ethical and moral dimensions – with respect to the present and future impact of their actions – are carefully observed.

1.7.3 Situational and temporal awareness

Theorising in the domain of innovation and entrepreneurship, decision making and inquiry, and technological change is not without its individual merit, but has traditionally been ill-defined when it comes to a fundamental awareness of – and appreciation for – space (Ray *et al.* 2011) and time (Janicik & Bartel 2003). Researchers tend to focus on a static 'snapshot' interpretation of a particular case at a particular time, doing little to account for the dynamic nature of agency, and how not only technology itself, but the rate of its change needs also to be considered holistically as part of an ever-evolving system. Frequently referred to as the need for increased 'mindfulness' in business (Ray *et al. ibid.*; Gherardi & Strati 1988), the vagueness of the term does not help to stimulate any interest in the crucial role it plays during the process of inquiry.

In a future environment where rampant change and unbridled complexity is unavoidable, future studies should adopt situational and temporal awareness as part of an holistic approach to inquiry. The need for an appreciation of space and time, as they both apply to the theoretical basis of this research, is discussed further in Chapter 6.

1.7.4 Business inquiry and reasoning

As pointed out in earlier sections, contemporary business inquiry is ill-equipped to function in unpredictable, fast-paced, 'high-velocity' settings. Considering technology and the start-up as an agent-structure pair addresses the ontological issues relating to environment and reality, but the epistemological dimensions must also be addressed.

This is achieved via an analysis of how the agents involved in business creation reach decisions when engaging with inquiry.

On account of a lack of prior experience and ever-expiring guiding narratives, the generation of new business in high-velocity settings ensures that nascent entrepreneurs and experienced managers alike are permanently faced with the challenge of not knowing what they need to know; resulting in the epistemological 'straight-jacket' of not being able to know because they do not know what to look for to begin with. Such impossible, circular reasoning was recognised classically as 'Meno's Paradox' (Warmington & Rouse 1957), and was initially based on Plato's dialogue with Meno, expressed by the sentiment: '*If you know what you are looking for, inquiry is unnecessary. If you don't know what you are looking for, inquiry is impossible',* implying that inquiry is either unnecessary or impossible. This is one example of the epistemic paradox attributed to Meno, and which has also been referred to by Bereiter (1985) as the 'learning paradox'.

The potential relevance of Peircean philosophy arises once more, in that abduction has been cited by several authors as being able to overcome Plato's learning paradox (Paavola & Hakkarainen 2005). This study investigates that claim with a view to incorporating it theoretically and practically within the proposed framework of inquiring heuristics. With reference to Peirce and Kant, both of whom have traditionally been marginalised by mainstream academia, the application of their philosophical approaches to reasoning in management inquiry are again seen as offering a unique understanding, and therefore novel contribution to knowledge.

1.7.4.1   Systems thinking as an approach to inquiry

Taking a whole-system view of problems via a comprehensive systems approach provides researchers with a framework for potential inquiry. Critical Systems Thinking (CST) has been applied traditionally to problems of a social nature, where a better understanding of the problem and involved stakeholders leads to better planning and execution towards a set of possible solutions (see, for example Corcoran-Nantes 2016; Raymaker 2016). However, CST has received little coverage in its application toward contemporary business problems; especially with respect to those described in the opening sections of this chapter. §2.9.3 discusses CST further, and highlights its relevance to this study.

Ormerod (2006) notes that researchers engaging with an OR approach have traditionally looked to philosophy for guidance and inspiration. Checkland (1981) highlights the relevance of Husserl's phenomenology to his soft-systems methodology, and Jackson (1991) and Flood's (1990) leading research is seen to *"draw on the critical theories of Habermas and Foucault's postmodernism"* (Ormerod *ibid.*: 892). Ulrich's (1983) approach to CST draws heavily on the philosophies of Kant (CPR, CPrR), and it is this version of CST that will be applied to the interpretation of business inquiry here, as it naturally leads to Kantian considerations of the ethical dimensions of inquiry: one of the main concerns of the study.

The latest developments in OR have been calling for more scholarly attention to be paid towards pragmatism and pluralism, with Ormerod (*ibid.*) calling for more research in the field as OR begins to realise the relevance of holism and the importance of a general systems attitude to business praxis. Accordingly, the pragmatism of C.S.Peirce is incorporated in to the analysis (see following section) to complement the Kantian elements that contribute towards an ethically and morally sound inquiry.

1.7.4.2   The philosophical dimensions of inquiry

This study searches for relevance in the writings of the enlightenment philosopher Immanuel Kant and American pragmatist Charles Sanders Peirce by applying their philosophies of practical reasoning, abductive inference and pragmatism to the reframing of business inquiry. As noted by Chiasson, the philosophy of Peirce – with specific reference to his take on pragmatism – is noted as being particularly relevant when addressing contemporary problematics:

> Peirce's concepts are important for all of us, especially in these times. Complaints about the failure of schools to produce workers able to meet the demands of the information age are really complaints about the lack of an effective 'design for thinking'…few people realize that Peirce's pragmatism is a rich and vibrant philosophy for which logic must be informed by both aesthetics and ethics if it is to produce right reasoning.
>
> Chiasson (2001: 2)

Kant and Peirce offer two relevant strands of interest to this research, both of which are largely absent from the existing body of management research in the domains of entrepreneurship, innovation and business inquiry:

1) Kant's notion of practical reasoning and the categorical imperative;

2) Peirce's notion of abductive reasoning and the pragmatic maxim.

Both philosophies are rooted in a tradition of 'doing the right thing', and so are apt to encourage the inclusion of moral and ethical dimensions in to the reasoning process. This relates directly to how entrepreneurs *should* or *ought to* be making decisions under conditions of extreme uncertainty and ambiguity. While such environments have been central to explaining entrepreneurial success, some account of the ethical implications of decision making in such settings needs to be firmly incorporated in to inquiring frameworks (McVea 2009) in order to claim any degree of ethical integrity. As evidenced by recent corporate scandals[7], ethical awareness in management needs to be addressed at the grass-roots level, as in many cases, today's entrepreneurs will become tomorrow's business executives and corporate leaders.

Although several frameworks have been advanced in the area of entrepreneurial action over the years (see, for example, Sarasvathy 2014; Alvarez & Barney 2007; Politis 2005; Bouchikhi 1993), none appear to address decision making based on a theoretical adoption, or practical rendering of inquiry centred around the philosophies of Kant and/or Peirce. It is the intention of this research to redress such under-representation in the literature.

1.7.4.3   A pragmatic approach to inquiry

Entrepreneurial decision making has been studied from a number of angles (e.g. Gustafsson 2006); notably when compared with corporate decision making (Busenitz & Barney 1997; Smith *et al.* 1988), but more recently as a central concept within Sarasvathy's (2014, 2008) theory of *Effectuation*. This research challenges existing theory, by suggesting that inquiry is not only based on the theoretical constructs advocated by work or behavioural psychologists, or the social or environmental aspects of entrepreneurship, but also on a much more pragmatic type of reasoning based on the immediacy of survival, growth and general sustainability.

Although Ormerod (2006) has called for a combination of pragmatism with Ulrich's Critical Systems Heuristics (1983), resulting in what Ormerod refers to as *Critical*

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[7] *E.g. Lehman brothers (2008); MCI WorldCom (2003); Enron (2001); Barings bank (1995)*

Pragmatism, there is little evidence thus far of any work in this area, other than in the context of social planning theory, as noted by Forester (2013).

1.8 Research contributions

This study draws on two principal scholarly domains for its inspiration: entrepreneurship, and organizational theory. Contributions are made to organizational theory via the sub-fields of organizational learning and the learning organization; and epistemologically via the fields of knowledge management and the generation of knowledge. With the exception of economic theories relating to entrepreneurship, insight is taken from resource-based, psychological, sociological, and opportunity-based theories; each of which provide some contribution towards the development of a substantive theory that advances the novel concept of *entrepreneurial inference*, operationalised by the application of *principled praxis*. For example, [entrepreneurial] psychological theory combines with sociological theory to suggest that inquiry is triggered by cognitive events via the accumulation of social capital and the exercise of habitus. Furthermore, the accumulation of social capital appears to accrue cognitively via a form of bricolage, thereby drawing on opportunity-, sociological- and resource-based theories within the field. The study culminates in the development of a hitherto novel concept called *entrepreneurial inference*, which falls under the cognitive approach to entrepreneurial decision making and behaviour, as described by Mole & Ram (2012: 28).

This research demonstrates originality in four key areas[8]:

1. An 'idealised' entrepreneurial mind-set is offered as a group of conceptually-inspired processes, and re-cast according to the three 'core categories' of *Sensemaking, Structured inquiry, and Principled praxis,* as informed by a grounded analysis of the empirical data.

2. Systems thinking techniques (e.g. CST, CSH) are applied to guide best-practice in decision making when addressing 'wicked' problematics amidst the challenges imposed by a complex, ever-changing technological, business and economic landscape.

3. The re-framed entrepreneurial mind-set seeks to enhance business reasoning by incorporating the philosophically-inspired moral and pragmatic perspectives of Kant and Peirce; thereby offering practical philosophical insight in to an otherwise ethically and morally deficient world.

4. By taking a holistic 'whole-view' of 1-3, it is suggested that the emergent novel concept referred to as 'entrepreneurial inference' may be adopted by any manager, enabling ethically sound, rational practitioners of new business creation, guided by the theoretically- and empirically- informed notion of *Principled praxis.*

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[8] *This list represents a summary of combined practical and theoretical contributions. Chapter 7 presents a detailed list, ordered according to practical, theoretical and methodological contributions.*

When taken together, the four areas above offer a critically-reflective framework that may assist those engaged in business creation to deal with complex problems and make decisions based on a theoretically and practically informed study.

Previous studies in organizational learning focussed predominantly on group action in large corporate settings, and so exhibit limited correspondence with themes relating to individual/small group action in start-up settings. Accordingly, studies relating to individuals working in smaller organizational entities were sought within the literature and considered for their relevance; specifically with respect to entrepreneurial action in high technology start-ups. Here, learning, sensemaking and the production of knowledge repeatedly present themselves at both the theoretical and empirical levels as areas of significant ongoing relevance.

Taking a step-back from existing theories of organizational learning and the production of knowledge, the study proceeds to build novel insight by taking its starting point as *inquiry*, rather than *learning* (Cope 2001). Furthermore, the study demonstrates that [structured] inquiry is premised on a foundation of *sensemaking*; a theory advanced by Weick *et al.* (2005) and Weick (1999, 1995, 1993) under the general heading of 'organizational sensemaking'. It will be shown that inquiry itself is foundational not only to learning, but also to creativity and discovery, and therefore plays an essential role in generative entrepreneurial action.

Contemporary sociological theories are applied to re-cast inquiry from a construct traditionally allied with structure and agency, to one increasingly based on change and agency; thereby rendering it capable of dealing with the type of prolific change characteristic of a twenty-first century information age. When combined with a systems approach, the resulting synthesis aligns with Churchman's (1971) notion of the *inquiring system*. Further analysis of the contributing empirical narratives yields deeply embedded concepts relating to good will and the universal good, confirming that the adoption of a philosophically considered dimension to inquiry may be useful in terms of its ability to guide a wider ethical and moral outlook with respect to entrepreneurial decision making. Aspects of Kant's practical philosophy and the pragmatism of C.S.Peirce are then invited to demonstrate that a sufficiently structured inquiry contains very real elements of practical, ethical and moral reasoning, which is then encapsulated by the idealised notion of *principled praxis*, and operationalised via *entrepreneurial inference*.

1.9   Structure of the thesis

1.9.1 Chapter 1: Introduction

This chapter opens with a general introduction which outlines the background to the study and frames its general position with respect to existing work in the field. Gaps in existing knowledge are explored, followed by an outline of the scope, research design and intended methodological approach. The aims and objectives are then stated, after which the main research questions are presented. This is then followed by a justification for the research and the contributions it is expected to make. Limitations relating to the study are anticipated, and the chapter concludes with a structural outline of the thesis.

1.9.2 Chapter 2: Literature review

Chapter 2 textualises the study by presenting a detailed review of contemporary knowledge relating to the proposed fields of interest outlined in Chapter 1. Relevant literature in the field is organised and positioned with respect to the themes of the research, and gaps previously identified in the literature are investigated further for their relevance in fulfilment of the stated goals and objectives. The areas addressed by the chapter are:

- The start-up/micro-business phase of business growth/evolution, as distinguished from the SME and corporate enterprise;
- Technological change, agency and relevant sociological theories;
- Entrepreneurial agency and technology in action;
- The practical, philosophical and ethical dimensions of decision making and inquiry;
- How a systems approach and/or process orientation may benefit this type of research.

1.9.3 Chapter 3: Methodology

Chapter 3 is presented in three sections: Section I details the research design and the methodological approach taken; beginning with an overview of the research questions, the available data, and which method(s) may best be suited to achieving the stated aims and objectives of the proposed study. The underlying philosophical assumptions that accompany the choice of methodology, as well as respondent selection and interview technique are also explored.

The merits of grounded theory and its variants are then considered and critically contrasted in Section II. Section III concludes by confirming the selection of a hybridised version of grounded theory as the preferred means of inductively discovering new concepts, and as a means of developing original theory from the narrative data.

1.9.4 Chapter 4: Conceptual elaboration

The chapter opens with worked examples of how grounded theory analyses narrative data provided by the entrepreneurial interviewees, as outlined in Chapter 3. Properties relating to entrepreneurial decision making and inquiry in start-up settings characterised by high levels of technological change are then coded, which lead to a set of emergent concepts that inform the practical processes driving entrepreneurial inquiry and inference.

1.9.5 Chapter 5: Data analysis

This chapter focuses on the development of a rich description of the conceptualised empirical data. Each emergent sub-category from the conceptual elaboration stage outlined in Chapter 4 is discussed. Relationships between concepts and categories, and categories and codes are established. The development of an acute theoretical sensitivity towards the data empowers the researcher to build novel theory in Chapter 6, and so the process relies entirely on the ability of the researcher to elicit novel and interesting connections between various aspects of the data that may otherwise remain hidden.

1.9.6 Chapter 6: Building grounded theory

Theory is developed by attaching meaning to the rich descriptive data of Chapter 5. Via the grounded theory stage of 'constant comparison and interchange of indicators', the conceptualised data is considered together with field notes, researcher memos and the extant literature of Chapter 2 to reveal novel areas of insight that relate to inquiry in contemporary start-up settings. The chapter aims to advance new theory that will help guide principled inquiry against a backdrop of technological change.

1.9.7 Chapter 7: Discussion and conclusions

A statement of the contributions made to practical and theoretical knowledge in the field is made, along with thoughts concerning future directions for the research, and how it may form the basis for a foundation upon which future researchers may develop and expand the proposed theory further. The chapter concludes with autobiographical reflections relating to the research journey.

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Chapter 2 – Literature review

2.0   Introduction

This chapter consists of the following main sections:

2.0	Introduction
2.1	Who is an entrepreneur?
2.2	Organizational learning and the learning organization
2.3	Sensemaking in organizations
2.4	Technological change
2.5	Agency: human and non-human
2.6	Inference and reasoning
2.7	Learning and inquiry
2.8	The DIKW pyramid
2.9	The systems approach
2.10	Pragmatism
2.11	Effectuation theory

It introduces the key themes of the thesis by sharing with the reader the results of other studies that are closely related to the research being reported (Hart 2018; Fraenkel & Wallen 1990); it relates this study to the larger, ongoing dialogue in the literature about a topic, filling in gaps and extending prior studies (Marshall & Rossman 1989); it provides a framework for establishing the importance of the study, as well as a benchmark for comparing the results of the study with other findings; and it 'frames' the problems identified in Chapter 1. As summarized by Wiersma (1995: 406), "*The literature review provides background and context for the research problem. It should establish the need for the research and indicate that the writer is knowledgeable about the area.*"

Contrary to the opinion of those following a Glaserian implementation of grounded theory (see §3.18.1 for discussion), a review of prior, relevant literature is an essential feature of any academic project (Ramalho *et al.* 2015; Webster & Watson 2002). An effective review offers a firm foundation for advancing knowledge by not only identifying any gaps, but also by facilitating the subsequent development of theory. Furthermore, the need to uncover what is already known in the body of knowledge prior to initiating any research study should not be underestimated (Hart 1998). A successful literature review

is therefore complete and focuses on concepts (Webster & Watson *ibid.*). It should be adequately structured and follow a logical sequence, based on a coherent structuring of the topic, and on a set of competing models, theories or points of view about the phenomenon under discussion (Bem 1995: 172).

2.1 Who is an entrepreneur?

To justify the selection of the entrepreneur as an exemplar agent for this study, and to assist with the subsequent search for suitable interview respondents (see §3.7.1) fitting the desired profile, it helps to have an understanding of the target subject from the outset by asking the question '*Who is an entrepreneur?*'

While much has been written about what differentiates the entrepreneur from the non-entrepreneur (e.g. Harris 2019; Mahto & McDowell 2018; Morris *et al.* 2018; Venkataraman 1997; Carland *et al.* 1984), the literature continues to promote the widely-held perception that entrepreneurship is a permanent attribute belonging to certain types of individual (Gartner 1988) exhibiting specific psychological (behavioural, cognitive) traits commonly associated with entrepreneurial action (Kerr *et al.* 2018; Palich & Bagby 1995; Shaver & Scott 1991). Some of the traits identified include the need for achievement (McClelland 1961); locus of control and innovativeness (Mueller & Thomas 2001; Levenson 1973; Rotter 1966); propensity for risk-taking (Johnson, Madole & Freeman 2018), and over-confidence and zeal in decision making (Cieślik *et al.* 2018; Invernizzi *et al.* 2017).

Furthermore, descriptions of what entrepreneurs do vary wildly. The assumption that entrepreneurial activity is pivotal to the emergence of new firms has become central to the understanding of entrepreneurship (Arenius *et al.* 2017). Lumpkin & Dess (1996) suggest that entrepreneurs are those who enter new or established markets, while Grichnik *et al.* (2016) and Timmons (2004) state that they are mostly opportunity driven, citing opportunities, teams and resources as the three factors critical to venture success. Kirzner (1997) ties them specifically to the discovery of unnoticed profit opportunities, while Stevenson *et al.* (1999) argue that they are individuals who pursue and exploit opportunities, but without concern for resource availability. Amit & Schoemaker (1993) point to the low opportunity costs that arise when environmental factors change, and how this is often an unintended gateway to entrepreneurship, while others react adaptively to the limited prospects for employment via traditional routes (Mesch & Czamanski 1997).

Baron (1998) suggests that entrepreneurial success is closely allied with the way in which entrepreneurs are apt to perceive and process information in to productively useful knowledge, and while Cuevas (1994) claims that an excessively 'economic' approach has led to much of the confusion, Bygrave (1989) contends that the inability to firmly define terms arises from a lack of credible theories of entrepreneurship, which may be responsible for distracting much attention from the task of predicting and discovering the main drivers of the entrepreneurial function. While much work in the area was produced during the 1990s, recent work has tended to move away from economic theories drawing on Kirzner (1997), and focusses more on entrepreneurship as a strategic orientation (e.g. Hitt & Ireland 2017; Kantur 2016; Ireland *et al.* 2003); thereby suggesting a move away from numerically-based studies to those focussed more on systems, process and people.

On realising that no common definition for the entrepreneur may ever likely be forthcoming, and drawing on my experience gained during 20 years' involvement in the high-tech start-up sector, it is my personal contention that entrepreneurial action arises in response to the *needs* of an individual or a group at certain points in the organizational life-cycle of their venture(s); something that is mobilised in to action as-and-when required in response to a perceived disharmony or change in environment, market, or opportunity. Indeed, the entrepreneurs that I have associated with exhibit many of the traits associated with habitual entrepreneurial action, and notwithstanding the fact that many *non*-entrepreneurial managers also exhibit similar traits as a feature of their (often extrovert) personality, such behaviours and attitudes tend to arise as an instrumental response to a particular demand; lasting only until the need has passed or has been satisfied. Once the need has disappeared, and/or any disharmony has been neutralised, the 'entrepreneur' returns to life as owner-manager, executive, corner-shop owner, CxO, parent etc.

The foregoing paragraphs imply that 'entrepreneuring' is one of many possible roles that an individual involved in business creation and management adopts transiently in response to the needs or demands that need to be fulfilled at a certain point in time. Responding to a paper by Carland *et al.* (1984) that differentiated entrepreneurs from small business owners, Gartner (1988) contended that asking 'Who is an entrepreneur?' is perhaps the wrong question, and that it is the *act* of entrepreneurship that warrants study, not *who* is engaged in the act (italics added for emphasis).

In alignment with Gartner's position, this study will focus on entrepreneurial activity during the formative start-up years of a venture, regardless of which identity those expressing the entrepreneurial action align themselves with (owner-manager, businessman, CxO, entrepreneur, *intra*preneur etc.). Indeed, as an interesting adjunct to this point: when asked, all respondents invited to take part in this study self-identified in a preliminary screening questionnaire (see Appendix A – respondent profiles) as anything *other* than 'entrepreneur', variously referring to themselves as *family business owner; head-honcho; owner-manager; founding member;* and in one case that highlighted a general disregard for titles, flippantly described himself as *"chief pot washer, bin emptier, and all-round dogsbody"* (see memo **M14:12** - Appendix M). This was in reference to the broad remit of duties expected of founding members during the start-up years, where entrepreneurs acting alone or in small founding groups are often compelled to fulfil all manner of roles as the need arises, and in order to survive.

In concluding his 1988 paper, Gartner (1988: 28) stated that: *"the entrepreneur is not a fixed state of existence, rather entrepreneurship is a role that individuals undertake in order to create organizations;"* a comment that may explain why many, including myself and the respondents contributing to this study, find it difficult to self-identify with the label 'entrepreneur'; rather, entrepreneur*ship* is something that one exhibits, as-and-when the [business] need arises.

2.1.1 Entrepreneurial Orientation (EO)

Entrepreneurial orientation (EO) is a multidimensional strategic construct (Ireland *et al.* 2003; Lumpkin & Dess 1996) usually applied at the organizational or firm level, which attempts to characterise entrepreneurial behaviour according to the level of risk-taking, pro-activeness and innovativeness exhibited by a firm. EO captures the strategic practices, managerial philosophies and other behaviours that are perceived to be entrepreneurial in nature (Anderson *et al.* 2009) and has previously been linked to firm performance (Lumpkin & Dess 1996).

Organizations and firms are socially constructed entities (Boella & Van Der Torre 2004; Campbell 2000), created, managed and operated by human collectives which embody a reflection of their leadership (e.g. Jelenc & Pisapia 2015; Hambrick & Mason 1984; Miller *et al.* 1982). As abstract entities are incapable of any form of logical inference or reasoned action, EO must either reside within the individuals that make up the collective,

or be expressed synergistically via the collective when viewed as a whole. EO is therefore expressed from a human perspective at the individual and/or collective level.

In established firms, entrepreneurial action arises internally when an individual or group of individuals act *intra*-preneurially, as and when the needs of the company dictate, or when an individual/group elect to act in some way that is otherwise perceived as being entrepreneurial. For example, should the firm's stakeholders decide that profit margins require improvement, then management will be mobilised to meet that demand. If the response to meet the demand is enacted entrepreneurially by, for example, exhibiting higher levels of risk-taking and/or a period of intense innovation and creativity, then the individuals/group concerned and the firm could be said to have together expressed their EO by acting *intra*preneurially.

Krueger & Sussan (2017) have recently noticed that a growing scholarly interest in the 'entrepreneurial mindset' has yet to be met by significant efforts to conceptualise and measure it. They suggest the possibility of an 'individual-level' EO analogous to the well-established firm-level construct, where the three dimensions characteristic of Miller's (1983) original formulation are tested against entrepreneurial behaviour and intent with respect to the individual; thereby paving the way for the possibility of heuristics that may be used to assess various aspects of the individual entrepreneurial mind-set.

2.1.2 The many faces of the '*-preneur*': a typology

A number of terms ending in the suffix *'-preneur'*, such as *intrapreneur, netpreneur, sociopreneur, ecopreneur, expatpreneur* etc. appear to suggest entrepreneurial action within certain fields of activity, or groups of people. For example, '*net*-preneur' relates to entrepreneurial activity specifically within the domain of internet-based ventures, and is often associated with high-technology entrepreneurship. Conversely, '*edu*-preneurs' seek to revolutionise and reform education (Brewer *et al.* 2018), while '*eco*-preneurs' are *"those who create green-green businesses in order to radically transform the economic sector in which he or she operates"* (Isaak 2016: 81). As a final example based on a word used frequently in this study, the widely recognised and understood term '*intra*preneur' refers to *"the actions of individuals within organisations leading to innovation of product, services or processes"* (Gapp & Fisher 2007: 330).

Whether in frequent use or not, addition of the '*-preneur'* suffix to a word appears to confer entrepreneurial activity to some degree. Collectively, the terms could be said to represent an entrepreneurial typology of sorts, all ending with the suffix '- *preneur*', and used seemingly with- or without- hyphenation.

Within such a typology, questions naturally arise regarding the intended, implied and generally perceived meaning of corresponding terms. For example, do 'internet entrepreneurs' engage in the same type and degree of entrepreneurial activity as those described by the contracted term *net*preneur? Also, what difference exists, if any, between a *net*preneur and the less commonly used terms *techno*preneur and *e*-preneur? Similarly, should social entrepreneurs be referenced equally as *socio*preneurs? It is the contention of the author that most are indeed equivalent in meaning, but one must always consider whether such terms may be used interchangeably, without any difference in intended meaning across variants.

Such caution becomes justified when one considers the case of the '*mom/mum*-preneur', who is defined as *"a female business owner actively balancing the role of mom and entrepreneur"* (Korsgaard 2007: 1). Somewhat confusingly, however, it appears that usage of the term applies equally to stay at home fathers, despite the obvious gender disparity. Although no studies appear to exist that investigate possible distinction in meaning between terms, the phenomenon needs to be highlighted i) to raise general awareness relating to the potential for obfuscation between terms; and ii) with respect to the need for continued clarity when using such words in doctoral or advanced research.

The field of social entrepreneurship is mentioned several times in this thesis (cf. §6.3.3 and §7.6.1), and refers not only to those who strive to innovate and provide impact with a wider positive social change, but also the possibility of building philosophically-informed propriety in to the construct. The literature relating specifically to 'social entrepreneurship' is well developed, and, while the term *sociopreneur* has yet to be adopted by scholars in the field, it seemed appropriate to use the contracted version here: i) in order to harmonise its use with other portmanteaus used throughout the study (e.g. *intrapreneur*); and ii) as a means of affirming entrepreneurial agency within a particular group or domain. As the concept of agency plays such a pivotal role in this research, it was felt that use of the term *socio*preneur more readily conveyed the role of agency in its expression, as distinct from 'social entrepreneurship' as a field of academic study.

In summary, and with regard to the possible distinction in meaning between terms, it would not be unreasonable to suggest that the underlying meanings are the same, with the contracted *'-preneur'* version perhaps adding a little emphasis to the dimension of agency.

2.2   Organizational learning & the learning organization

In the context of the two scholarly camps of 'organizational learning' and 'the learning organization' the following definitions are offered:

> A learning organization is an organization skilled at creating, acquiring and transferring knowledge, and at modifying its behaviour to reflect new knowledge and insights.
>
> (Garvin 1993: 78)

> Organizational learning is a process of detecting and correcting error.
>
> (Argyris 1977: 116)

> Organizational learning means the process of improving actions through better knowledge and understanding.
> (Fiol & Lyles 1985: 4)

Organizational learning is the 'activity' and the 'process' via which organizations reach the ideal of the learning organization (Finger & Brand 1999) and facilitates the generation of new knowledge and insights that have the potential to influence behaviour (Slater & Narver 1995; Huber 1991; Fiol & Lyles 1985). Originally studied from a psychological perspective in the 1970s, and later popularised by Argyris & Schön's (1978) concept of single- and double-loop learning, organizational learning (OL) is an established subfield within the wider domain of organizational studies that feeds directly in to the applied science of Knowledge Management (KM), which ultimately informs the concept of the learning organization.

Organizational learning, as a domain within the larger field of organizational theory represents the epistemological starting point of this research. It has its roots in the post-war theories of the firm (Cyert & March 1963), and the later theorisations of Argyris & Schön (1978). The commercial significance of organizational learning has long been recognized, with various authors attempting to formulate templates or tools "*which real organizations could attempt to emulate*" (Easterby-Smith *et al.* 1999: 2), indicating that the learning organization was an ideal "*towards which organizations have to evolve in order to be able to respond to the various pressures*" (Finger & Brand 1999: 136).

Organizational learning can be thought of as a metaphor derived from an understanding of individual learning (Kim 1993: 37-50), and relates to the process of creating, retaining, and transferring knowledge within an organization; which occurs once there has been some change in the knowledge of an organization (Argote *et al*. 2001).

Knowledge, which is either explicit or tacit (Collins 2010; Nonaka 2008; Polany 1967) is gained via one of four *units* of learning: Individual; Group; Organizational; and Inter-organizational, as outlined in Table 2.1.

Table 2.1   *Knowledge acquisition via the four units of learning*

Individual	Relates productivity at work with increasing expertise, where the sharing of knowledge with others is decided by the individual. If not shared, the knowledge is lost once the individual leaves.
Group	Seen to occur at different speeds within group settings when individuals either acquire, share, and combine knowledge through experience with one another (Argote 1993), or when the group takes action, gets feedback, and modifies future action in accordance with feedback.
Organizational	The way in which organizations create and organize knowledge relating to their functions and cultures. The goal is to successfully adapt to changing environments, to adjust under certain conditions, and to increase efficiency (Dodgson 1993).
Inter-Organizational	Organizations are able to improve processes and products by integrating new insights and knowledge from one another. They collaborate to share knowledge and learn from one another. Cutting costs, faster learning, improving efficiency and decreased risk associated with problem solving are some of the noted benefits.

(Adapted from Crossan et al. 1999: 525)

As Argyris (1999: 9) points out, the literature that pays serious attention to organizational learning is divided in to two main categories: the practice-oriented, prescriptive literature of "the learning organization" promulgated mainly by consultants and practitioners; and the predominantly sceptical scholarly literature of 'organizational learning,' produced by scholars and academics.

Within the context of organizational learning, organizations are seen to learn by *"encoding inferences from history into routines that guide behaviour, learning from direct experience, the experience of others… and how conceptual frameworks or paradigms for interpreting that experience are discovered"* (Levitt & March 1988: 320). In their description, Levitt and March make specific reference to the historical dimension, as well as the habitual routines associated with learning; two aspects that are often overlooked in the contemporary organizational learning literature, each of which stands

to play an important role in the development of an entrepreneurially-oriented critical theory in the later stages of this work.

The significance of the learning organization is underscored by the [Darwinian] need to adapt to constant change, where the most successful organizations are those that not only cope with change, but thrive on it (Darwin 1859). Whereas Darwinian evolutionary processes tend to be unconscious and blind, well-functioning learning organizations respond via intelligent, reasoned response in order to adapt and compete (e.g. Breslin 2016; Wilson & O'Conor 2000). Indeed Drucker (1998) maintained that knowledge would be the only lasting resort of competitive advantage, and that in the knowledge economy of the new century, "*the knowledge worker would be pivotal to organizational survival and success*" (Starkey *et al.* 2004: 2)

Competitive Forces	Total Quality Empowerment Re-engineering	Learning Organization Core Competencies Knowledge Management	The Virtual Organization	**?**

(Adapted from Wilson & O'Conor 2000:10)

Figure 2.1   *Timeline of developing management theory*

Although by no means a comprehensive depiction of developing management theory with respect to the learning organization, the timeline shown in Figure 2.1 illustrates change from a management style based on the mechanistic, command-and-control type of organization associated with industry during the post-war decades, to that of the 'virtual' organization at the turn of the century. During the post-war years a metaphor of the 'organization as machine' (Morgan 2006), characterised by the mass production techniques associated with Fordism and the overtly quantitative dimensions of decision-making advocated by Taylor's scientific management, began to give way to 'virtual' organizational entities during the closing years of the twentieth century. Burns & Stalker (1961) had presciently recognised the need for change to a more fluid, organic type of organization (*ibid.* 1961: 6) many years earlier, by arguing that in dynamic sectors firms with organic structures were inherently more effective than those with more mechanistic structures (see Sine *et al.* 2006). These once-vertical and rigid structures of hierarchical management thus gave way to a flattened, more horizontal model characterised by the primacy of people and their core competencies (Prahalad & Hamel 2000); expressed in

terms of their skillsets and experience, as well as their management of knowledge within organizational settings.

While competitiveness is perceived as a consistent thread that drives management research in the learning organization (Elyasi & Shafiepour Motlagh 2014), the popular rise of organizational learning theory was noted to coincide with a decline in business process re-engineering. Although the two had much in common in terms of improvisation, the differences were more apparent, where the learning organization:

- While BPR focussed on the maximization of resources by placing an emphasis on people, finance and physical assets; the learning organization emphasises intangibles such as experience and knowledge.

- insisted on a systemic approach to the organization and its problems (re-engineering requires an analysis of the whole organization within its environment) prior to the proposal of solutions; whereas the learning organization deploys a 'systems approach' to inquiry.

- relies on an open mind set, with re-engineering urging higher management to redesign the organization from scratch, while the learning organization encourages all to be aware of the limiting effects of their preconceived 'mental models.'

(Adapted from Wilson & O'Conor 2000: 10)

The progressive shift from a management focus based on mechanistic models, to that of the learning organization has also been reflected in changing attitudes in the field of Operational Research (OR), which saw a corresponding move from numeric precision and optimisation based on 'hard' systems approaches, to more ill-defined human-based systems that required a more 'softened' approach; resulting in the emergence of Checkland's 'Soft Systems Methodology' (SSM) (Checkland & Scholes 2009, 1999; Checkland 1981). The link between organizational learning and operational research is key to this study, as both are underscored by a systems approach requiring the addition of pragmatic dimensions and a greater degree of practical reasoning (Ormerod 2006).

Organizational learning and Individual learning

In order to be successful and maintain a competitive edge, the modern organization has to be capable of continuous learning (Senge 2006, 1990). Core competencies (Parahalad & Hamel 2000) must be well-developed, able to show continuous improvement, and have the ability to be critically reflexive in terms of the way in which they constantly reinvent, renew and revitalise themselves. While organizational learning may be seen as a systemic feature of the organization impossible to relate to the whole, it must nevertheless be

recognised as a feature of its constituting parts: i.e. the individual employees or groups of employees. Indeed, Argyris (1999: 9) makes the distinction between employees acting directly on-behalf of the organization in which they work and acting as part of a decision-making collective.

The distinction lies not between the start-up and the organization, or questions concerning the legitimate status of the start-up as an organizational entity, but in the distinction between reflection as a form of individual development as enacted by the reflective practitioner (Schön 1983), and the critical reflection exhibited by the collective action of employees as a component of organizational learning and change. As Gray (2007) points out, the concept of the *reflexive* conversation (Clydesdale 2016; Cunliffe 2002) when contrasted with mere *reflection* (which may be regarded as a modernist idea searching for patterns, logic and order) refers to *"complexifying thinking or experiences by exploring contradictions, doubt, dilemmas and possibilities"* (Cunliffe 2002: 38). As foundational concepts that thread throughout the whole study, reflection and reflexivity represent the very essence of an engaged, critical approach to inquiry. They will be developed as concepts that feature heavily in later sections, forming an integral part of the analysis and theory-building sections. Both concepts are explored further in §2.8.3 of this chapter.

Relevance to this study

As Schön (1971: 57) contends: *"learning was variously viewed as a groping and inductive process for which there was no adequate theoretical basis,"* and from this perspective, the learning organization as part of an overarching theory of organizational learning was destined to remain underdeveloped on account of its lack of integration with praxis. For these reasons, as Antonacopoulou (2006: 456) explains, the organizational learning debate has stalled in recent years, because it is "*missing ways of capturing the holistic and complex nature of learning.*"

In the domain of the start-up/micro-business entity, organizational learning remains under-reported, which is perhaps a response to the confusion surrounding a definition pertaining to its organizational status and a lack of tangible structure on which to focus research (see discussion in §1.3.2). Within the wider domain of organizational studies, the literature relating to organizational learning relates mostly to those larger organizations at the 'medium' end of the SME spectrum; i.e. those firms with between 10-49 (S), and 50-249 (M) employees, but which tend to overlook those micro-entities (subsumed by the 'S' in SME) with fewer than ten employees.

2.2.1 Senge's *'The Fifth Discipline'*

Although his work has been approached cautiously in view of its 'many faces' (Örtenblad 2007), Senge (2006) considered that systems thinking in its role as the so-called 'fifth discipline' was the 'conceptual cornerstone' of the learning organisation. By integrating the other four supporting disciplines of *personal mastery*, *mental models*, *team learning* and *shared vision*, it was suggested that a coherent body of theory and practice could be advanced (Senge 1990: 12). Remaining common to both is systems thinking, which continues to act as the 'conceptual cornerstone' that threads throughout the methodological approach of not only Senge's learning organization of the 1990s, but also the idealised twenty-first century entrepreneurial mindset, as this study will later theorise.

The Fifth Discipline is widely recognised for leveraging systemic thinking in to the educational and social mainstream (Flood 1999: 67) and focusses predominantly on group problem solving by applying systems thinking to convert existing business entities in to learning organisations. From an entrepreneurial perspective, Senge's discussion focuses around degrees of corporate entrepreneurship as enacted by *intra*preneurs, with no mention of the role of systemic thought enacted by [start-up] entrepreneurs during the generative stages of business inception and growth. Accordingly, the model is biased entirely towards established business entities of a [mostly] corporate standing.

In acknowledging the importance of Senge's work and the many positive contributions it makes, Flood (*ibid.*) contends that there are many potential areas in which it could be enhanced, pointing specifically to the role of systems thinking. Whereas Senge advocates an almost universal applicability of systems thinking – suitable to all people in all situations, at all times – Flood (*ibid.*) cautions that in order to uphold the spirit of holism, systems thinking must be considered in context by taking in to view the wide-ranging discourse relevant to *all* types of organization; thereby allowing all reasonable options to be considered at once.

Based on a 1990s organizational perspective, Flood (1999: 72) suggests that a systemic approach reflective of the epoch was consistent with Beer's viable systems model (Beer 1972, 1984, 1985; Espejo 1990; Espejo & Harnden 1989), and Ackoff's (1989b) notion of the circular organization presented in the context of a traditional management hierarchy. However, by not considering the diversity of alternative options also available at that point in space and time, the limits to thinking would stand to be forever constrained, thereby losing any opportunity for creative inquiry and learning via the

marginalisation of multiple (diverse) lines of potential inquiry. It is in this reflective selection of relevant and purposeful alternatives that the skill of the systems thinker becomes evident: by articulating a carefully considered boundary critique informed by the collective input of as many stakeholders as possible (by recursively 'sweeping-in' facts from diversely situated experts – see §2.9.4), and by selectively drawing on the expertise and experience held within that loosely-tied social network, the true potential of any system at a particular point in space and time may be more fully explored.

As pointed out by Flood (*ibid.*), *The Fifth Discipline* appeals to organizational issues of concern with respect to the problems of the late 1980s and 1990s; a time when managers were searching for holistic techniques to complement the ideals and efficiencies espoused by business process re-engineering approaches, where Total Quality Management (TQM) and other management techniques that were perceived as affecting the transition from a mechanistic, hierarchically structured economy, to one based on knowledge, change, and loosely-coupled (horizontal) ties, were implemented along with other measures.

While somewhat dated in a twenty-first century characterised by massively-interconnected information systems, *The Fifth Discipline* continues to offer currency when exploring issues pertaining to organizational learning and the management of knowledge; especially in the sphere of entrepreneurship and venture creation set against a technologically dynamic background. In conjunction with changing attitudes in operations research, the book was amongst the first to offer a practical recognition of the pragmatic application of systems thinking and systems theory in a chaotic world defined by so-called 'wicked' problems. Elements of Senge's seminal work are therefore carried forward and reframed by this research in recognition of their continued utility with respect to a predominantly digital, information era.

2.2.2 Entrepreneurial learning

The previous section implied that tacit dimensions exist with respect to the knowledge possessed by start-up firms, suggesting that knowledge is located and distributed disparately amongst the various networks of human (and more recently, digital) knowledge bases that constitute the firm. However, unlike its larger, more centralised corporate counterpart, it could be said that the start-up benefits more from an externally-located dynamic knowledge base facilitated by exogenously located information systems; the locus of which is the entrepreneur.

Before considering entrepreneurial learning as a quasi-independent concept, its relationship with existing theories relating to individual learning and organizational learning deserve further attention, as both areas have benefitted from the majority of scholarly attention in the field to date. However, linking the concept of entrepreneurial learning with the two established schools of thought may not be so simple: as demonstrated by the authors cited in Antonacopoulou (2006), being able to reliably differentiate between the two aspects of learning remains unresolved, even in current organizational learning debates (Antonacopoulou 2006, 1998; Cope 2001; Friedman 2001; Richter 1998; Kim 1993; Friedlander 1983). While the case for learning at the level of the individual within organizations is clear, Argyris & Schön (1978: 9) captured the paradoxical essence of 'organizational' learning by reflecting on the question 'Does an organization learn?', to which, in recent research by Antonacopoulou (2006: 455-456), a variety of responses were forthcoming, including 'yes', 'no', and 'maybe'; thereby demonstrating that the matter continues to remain undecided.

As with other organizationally-based attributes ('organizational cognition', 'organizational memory', etc.) conceptualisation of any human-originated ability as it relates to the organization remains difficult, as it will always be reified in to an unnatural anthropomorphism (Kim 1993). Although various arguments for organizational learning offer good justification for the construct at a number of levels: for example, Schulz (2001) and Walsh & Ungson (1991) argue that 'organizational memory' is exhibited via shared mental models, values and behaviours, and accumulates in the rules, roles, routines and procedures that manifest as 'organizational memory'. In order to avoid any unnecessary anthropomorphisms – with respect to organizational learning at least – it is now acceptable to see learning within the context of organizational entities as the product of individuals' learning (Senge 1990; Fiol & Lyles 1985; Argyris & Schön 1978). An important factor affecting organizational learning was context, where context represented the structure, culture, technology, identity, memory, goals, incentives and strategy inherent in organizations (Cyert & March 1992). Context forms an important part of this study, and so an appreciation for not only agency, but the site of agency, as well as the time-span of action, needs to be recognized if a fully systemic consideration of entrepreneurial learning is ever to be accepted as credible.

Moving towards notions of collective learning, Hedberg (1981), Pawlowski (2001) and Simon (1991) present organizational learning as a social process affected by organizational factors like structure, information, communication and control processes;

all of which are suggested to have a direct impact on the way individuals learn. At the community level, focus shifts to the collective practices of people within firms where the sub-cultures and other intersubjective actions embedded within the group manifest as a form of organization learning that leads to [organizational] intelligence and the development of [organizational] knowledge (Crossan *et al.* 1995; Brown & Duguid 1991; Lave & Wenger 1991). This also has implications for the entrepreneur acting in the start-up context, but the professional community with which he/she interacts is more likely to be exogenous to the firm, where interactions take place digitally, rather than personally.

Learning in response to critical incidents

Cope (2011), Singh *et al.* (2007) and Minniti & Bygrave (2001) argue that entrepreneurs learn from failure as well as from success. They provide a structural model of entrepreneurial learning based on the exploitation of past failures, where, based on a stock of knowledge accumulated from past experiences, entrepreneurs were seen to repeat only those choices that offered the most promise; discarding those that previously resulted in failure. Employing a form of double-loop learning, the entrepreneurs were seen to process information, make mistakes, update their decisional algorithms, and go on to progressively improve their performance over time.

The importance of learning and knowledge acquisition for small-to-medium sized enterprises was investigated by Sullivan (2000), where experienced entrepreneurs were deployed as mentors to support and advise novice entrepreneurs. The link between double-loop learning and learning from experience was recognised by Cope (2001), who noticed that critical incidents such as past failures, customer/supplier problems, or issues that threatened the survival of a venture often prompted in to action this type of adaptive learning.

Single- and double-loop learning

By treating learning as a process of feedback, and leadership as a transmission mechanism within a bounded system of shared meaning, Senge (2006) showed how, via a 'double-loop' cognitive process of shared learning, everyone is ultimately capable of leading (Senge *ibid.*). From this, it follows that learning is not a behavioural attribute limited to the individual. Argyris & Schön (1978) were the first to outline the distinction between single- and double-loop learning: the former is control-oriented and reactive, leading to rational corrective action, with failure in one course of action being followed by another.

In contrast, double-loop learning, which is self-reflective and prescriptive, breaks the 'single-loop' cycle of learning via "*the detection and correction of errors, where the correction requires changes not only in action strategies, but also in values governing the theory in use*" (Argyris 2004: 10).

Similar to the aims of Habermas's theory of communicative action (Habermas 1981), Böhm's concept of *Dialogue* (Böhm 2006, 2004, 1990), and Ulrich's *Critical Systems Heuristics* (Ulrich 1984) (see §2.7.4 and §2.9.4), Senge (2006) was attempting to expand the scope of participative leadership by advancing and emphasizing platforms for open dialogue and participation as a way of achieving some kind of consensus regarding ends. Such participative modes of learning appeared to replace the traditionally hierarchical 'command-and-control' (Seddon 2003), or leader-imposed modes associated with learning, and while Senge continued to believe that learning as a cognitive form of organizational change was difficult to decode, he nevertheless proposed that knowledge itself could become more explicit, by forcing it to emerge from its tacitly-held cognitive shackles (Nonaka & von Krogh 2009; von Krogh *et al.* 2000), encouraging it out in to the open, to be made available to all.

2.2.3 Communities of practice

Wenger (1998) suggests that communities of practice *"are formed when individuals gather to engage in a process of collective learning, in a shared domain of human endeavour."* In a later publication Wenger-Trayner & Wenger-Trayner (2015: 1) proceed to offer an updated definition as "*groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.*"

The link between formal entrepreneurial networks and communities of practice has already been the subject of a paper (Lefebvre *et al.* 2015), where entrepreneurial learning is linked to the networking activities of the entrepreneur within the type of co-evolving dynamic discussed in this thesis. Here, the network begins life as a social network consisting of family, friends and other acquaintances, and during the course of evolution of the firm(s) under the control of the entrepreneur, progressively transforms to become the type of community of practice posited by Wenger, where entrepreneurial learning happens as a process of social interaction, mediated by the growth of the firm and evolution of the network as the learning needs of the firm change over time. Of note here is the oft-underrepresented significance of the temporal aspect.

Regardless of the potential to anthropomorphise many more human qualities in to a reified 'organizational' take, it cannot be denied that the underlying agency that drives everything is human agency. Whether at the individual or group level, human agency is the sole *generative* causal force responsible for not only the creation of organizations to begin with, but which also drives the many qualities – rightly or wrongly – attributed to 'the organization'.

Strong parallels may be drawn here with respect to the theories of communities of practice, as suggested by Wenger (1998). Although Wenger's work relates specifically to established organizations, the network of associates – social, personal, and work-related - developed by the entrepreneur over a period of time may play a part in building communities of helpful individuals that will ultimately go on to form a community of 'entrepreneurial' practice. Entrepreneurs act either individually as sole agents, or collectively as part of a co-dependent group pursuing similar goals.

The notion of community of practice as advanced by Wenger (*ibid.*) has received widespread recognition as a means for understanding collective, professionally-based learning within the burgeoning knowledge economy. Brown & Duguid (2001) argue that organizations should be seen as collectives of such autonomous communities whose interactions can promote innovation and creativity at the group level; thereby accelerating the introduction of novel ideas in to local and wider working practices. In the case of established for-profit firms, competitive advantage benefits from a firm's ability to coordinate across various communities of practice, leveraging the knowledge that flows into these communities from those social network connections (Brown & Duguid *ibid.*), where the 'social networks' referred to here are clearly *non-digital* in nature, given that the paper was written some five years prior to the advent of Web 2.0. How an organization manages to achieve this though is a key challenge for management when understanding how to balance strategies that capture knowledge without killing or suffocating it with unnecessary bureaucracy (Brown & Duguid 2000).

2.3   Sensemaking in organizations

Organization theory has witnessed a gradual shift away from the study of the structures (Giddens 1984) from which organizations were once determined and defined, to one focussed increasingly on process, agency and change (Caldwell 2005, 2006). Globalisation has been accompanied by the realisation that everything flows, and the world is in a perpetual state of flux, continually in a process of 'becoming'. Organizations are viewed not as 'things made' but as processes 'in the making' (Hernes 2007). As Chia notes in Hernes & Maitlis (2010: xvi):

> We are living in an era of unprecedented change; one that is characterised by instability, volatility and dramatic transformations…such a world calls for a new kind of thinking: thinking that issues from the chaotic, fluxing immediacy of lived experiences; thinking that resists or overflows our familiar categories of thought, and thinking that accepts and embraces messiness, contradictions, and change.
>
> Hernes & Maitlis (2010: xvi)

Humans are intentional beings, actively configuring meaning by imposing order on the world (von Eckartsberg 1986) around them. To not be able to impose order or meaning to unsettled situations implies that a state of disharmony remains, and meaning cannot be made. The job of the [idealised] entrepreneur, and indeed any other person involved in an exemplary managerial role therefore, would be to ethically and responsibly neutralise such disharmonious states, as their actions are known to have consequences that impact on large portions of the population, resulting in widespread and far-reaching consequences; both intended and unintended.

According to Klein *et al.* (2006: 71) sensemaking is:

> the ability or attempt to make sense of an ambiguous situation… [it] is the process of creating situational awareness and understanding in situations of high complexity or uncertainty in order to make decisions. It is a motivated, continuous effort to understand connections (which can be among people, places, and events) in order to anticipate their trajectories and act effectively.
>
> Klein *et al.* (2006: 71)

Klein here emphasises situational awareness as a key component to productive sense making, which corresponds with Dervin's (1998) earlier theories relating to a 'cognitive gap' (see §2.5.5).

'Situational awareness' in conjunction with a 'cognitive gap' together may therefore be said to represent two crucial elements of 'sense' formation. They are key to this study, as the cognitive gap represents an absence of knowledge, or understanding, which needs to

be filled – as this research will demonstrate – via the formation of a guiding narrative generated using a reflexive attitude towards structured inquiry (see §2.8.5). When considered together with situational awareness, which represents not only the spatial and contextual recognition of incongruity that emerges during times of change, but also the temporal aspects of change, appreciating that change occurs in pace with language, society, and the general cultural 'zeitgeist' over time is of key conceptual importance.

2.3.1 The processual aspects of sensemaking

As noted by Orlikowski in Hernes & Maitlis (2010: xv), the growing importance of process perspectives highlights an important departure from traditional organizational views that have previously focussed on self-standing events or discrete entities, with organizational realities now being realised via an emphasis on the emergent phenomena exhibited by their activities and recursive relations. Such features are not exhibited by traditional organizational approaches premised on separation, stability and substance, and so process perspectives stand to provide insightful, critical and powerful meaning to contemporary organising; especially in domains characterised by unprecedented, unpredictable and turbulent change.

Sensemaking is processual in nature (Finemann 2019: 183), where process and sensemaking may be seen as mutually interlocking phenomena. The theory and ontology of process, when coupled with narrative thinking suggests that narrative acts as an essential and necessary blueprint via which action unfolds in a given context. Sensemaking, process, narrative and context are therefore mutually dependent (Perry *et al.* 2019) on each other: in the absences of any one, action becomes misguided and prone to error. Process theory helps with an understanding of the start-up setting from an organizational perspective, as the start-up entity could be said to be an 'organization in the making', and while many of the characteristics that define the traditional corporate entity may be missing in the start-up, its potential to realise - to *become* is – is nevertheless ever-present.

Dervin (1998) links sensemaking to the temporal translation of concepts from the noun-based, knowledge frameworks associated with the past, to verb-based frameworks of the future, emphasizing diversity, complexity and generative potential. In other words, the ability to makes sense requires a move away from organization to organizing, from strategy to strategizing, and from being to *becoming* (Caldwell 2016). The need for the

respondents taking part in this study to bridge Dervin's so-called 'cognitive gap' was encountered at a number of points during analysis, being described in terms of (i) the need for a guiding narrative; or (ii) the need to restore balance to an otherwise unstable situation; both of which contribute towards one's ability to make sense of a world otherwise characterised by change and unpredictability.

2.3.2 Weick's sensemaking in organizations

Sensemaking in the context of a normative organizational approach was pioneered by Karl Weick (1995). In order to draw some boundaries around the phenomenon, Weick (1995: 17-62) defined seven distinguishing characteristics that set it apart from other explanatory processes such as understanding, interpretation, and attribution. Sensemaking is thus understood as a process represented by the properties summarised in Table 2.2.

Currie & Brown (2003) point out that each of Weick's seven aspects interact and intertwine as individuals interpret events, and that the narrative identity and tacit knowledge of individuals are similarly intertwined. Their interpretations become evident through narrative, which ultimately conveys the sense they have made of events. In quoting Heritage (1987: 242), Bolander & Sandberg (2013: 288) claim that sensemaking is associated with the production of a 'practical reality' where *"action and context are mutually elaborative and mutually determinative elements in a simultaneous equation that the actors are continually solving and re-solving to determine the nature of the events in which they are placed."* Such a statement is reminiscent of Pettigrew's (2012, 1987) concept of *action in context*, and represents a major point when discussing the context of action, the awareness of temporality, and the significance of a process approach in the general discourse relating to change and agency.

Table 2.2   *The Seven Properties of Sensemaking*

1 ***Grounded in identity construction***
  Identity and identification are central – who people think they are in context shapes what they enact and how they interpret events

2 ***Retrospective***
  Retrospection provides an opportunity for sense making: the point of retrospection in time affects what people notice, thus attention and interruptions to that attention are highly relevant to the process.

3 ***Enactive of sensible environments***
  People enact the environments they face in dialogues and narratives. As people speak, and build narrative accounts, it helps them understand what they think, organize their experiences and control and predict events and reduce complexity in the context of change management.

4   ***Social***: Sense making is a social activity in that plausible stories are preserved, retained or shared. However, the audience for sense making includes the speakers themselves and the narratives are 'both individual and shared...an evolving product of conversations with ourselves and with others'

5   ***Ongoing:*** Sense making is ongoing, so Individuals simultaneously shape and react to the environments they face. As they project themselves onto this environment and observe the consequences they learn about their identities and the accuracy of their accounts of the world. This is a feedback process, so even as individuals deduce their identity from the behaviour of others towards them, they also try to influence this behaviour. As Weick argued, 'The basic idea of sense making is that reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs'.

6   ***Focused on and by extracted cues***: People extract cues from the context to help them decide on what information is relevant and what explanations are acceptable. Extracted cues provide points of reference for linking ideas to broader networks of meaning and are 'simple, familiar structures that are seeds from which people develop a larger sense of what may be occurring.'

7   ***Driven by plausibility rather than accuracy***: People favour plausibility over accuracy in accounts of events and contexts: 'in an equivocal, postmodern world, infused with the politics of interpretation and conflicting interests and inhabited by people with multiple shifting identities, an obsession with accuracy seems fruitless, and not of much practical help, either'.

<div align="right">Summarised from Weick (1995: 17-62)</div>

2.3.3 Entrepreneurial sensemaking

Characterised by high levels of unpredictability and turbulent change, Johnson & Bock (2016) contend that the high-technology sector represents a unique context for the study of entrepreneurial sensemaking. McKelvie *et al.* (2011) demonstrated that the success of a venture depends on an entrepreneur's ability to recognise and respond to uncertainty, although according to Milliken (1987), perceived levels of environmental uncertainty are apt to have an adverse impact on entrepreneurial decision making. Entrepreneurs are faced with many types of uncertainty emanating from a variety of sources, especially when engaged with the creation and management of ventures in the 'high-tech' domain.

In high-velocity environments (Eisenhardt & Bourgeois 1988) the risks associated with unpredictability and uncertainty are high. Being able to make sense of a dynamically changing and turbulent working milieu therefore stands to equip workers with a better understand of the situations they face, thereby facilitating better interpretation and appropriate, responsible action (Maitlis & Christianson 2014). Sensemaking also furnishes managers and entrepreneurs with the vital narrative(s) that may otherwise be missing – the so-called 'cognitive gap' described by Dervin (1998) – or which may have expired and been rendered useless by the fast pace and relentless emergence of new technologies (Weick 1995). 'Knowing where to start' therefore represents a formidable challenge faced by all entrepreneurs during the early pre-venture stages, assuming that the venture consists of a small number of independently motivated, founding members,

who have not yet succumbed to any external sponsorship in terms of professional (investor) finance or managerial input (see §1.6.1).

Beginning a new venture is by definition an undertaking filled with uncertainty and ambiguity, with Hill & Levenhagen (1995) pointing out that a sign of entrepreneurial success represents an ability to cope with, and overcome the specific challenges associated with venture creation. In order to cope with these uncertainties, a mental model, or some form of future-based 'vision' needs to be formed as a means of making sense of the immediate environment, which may then be further developed and communicated to others. According to Duffy (1995: 2) *sensemaking* is defined as "*how people make sense out of their experience of the world,*" where it is the process by which people assign meaning to [worldly] experience.

2.3.4 Metaphoric tropes as sensemaking heuristic

Metaphor is seen as providing a key cognitive component to encourage meaning construction (Kappelhoff & Müller 2011; Rubio Fernandez 2007; Pinder & Bourgeois 1982) and is one medium via which social actors are able to articulate the often ambiguous and complex nature of collectives (Cornelissen & Kafouros 2008). As pointed out by McCourt (1997: 511), metaphors are deployed to increase understanding of organizational life and to promote creative action, further arguing that "*they enable us to see organizations in a new way, thus opening up new creative possibilities.*"

Located within the OD model of organizational change, metaphoric thinking has been shown to be an epistemologically valid approach to making sense of organizations (Lakoff & Johnson 2003; McCourt 1997; Weick 1989). Its value as a way of coming to terms with increasingly complex organizations, and of facilitating the type of change characterised by high-velocity technological environments remains under-stated in mainstream academic literature, and should be explored further as a means of articulating aspects of sensemaking, especially with respect to start-up ventures.

Metaphoric thinking has been viewed as essential to the contribution of theory (Weick 1989), and it has also been claimed that metaphor represents that 'missing link' between lay and scientific discourse (Tsoukas 1991), thus offering potential in the debate between the widening gap between theory and practice. Echoing Brown (1977: 87) who stated that "*the language of science is basically metaphoric,*" Morgan (2006) was also of the opinion that scientific inquiry is essentially a metaphorical process.

The difficulties encountered in applying metaphoric thinking as an adjunct to understanding organizational change needs to be addressed in light of the various types of organization, and if the start-up is indeed to be classified organizationally – or even as an organization '*in the becoming*' – is there any scope for metaphoric insight along the lines originally proposed by Morgan (1980)? As McCourt (1997: 512) points out, Morgan makes two essential claims in relation to metaphor:

> i)   Far from being a merely decorative linguistic device, metaphors are a fundamental element in scientific thinking; the process of scientific inquiry is, in fact, a process of finding and elaborating metaphors;
>
> ii) If metaphors are fundamental to scientific thought, then thinking metaphorically should give us new insights in to how organizations behave, and that those new insights should in turn suggest new possibilities for creative action.

<div align="right">McCourt (1997: 512)</div>

Considering the above statements, it appears that metaphoric thinking may be independent of organizational status, and more to do with the type and mode of inquiry that takes place within the entity, rather than a function of entity type. Regardless of the situational setting, metaphor as a means of understanding organizational change within the context of the start-up will continue to be subject to Tsoukas' claim (1991) that metaphoric thinking remains vulnerable to the charges of triviality and re-inventing the wheel.

Despite increasing recognition of its importance to theory development, the influence of metaphor – especially in the context of entrepreneurship – remains largely unexplored by the literature. Lundmark *et al.* (2019) suggest that this continues to be a problem, as a field's metaphors shape inevitably its underlying assumptions. In terms of the implications for this research however, the holism of a systems approach when considered in conjunction with an adaptively complex system exhibiting emergent features (see §1.5.5) almost guarantees the continued and future relevance of Morgan's (2006: Ch.8) 'unfolding logics of change', primarily via his '*organization as flux and transformation*' metaphor. This bears equal relevance also to his other metaphors centred on tropes of learning and self-organization, such as the biological '*organization as organism*' metaphor. Being able to tie metaphor to a form of sensemaking heuristic therefore helps with a better understanding of sensemaking as it relates to entrepreneurship in a technologically changing world, and so avoids the problems related to the shaping of underlying assumptions as cited by Lundmark *et al.* (*ibid.*)

2.4   Technological change

Recent advances in ICT and Web 2.0 technologies (§1.3.4) are having a profound impact on the world's most developed economies (Denyer *et al.* 2011; O'Reilly & Battelle 2009; Nath *et al.* 2009) with no sign of any impending slow down. The bustling manufacturing, financial and retail sectors of the UKs once-productive post-war economic years are gradually being supplanted by massively centralised production and distribution plants (Maitland & Thomson 2015) driven by the instantaneous demands of an 'on-line', 'always connected' form of mass-consumerism, characterised and driven by the emergence of 'Web 2.0' technologies. Such an outlook raises important questions concerning the future of technology and its unfolding relationship with respect to the creation and management of business in general; not to mention its effects on the very nature of work (Brynjolfsson & Mcafee 2014; Rifkin 1997) and the economy at large (Lazonick 2009).

How companies are able to seize opportunities and innovate in the face of relentless technological change (Utterback 1994), both internally (endogenously) within the company (Romer 1990) and external (exogenously) to it (Arend 1999) has been the subject of much debate. As pointed out by Schumpeter (1942) innovation is at once the creator and destroyer of industries and corporations, with traditional jobs giving way to digitisation and automation (Mcafee & Brynjolfsson & 2016; Ford 2015) on an unprecedented scale.

Why users react in particular ways towards technology has traditionally focussed on instrumental beliefs as drivers of individual usage intentions (Agarwal & Karahanna 2000). In formulating the conceptual constructs of 'cognitive absorption', which relates to the individual, and 'absorptive capacity', which relates to the organization, research studies have previously focussed on approaches to analysis using the world wide web as a single point of analysis within the context of large corporates (*ibid.*). However, this was a perspective borne of the now-expired 'Web 1.0' paradigm associated with the internet boom years of the 1990s, lasting until its demise in the early 2000s (the crash of the so-called 'dot-com' bubble). This study moves away from so-called 'unitary' Web 1.0 based approaches and takes a holistic view of technologies based on the current 'Web 2.0' model, which includes all manner of interactive platforms, applications and databases – including the 'web' – situating their utility in the challenging and unpredictable settings associated with the start-up venture.

2.4.1 Technological determinism

Employing different theoretical assumptions and explanatory approaches, technological determinism (TD) remains a somewhat elusive concept (Bimber 1990). Despite its poor conceptualisation in the literature, agreement about its meaning and underlying causal mechanisms remain fragmented. Descriptions of it range from positive accounts of an inevitable technological order, to claims that technology is the dominant factor in social change (Bimber *ibid.*), whose influence derives from the cultural meaning or importance given to it by people. It is an approach that identifies technological advance as the central causal element in processes of social change (Croteau & Hoynes 2003: 305-307), where its design tends to dictate the behaviour of users and diminishes human agency as a consequence. The paradox here is that, if the cultural and social circumstances in which the technology was developed continue to be ignored, the feedback loop will begin to [positively] reinforce the dominance of technological agency.

As Thomas (1994) points out, although inattention and ignorance may lead technological enterprise to be experienced as an exogenously imposed, independent force; simply put, new technology does not just *'fall from the sky'* (*ibid.* p.8). As with the concept of the organization, technology and any perceived notion of agency arises solely as a result of prior human activity, typically driven by collective action. When viewed through the lens of entrepreneurial activity, it may appear that the agencies represented by technology and the entrepreneur are distinct from one another, but this is merely a case of direct human (entrepreneurial) agency acting with or against an indirect [collective] human agency fronted by technology. In other words, humans are recursively assisting and aiding their own situation via a mutually beneficial (or detrimental, in the case of destructive warfare etc.) interaction, which takes the form of a push-pull power/tension dynamic with *other* humans via the collectivised agency offered by contemporary technological artefacts.

This study demonstrates that it may be more prudent to admit technological determinism as a useful heuristic, rather than being viewed purely from its theoretical perspective, where academics are often caught-up in the deterministic-constructivist argument. From a practical perspective, the interaction between human society and technology may therefore be better imagined as a continuum that exists between two polar extremes, enacted by human and non-human agents alike, and in the context of this study, enacted by entrepreneurial and technological agency respectively.

It is worth comparing the 'push-pull' power dynamic described above with descriptions of technological determinism and social constructivism (e.g. Monsees & Wæver 2019; Duncombe & Reus-Smit 2019), as they in themselves both point to recursive cycles of [social] activity between actors, resulting in a continuous tension that arises between the social and technical agencies in a given situation.

Clearly, only a social element is able to offer any kind of rational resolve to such tension, with rational human intervention being facilitated by what Kant (CPrR) referred to as *practical reasoning.* This research suggest that it plays a vital and contributing role in the development of practical human inquiry, and the ultimate production of knowledge. In other words, in attempting to address the tension created by a push-pull dynamic, the entrepreneurial mindset is prompted in to initiating an inquiry that strives to find a practical solution towards the restoration of stasis. As the research will later demonstrate, this is driven in turn by the desire to settle doubt in chaotic environments.

As with all human beings who survive by rising to the challenges posed by daily life, the constant state of high-velocity flux associated with contemporary ICTs similarly compels the entrepreneur to search for ways to reduce the business tensions created by relentless change, and this is achieved by successive corrective/restorative interventions. If the system is not corrected, then it falls in to disarray and/or decay. Others have referred to it as the need for entropic negation, which makes reference to the biological notion of negative entropy, or *negentropy,* which is a measure of the degree of disorder in an otherwise chaotic universe. Although the topics of chaos and complexity are beyond the scope of this study, the fields are finding increasing relevance in explaining certain aspects of entrepreneurial discovery and creativity (McKelvey 2004) as they arise in self-organising systems. It is nonetheless useful to retain in mind the concept of entropy as a force against which all human beings – especially those entrepreneurially inclined – spend a lifetime battling against, and which is something to which all will eventually succumb (Gleick 1997).

As pointed out by Wyatt (2008 :169), one of the problems with TD is that "*it leaves no space for human choice or intervention, and, moreover, absolves us from responsibility for the technologies we make and use…and allows all of us to deny responsibility for the technological choices we individually and collectively make…*" Although technology itself does not possess any kind of will to action, TD has often been mistakenly associated with progress (Smith & Marx 1994). In an attempt to mitigate such views, Heilbroner

(1994) and Egerton (1999) take a contextually holistic view on TD, arguing that it is the availability of different machines that defines what it is like to live in a particular place and time. This is of particular note, as it highlights the importance of the temporal element when considering processes of change over time. Of the three accounts of TD offered by Marx (1994), Miller's (1984) extended version of Cohen's (1978) 'logical sequence account' contends that social structures evolve by adapting to technological change; a viewpoint that was further articulated by Heilbroner (*ibid.*). All three accounts are commonly interpreted as TD, despite their differing philosophical outlooks and political aspirations.

While some of the competing viewpoints may be in opposition to other much older 'norm-based accounts' offered by Ellul (1964) and Habermas (1971), and the 'unintended consequences' account advocated by Langdon Winner (1977), they all contain elements that point holistically to the emergent nature of TD *over time*, given an (holistic) appreciation of the entire system in which it is operating. For these reasons, it may be prudent therefore to ensure that some of the more mature literature relating to TD, and technological change in general, is retained in mind as a balancing factor to temper contemporary debate.

2.4.2 The digitisation of social networks

Prompted by significant advances in ICTs and the subsequent emergence of on-line interactive Web 2.0 applications, *digital* social networks did not emerge until the middle of the first decade of the new century (c.2004 CE). While the potential for corporate marketing, customer service and branding have been widely recognised and exploited (e.g. Hughes 2016; Parridon & Carraher 2009), the implications for its impact on organizational change and entrepreneurial inquiry remains under-reported.

Edosomwan *et al.* (2011) distinguish between social media and social networking, referring to the former as a communications channel or outlet for broadcasting, whereas the latter is a utility for connecting with others. As Hartshorn (2010) points out, social media (e.g. YouTube, Vimeo) platforms are used to transmit or share information with a broadly-based, disparate audience, whereas social networking (e.g. Facebook, Twitter, LinkedIn) promotes mutual engagement between individuals who share common interests; often building relationships through shared expertise, experience and community values (Hartshorn *ibid.*).

Following Granovetter's (1973) original study of the strength of weak ties in social networks, Aldrich & Zimmer (1986) recognised the need to consider the relationships that existed between process and network in entrepreneurship. Until the 1990s, the kinds of networks with which entrepreneurs engaged were entirely social in nature, based on inter-subjective interactions at the individual or group levels. Furthermore, they were inherently analogue – as opposed to digital – in their delivery, and mostly devoid of any technological dimensions. Aldrich & Zimmer (1986: 3) pointed out the need to address entrepreneurship itself as a processual and social phenomenon, thereby recognising it as a temporally dynamic process that should be viewed not as a series of cross-sectional 'snapshots', but as a continuum of adaptive social action, where the key components of its constitutive processes could be meaningfully linked to one another. The need to conceptualise entrepreneurship as more of a 'socially processual' phenomenon in line with contemporary digitisation of networks is further developed in the discussion relating to structure and agency, where Giddens' (1984) formulation of structure is devolved in to *process* and *system* in order to accommodate contemporary change and evolution (see §2.5.1). As part of this re-cognition, the links between social networks and various aspects of entrepreneurship, such as the discovery and exploitation of opportunity (Singh *et al.* 1999; Hills *et al.* 1997); the number of opportunities (Hills *et al.* 1997); and learning and performance (Brüderl & Preisendörfer 1998) became more mainstream, thereby paving the way for such networks to be accommodated in settings of turbulence and change.

The convergence of individual entrepreneurs to form teams from social networks was recognised by Chabaud & Condor (2009) in response to a previous study on 'network crystallization' by Larson & Starr (1993). As pointed out by Fayolle *et al.* (2016), both papers demonstrate that the persistence of communication – as driven by the needs of the entrepreneur and facilitated by the network – was key to the formation of both weak- and strong- social ties, and in so stating pointed towards the continued relevance of Granovetter's original 1973 thesis in the contemporary era of digitised social networks.

Lamine *et al.* (2015) demonstrated the need to take on a more inclusive view of entrepreneurial process; one that could take in to account the networks, linkages and connections that persisted over time, including the cultural and institutional contexts that have the potential to drastically affect elements of the process. Accordingly, a holistic appreciation of context should be accepted as being crucially important if a deeper understanding of entrepreneurship is to be developed (Welter 2011; Zahra 2007). For example, rather than considering the linear process of opportunity as nexus of

entrepreneurial action (Shane 2003), Chabaud & Ngijol (2015) point out that the coevolution of social networks with opportunities should be considered as a better reflection of the non-linearity of opportunity formation.

As pointed out by Lefebvre *et al.* (2015: 500) "*evidence exists that SME entrepreneurs value formal peer networks more than any other policy-led formal business networks dedicated to business support,*" meaning that the business support found in casually formed, social networks is valued more than any that could arise from the 'formal networks' offered by business clubs, chambers of commerce, incubators, or government-funded advisory services (Business Link, Training and Enterprise Councils, etc.).

2.5   Agency: human and non-human

The concept of agency, whether presented from a centred - or decentred - view (Caldwell 2006) is central to this study and features heavily as part of organizational change discourse. Where organizational change could once be managed or planned as part of a rational process with a transparent agenda (Caldwell *ibid.*) subject to the mechanistic force of Taylor's scientific management (Drury 2018; Kanigel 1997; Aitken 1985), they now appear as restructured – often virtual – workplaces, characterised by a lack of hierarchy, different kinds of flexibility, unpredictability, turbulence and chaos, where the sources and impact of change interventions have prompted scholars to reconsider the role that agency – both human, and non-human – play in organizational settings.

As Caldwell (*ibid.*) points out, it is impossible to conceive of a general approach catering to all types of change and all types of organization. However, as discussed in §1.4 of this volume, the stated aim of this study is to focus on the role of entrepreneurial agency within the context of the start-up 'organization', and how it is enacted, either individually, or jointly with other human and non-human actants.

As noted by Brinkmann (2017: 594) in Denzin & Lincoln (2017), Latour states that agency can never be located solely within the human being but is distributed across networks; many elements of which are constructed from numerous 'nonhuman' things. As part of his contention that social forces do not exist in themselves, Latour (2005) does not qualify his networks as necessarily being social (Latour *ibid.*), but leaves room for the possibility of non-social networks, of the kinds currently portrayed by digital telecommunications and data networks; the very non-social data networks that, ironically,

are solely responsible for the recent (post-2010) social networks that are receiving significant attention. Castells foresaw such phenomena in his original concept of 'the networked society' (Castells 2011).

Technology as a non-human participant in the co-creation of reality has been the subject of many debates (e.g. Boudreau & Robey 2005; Heidegger & Lovitt 1977), ranging from the ultimate fate of the human species (Kurzweil 2010, 2000) to the mass-automation of whole sectors of employment (Lazonick 2009; Rifkin 1995). From a teleological perspective, technology has played a passively utilitarian role in previous epochs used by humans on a purely instrumental basis, where its artefacts were 'put to use' during pre-agrarian, agrarian and industrial ages. Here, the human being was very much in charge of technology in terms of its specification, production and control. However, since the fall of 'organization man' (Lazonick *ibid.*), technology has expanded its utilitarian dimensions to take on what may be perceived as an agency of its own, but one which also offers a co-dependently created future formed with those who actively engage with it; referred to by Latour (1983) as the 'sociotechnical collective.'

According to McMaster & Wastell (2005), tools and technologies are now so ubiquitous that the human and non-human may no longer be meaningfully separated; the two are symbiotically related, where neither is able to exist independently of the other. Latour's principle of symmetry (1993: 138), a position crucial to his critical rejection of ontological dualism and essentialism which opposes the human to the non-human in its various forms, is asserted as a principle of 'sociotechnical collectives', dependent upon narrative (via metaphor and storytelling) and the projection of identity, via self, other etc. According to McMaster and Wastell (*ibid.*) agency is no longer reducible to people or technical artefacts alone, but manifests as an interplaying hybridised actant, consisting of combined human and non-human elements that present a unitary 'acting interface'. Here, the act and the actant may no longer be separated, thereby rendering the two indistinguishable from one another. Furthermore, any responsibility for action may be said to be shared between actants, as, according to McMaster & Wastell (*ibid.*), competence and responsibility are the properties of sociotechnical composites.

According to Giddens (1984: 14) an agent ceases to be if he or she loses the capacity to 'make a difference'; that is, they are unable to exercise some kind of power. Furthermore, he states (Giddens 1984: 281) that the very core of agency is epitomised by an awareness

of social rules, where agents are acutely aware of the consequences and the actions they take in their day-to-day lives.

Three issues concerning human and non-human agency should be raised here as relevant: first, the notion of action 'occurring at an interface' exhibits strong parallels with research on chaos and complexity theory (Schwartz 2014; Kauffman 1993), where the 'novel' and most creative features of systems have been noted to emerge when actants operate at the 'edge' of chaos; or the boundary at which a stable system is at risk of falling out of stasis and becoming unstable. It is at this somewhat precarious boundary that so-called 'emergent' artefacts are noted to manifest, offering uniquely creative insights that would otherwise be hidden when firmly located in the stasis- or chaos- side of the boundary. Coincidentally, the same boundary has been referenced by a number of other authors (Csikszentmihalyi 1997; Stacey 1996; Koestler 1964) as representing the very locus of creative and innovative thought. When Latour's notion of a hybridised human: technological action presenting itself as an interface is compared with similar concepts within chaos and complexity theory, then it may be possible to understand why enduring tropes of the entrepreneur as 'maverick risk taker' have persisted over time; where 'falling in' to chaos is characterised by repeated failure in the early stages of inexperienced entrepreneurial life, to be gradually replaced with success and the systemic stability associated with the creation of something new as the 'interface' between stability and chaos is repeatedly traversed as part of the entrepreneurial journey towards success. Given the dynamism and turbulence of the [start-up] environments in which they operate, entrepreneurial creativity may be said to occur at the boundary between chaos and order, which may go some way to explain why entrepreneurs are recognised for their propensity to operate 'at the edge of chaos'; more commonly referred to as operating 'on a knife's edge' (Lichtenstein *et al.* 2007).

Second: much of the discussion relating to technological dominance may sound like far-fetched speculation, but if futurists like Kurzweil (2010, 2000), Kelly (2017, 2011,1995) and others who write on the evolution and emergence of technology are to be believed, then the so-called 'singularity' (Kurzweil 2010) of a dominating technological agency, where humans become the dominated – rather than the dominant – actant, may be uncomfortably prescient; even if such theories are only partially credible. If Latour's metaphors are extended to others of biological symbiosis, such as parasitism, mutualism or helotism (a 'master-slave' type of relationship), then the spectre of a future where the

human species is dominated and used by workers of another species becomes all too apparent.

Third: Latour's theory based on biological metaphors of symbiosis needs to be questioned, as not all agents are human, but an environmental philosophy could be developed whereby the entities, artefacts and devices of technology could be viewed anthropomorphically in so far as their capacity to self-generate or self-replicate. Self-replication is already widespread when one considers the ability of contemporary software (e.g. malicious computer 'viruses') to distribute, update and even repair itself when damaged. Self-generation still has some way to go in terms of an advanced Artificial Intelligence (AI), but both exhibit significant overlap with Maturana & Valera's (1991) theories of *autopoiesis* (self-making) and *allopoiesis* (making of the 'other') when considered in the context of the sociotechnical collective formed by human and technological agency.

In a paper entitled *Enaction and engineering*, Stewart, Khatchatourov & Lenay (2004) describe all technical artefacts as *enactive* interfaces, able to mediate between human beings and the world in which they live. In so doing, they bring forth a particular world of lived experience. They highlight the crucial role of the interface in that it is the embedded human element of agency that promotes or inhibits enaction with the world, rather that the interface itself. The degree to which the human and non-human elements contribute to the effect of the resultant interface at any one time is therefore of crucial importance, but continues to be under-reported and under-theorised as a means of informing reality in the world in which we live.

According to McGuire & Tuchańska (2000), Latour was concerned with the runaway production of technological artefacts, but failed to recognise their collective potential as actors, and that the very possibility of this happening could pose an ecological threat to the survival of life. Responsibility for action was seen as being shared between the contributing actants, as noted by McMaster & Wastell (2005), with competence and responsibility being the mediating properties capable of being expressed solely by the human element of sociotechnical composites. In order to offer any real chance of future progress, the human element of agency in the context of contemporary organizations (the entrepreneur, owner-manager, corporate executive etc.) therefore needs to ensure their continued dominance in order to prevent the proliferation of a technologically-dominated, future world (Kurzweil 2016; Ocay 2010).

As well as a recognised precursor to learning and knowledge management (§2.8), narratives support a pragmatically and morally purposeful engagement with other forms of agency. The narratives maintained for interacting with other human beings are well-established and manifest as the various codes relating to intersubjective discourse, social etiquette, virtue, and morality. For this reason, the concept represents a focal cornerstone to this study, where narrative represents a cognitive bridge not only between different forms of agency, but also fuels the ever-renewing paradigmatic revolutions that underscore and drive technological change (Kuhn 1962). The importance of narrative is discussed further in §2.8.5.

While the sociological theories cited here do not represent cohesive theories in themselves, they are useful as strategically applied heuristic in understanding, or making sense of, the roles, responsibilities and interactions exhibited by the agents under study (Mol 2010). Once adapted along the lines of Caldwell (2006), Giddens' re-framed notion of structuration offers meaningful insights in to entrepreneurial decision making by removing the focus from hierarchy and structure, and forcing a consideration of the temporal and spatial dimensions; thereby allowing the contemporary debate to accommodate settings characterised by turbulence, unpredictability and change.

2.5.1 Agency and structure

The nexus of structure and agency as a central tenet in the field of sociology, referred to also as the 'duality of structure', continues to polarise discourse relating to structure and agency. As Giddens' (1984) work continues to represent the key starting point for research in to the dichotomy, it is useful to consider the foundational role it plays when considering alternatives to structuration theory.

According to Barker (2005: 448) *structure* refers to "*the recurrent patterned arrangements which influence or limit the choices and opportunities available,*" with *agency* being, "*the capacity of individuals to act independently to make their own free choices.*" In enacting their agency, the daily activities and actions of people reinforce and reproduce a set of expectations, and such expectations constitute the very 'social forces' and 'social structures' that scholars discuss, thus: "*society only has form, and that form only has effects on people, in so far as structure is produced and reproduced in what people do.*" (Giddens & Pierson 1998: 77).

Although commonly received as some 'medium of interaction' the concept of structure otherwise exhibits no demonstrable properties that can clearly be identified, analysed or changed (Layder 1987). Given that Giddens himself was unclear on an exact definition of the term, doubt was also raised regarding the ability of agency to reproduce structure. According to Barnes (2000) these 'structures' remained somehow indeterminate. The confusion as to where structure and agency begin and end, and how practice could possibly be mediated between the two has never been made clear (Bourdieu 1990). On realising this, Giddens made attempts to reframe structure by offering a process-based theory of the duality of structure (Sztompka 1993); disregarding any corresponding notion of the duality of *agency*, which continued to be overlooked. Given his tendency to privilege the efficacy of agency over structure, it is surprising to note that Giddens fails to provide any explanation as to how agency is enacted over time, via temporal processes; an oversight that inevitably lead to the erroneous determination of agency as being atemporal – and therefore also ahistorical – in nature (Giddens 1984).

Once it was recognised that the original theory of structuration and the structure-agency dichotomy could not be reconciled with notions of change, Giddens fragmented the notion of structure along two lines: structure as *systems*, and structure as *process*; with both points later being adopted by Caldwell (2006: 26) in his proposed notion of change-agency as a contemporarily appropriate replacement for structure-agency. This leads to Caldwell's (2006, 2005) reformulation of structuration theory to accommodate a process view based on change, where structure still remained, but became a two-stranded notion represented by *process* and *system*. This now paved the way for the 'dubious duality' of Giddens' structure-agency to be recast to an interacting 'generative' pair centred around the dynamism of agency and change.

2.5.2 Entrepreneurial agency in context

As suggested by Steyaert (2007: 456) the field of entrepreneurship may be envisaged less from the perspectives of classical economics and mainstream psychology, and the 'rarely questioned heritage upon which it has thus-far been based' and made more sensitive to the processual, creative and philosophical aspects that underpin it. By envisioning 'entrepreneuring' as a field of creative effort that unfolds along 'rhizomatic'[1] lines, "*a*

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[1] ***Rhizomatic:*** *A term coined by Deleuze and Guattari to describe opposition to hierarchical (tree-like) concepts of understanding based on binary choices and dualisms. A rhizomatic perception is based on planar (horizontal, adjacent) connections between chains of meaning, power structure with no beginning*

generative and travelling concept...to advance connections with new theoretical perspectives that so far have been kept outside the strongly policed disciplinary boundaries of entrepreneurship studies" (Steyaert 2007: 456), the field could be distanced from methodological individualism and aligned more with a social ontology of relatedness expressed by the kinds of actor-operationalised networks discussed in this study. Such relatedness in a modern information society would be accelerated by the phenomenon of a 'Web 2.0' technologically-enabled [digital] social network, intelligently matching needy inquirers with disparately located expert sources, and is indeed evidenced by the prolific uptake of search engine enquiries and the burgeoning use of social media platforms at the time of writing.

In Western philosophy, *agency* is directly linked to the medium via which things are accomplished, and inevitably – in the case of humans – concerns the will and ability to act through the medium of consciousness. As Munro (2009: 125) contends, *"the presumption is that behind every action lies an intention. Someone, somewhere 'wills' something and so 'causes' it to happen."* When compared to technological agency, human will is still at play, but manifests itself indirectly via the actions of the technology at a time and/or a place quite detached from its originating cause (e.g. knowledge workers controlling distant resources from their 'virtual' office). Not only this, but the same will may be enacted repeatedly without regard to situation or general context as part of an autonomic imperative to act. Technology developers write software and develop systems that therefore have the power to cause [human] will to be indirectly influenced repetitively and concurrently across time and space; and while the original 'will to act' may become blurred amidst claims of efficiency and digital automation, it also leads to the broadly-based or blind application of the same 'solution' to any number of different problems, thereby resulting in unwanted or unintended outcomes. It is this loss of [original] human guidance in the recursive application of human-originated 'will' that may be partially responsible for the moral and ethical ills associated with the mass-engagement with technology today. A greater degree of ethical awareness amongst those responsible for the production of the technological artefacts with which we are destined to co-opt as co-actants in the production of a lived social reality is therefore called for.

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or end, resisting chronology, causality and organization; instead favouring a nomadic system of growth and propagation. Summarised from Deleuze & Guattari (1988).

Discussed in §2.5.4, Bourdieu's (1977) concept of habitus, which refers to a system of dispositions that structure social fields, may be compared conceptually with the enactment of habits of will and habits of action – often referred to as habits of *response* – where human habits mirror the concept of habitus in terms of their ability to reproduce social structures. Together, these may be said to form the basis for a general theory of contemporary (post-Web 2.0) societal reproduction, where habitus represents the systemic combination of socio technical habits. Similar arguments with respect to habits and habitus in terms of human capabilities have previously been advanced (e.g. Crossley 2013) but have been unable to avoid the problem of relativism at the social level. However, in the multi-actant socio-*technical* context of the start-up (remembering here that not all actants are necessarily human), relativism is neutralised by the constant 'churn' factor driven by the relentless emergence of novel technologies.

Latour's Actor Network Theory

With respect to non-human actants, the *Actor-Network Theory* (ANT) proposed by Callon, Latour and Law (Latour 2005) addresses non-human agency, and so is useful for developing a deeper understanding of relationships situated in the kind of high-velocity technological environments in which contemporary start-ups typically find themselves. While the theory has been applied to innovation in SMEs (Gherardi & Nicolini 2005) and agricultural settings (Lockie 2006), it has yet to be linked to situations characterised by uncertainty in a multi-actant context, especially where actors are human- and technologically based.

The importance of a 'will to action' over time is highlighted when considering technology from an actor-network theoretical perspective, which supports not only the importance of habitual action in the pursuit of structured inquiry (see RQ2:SC9), but also gives credence to the criticality of habit as a fundamental essence of pragmatic orientation. This supports the argument that habitual action is crucial to the emergence of social structures arising from actions (Gronow 2011). Indeed, in her analysis of Peirce's version of pragmatism, Rosenthal (1986: 7) defines pragmatism itself as *"A theory of meaning and belief, rooted in habits of response."*

According to Gherardi & Nicolini (2005), ANT is based on a combination of two ontological principles: material relationalism and ontological performativity. It offers a theoretical and methodological approach to social theory where everything is maintained and supported by the constantly shifting digitally-enabled relationships described by

respondents in the narrative excerpts driving the sub-category RQ1:SC4 – *Networks* (See Appendix RQ1). This perspective is what Steyaert (2007) refers to as *anti-entitative*, meaning that it does not focus on the entities or structures supported by structuration theory, but focuses more on the generative [social] potential of a recursively enacted interplay between actors and their connected environment (the network). The ANT approach, according to Steyaert (2007) could therefore be said to emphasise the process of assembling, bringing together, or *becoming*, which resonates with Caldwell's (2006) reframing of structuration's structure as *process* and *system*, underpinned by a mediating agency-change duality. This is representative of a contemporary reframing of Giddens' (1984) original agency-structure dyad found in structuration theory.

2.5.3 Structuration theory reconsidered

Shane & Venkataraman (2000) suggested that structuration theory (Giddens 1991, 1984, 1979, 1976) might be a useful lens through which entrepreneurial processes may be viewed. As one of the social theories addressing technology (Jones & Karsten 2008; DeSanctis & Poole 1994) it considers how people interact with technology as part of their everyday practice, and how they recursively enact the structures that shape the emergent use of technologies.

Structures are represented by the rules and resources around which social systems are built, with the theory suggesting that actions are both constrained and enabled by the structures that produce them. A revised form of structuration theory for the contemporary digital age – i.e. one that takes rapid change, history and the temporal accumulation of experience in to account – may therefore have implications for entrepreneurial action in the context of the start-up.

As a social undertaking, entrepreneurship is carried out – and ultimately understood – within the context of social systems. As pointed out by Giddens (1991: 204):

> In seeking to come to grips with problems of action and structure, structuration theory offers a conceptual scheme that allows one to understand how actors are at the same time the creators of social systems, yet created by them. . .. It is an attempt to provide the conceptual means of analyzing the often delicate and subtle interlacing of reflexively organized action and institutional constraint.
>
> Giddens (1991: 204)

In contrast to Shane and Venkataraman's (2000) thesis, where the nexus of entrepreneurs and opportunity is central to entrepreneurship, this study aims to reframe

entrepreneurship as being a recursive process enacted between the entrepreneur and emerging contemporary technologies. Whereas Shane & Venkataraman (*ibid.*) focus on opportunity as central to entrepreneurial action, this study suspects that the role played by technology in the discovery and inquiry phases that are prior to the identification, creation, and exploitation of opportunity are themselves central to the creation of opportunity. Accordingly, they could be said to complement Shane and Venkataraman's original thesis, albeit indirectly, via the mediation of a redefined agency-change dualism.

A key aspect unique to human agency is that of reflexive monitoring, where reflexivity refers to the ability of humans to introspectively observe their actions, while at the same time maintaining a cognitive awareness of the social contexts and types of activities within those contexts. In their monitoring of the flow of activities, such actors are therefore able to develop a better understanding of themselves, and others. It is this notion of reflexive monitoring that permits structuration theory to address areas beyond those previously assigned to modes of behaviour. Whereas behavioural perspectives focus on the cognitive interpretations of social systems, structuration permits recursive reflection, and therefore a dynamically adaptive viewpoint that reflects and modifies interpretation.

It was suspected that Giddens' (1984) structuration theory would play some role in the elaboration of theory relating to human agency, the structures-within-knowledgeability (rules, resources etc.), and the task-specific modalities on which agents draw when they interact. In support of this initial hunch, Berends *et al.* (2003) cites structuration theory as an ideal starting point for establishing connections between individuals (agents) and aspects of organisational learning. During the early years of a start-up venture, structure is mostly absent, and so the entrepreneur must construct his or her social reality from nothing, relying on what Giddens referred to as *practical* consciousness that consists of tacit stores of residual knowledge based on an [often] limited worldly experience.

2.5.4 Bourdieu's Theory of Practice: Habitus

This section considers the sociological theories of Bourdieu in consideration of its relevance to entrepreneurial practice, as viewed through the analytical lens of an agency-structure dichotomy. With reference to the objects of this study, it is operationalised by the entrepreneurial (agent) in conjunction with technology (co-agent and/or structure) in the context of the start-up environment (structure).

In establishing the interdependent relationship between his three main heuristics: *habitus*, *capital* and *field*, Bourdieu (1984: 101) formulates practice as follows:

[(habitus) (capital)] + field = practice

Bourdieu's theory of practice can be classified as a 'Grand Theory' (Yang 2014), which is an "*abstract and normative theory of human nature and conduct*" (Skinner 1985: 1), generic in nature and able to be applied to different circumstances and areas of research. The theory has been applied variously as theoretical frameworks within organizational studies (Nahapiet & Ghoshal 1998), marketing (Holt 1998) and human resource management (Mayrhofer *et al.* 2007). More recently, Anderson *et al.* (2010) have applied the theory to entrepreneurial networking and start-up growth.

Habitus is one of the central concepts in Bourdieu's sociology (Bonnewitz 2005) and refers to the physical embodiment of deeply maintained habits, skills and opinions that have accrued over a lifetime of accrued experience. As one of Bourdieu's most popular and widely-referenced concepts, it provides the practical skills and dispositions needed to navigate the demands of every day personal and working life, providing direction and guiding individual choice amidst a diverse backdrop of competing power sources.

Foucault sees organizational power as ubiquitous (Bevir 1999; Clegg 1998), extending beyond the confines of the agent-structure dyad of Giddens (1984). However, Bourdieu attaches a cultural and symbiotic sense of temporal dynamism to its ongoing presence, portraying it as an ongoing interplay between both agent and structure, constantly reinforcing and reinventing itself in the pursuit of ongoing validation and legitimacy. 'Habitus' therefore manifests as an oscillating interplay of power-dynamics, or an ongoing *tension* between structure and agency, and is instrumental in defining aspects of culture and the daily practices of individuals that reflect the norms of the collective as embodied by groups, societies and nations (Beasley-Murray 2000). It includes the totality of learned habits, bodily skills, styles, tastes, and other tacit knowledge contained within the extended group. Habitus is in a permanent state of flux, constantly under a process of reformulation as the successes and failures of past actions inform the will-to-action and disposition of those engaging with, and 'inviting' an as-yet unknown future. In terms of its affinity with entrepreneurial action, it is as if Bourdieu had entrepreneurial action in mind when formulating an ideal type of agency to represent his theory.

Habitus is a group rather than an individual quality, and leads to enduring patterns which may be transferred between contexts. Distinct from the notions of même (Blackmore 1998) or narrative (see §2.8.5), which are scalar quantities containing only descriptive elements, habitus is a temporally responsive dynamic that is seen to shift and adapt according to context and the unfolding of events over time. As Navarro (2006: 16) points out, habitus is "*not fixed or permanent, and may be changed under unexpected situations or over a long historical period.*" Habitus may therefore be viewed as a multi-dimensional, or 'vector' quantity, expressed by the concepts of experience, location and time. The concept is therefore suited to the analysis of datasets based on a longitudinal analysis of dynamically changing settings, and is premised on the very change and dynamism that characterise the units of analysis for this study (the entrepreneur, the start-up, and high-velocity technological change).

2.5.5 Bricolage and the entrepreneur as bricoleur

In studies that endeavoured to demonstrate the equivalence of entrepreneurial capacity across cultures, Lévi-Strauss (1962) introduced the concept of *bricolage*. Unlike those involved in scientific pursuits with fully-resourced laboratories who are able to plan ahead by gaining access to all that is needed to complete a project before starting (Baker & Nelson 2005), entrepreneurs are apt to 'make do' with whatever materials are at hand, where the idea of 'making something out of nothing' is the key driver behind the theory.

While Lévi-Strauss (1962) offered no specific definition of bricolage, Baker & Nelson (2005: 332) proposed an integrative definition as *"making do by applying combinations of the resources at hand to new problems and opportunities,"* defining 'resources at hand' (p.329) as, *"those resources that are readily available in the environment of the entrepreneur, such that their acquisition and use does not require great effort or extensive capital."* Sarasvathy (2008) borrows from the concept of bricolage in advancing one of the principles driving her theory of effectuation – the *bird-in-hand* principle – which refers to *"a means-driven (as opposed to goal driven) action, with the emphasis being on creating something new within existing means, rather than discovering new ways to achieve given goals"* (Sarasvathy *ibid.*: 15).

Unlike Lévi-Strauss' socially-focussed concept of bricolage, Sanchez-Burks *et al.* (2015) advanced an alternative view based on creative cognition that referred to the way in which individuals retrieve and combine knowledge in new ways, where 'psychological' – as opposed to material, instrumental – bricolage refers to the cognitive processes that enable

individuals to re-formulate previously unrelated knowledge that they already possess. As part of his work on organizational sensemaking, Weick (1993) had previously suggested the notion of a psychological/cognitive bricolage by identifying the following prerequisites for its implementation:

- Intimate knowledge of resources;
- Careful observation and listening;
- Trusting one's ideas;
- Self-correcting structures with feedback.

By using musical jam sessions as analogy, Heemsbergen (2004) draws on artistic practice to explain how bricolage relates to a form of organizational improvisation, and how it differs from [scientific] experimentation in that it helps to elicit learning that is highly transferrable to other forms of organizational behaviour. Whereas experimentation begins with a set of hypotheticals, bricolage and improvisation take 'whatever is available' – either physically or cognitively – and by starting out with a 'blank canvas' improvisation may be viewed as a vital contributor to the capacity for creativity, and the production of new knowledge via entrepreneurial discovery and innovation. Enacted collectively in a community of common practice, Heemsbergen (*ibid.*) continues to explain that improvisational 'jamming' within organizations may provide a link between the *"deep void of the mystery of life's existence by giving attention to the depth, expression, reflection, and sheer abandon that may be applied as a technique for a deeper human connection with the source of our nonconscious mind."* [2]

In terms of relevance to this research, Weick's (1995) concept of organizational sensemaking is closely related to the concepts of bricolage and improvisation, where both may contribute to the initial steps needed as part of an entrepreneurial mode of discovery. In other words, the cognitive gaps (Dervin 1998) in perception and understanding that prevent sense from being made of a situation may be bridged by the application of bricolage and improvisation-like techniques as part of the process of inquiry. Although beyond the scope of this research, Weick's work may offer further utility by i) helping to establish sense when coping with uncertainty (e.g. Johnson & Bock 2017) and ii) mediating sensemaking, where the sense-maker is forced to think *reflexively* about sense that has already been made (Strike & Rerup 2016).

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[2] *Heemsbergen (ibid. Pt.2, 'What is improvisation?' Para.6)*

2.6   Inference and reasoning

Logical inference, or simply *inference,* describes various *modes* of human reasoning, and embodies the process of moving from premise to conclusion. In his writings C.S.Peirce (Peirce 1878) outlined three types of logical inference: deduction, induction, and abduction. Inference plays a vital role in all stages of decision making, as one or more of its three modes are used recursively and interchangeably towards the resolution of problem sets – or the settlement of belief – as part of every day, constructive inquiry. It is of particular relevance to this study because the novel concept of *entrepreneurial* inference – which will be a theoretical contribution of this study introduced as an emergent property of the analysis – is suspected of being largely abductive in nature; as opposed to the largely hypothetico-deductive forms of inquiry that characterise the canons of normative scientific inquiry. Although there is much overlap between scientific experimentation and entrepreneurial discovery, it will be suggested that a heavier reliance on abductive reasoning, operationalised as *retroductive abduction*, is what differentiates entrepreneurial inquiry from other modes of inference.

2.6.1 Deduction and Induction

Deduction, deductive inference, or deductive reasoning is associated with a 'top-down' approach to inquiry, moving from the more general to the more specific, and is commonly associated with quantitative research and the empirical sciences. It begins with a hypothesis, where theory is aimed at testing theory. In contrast, induction – or inductive reasoning - represents the reverse process to that of deduction and is characterized by a 'bottom-up' approach to knowing, where the researcher generates new theory from data "*using observation to build an abstraction or to describe a picture of the phenomenon that is being studied*" (Lodico *et al.* 2010: 10). Inductive research begins with a detailed observation of the world (Neuman 2003: 51), and theories are then formulated as a result of collective observations (Goddard & Melville 2004). Here the patterns, regularities and forms encountered during the *lived* experience of the phenomenon are observed in order to reach theoretical conclusion. It suggests that new knowledge may be acquired by learning from experience and has a more open-ended and exploratory 'feel' to it, which can raise concerns relating to its viability in research settings.

2.6.2 Abduction

Abductive reasoning – also referred to as *abduction* or *abductive inference* – begins with an observation and then proceeds to find the simplest and most likely explanation. Abductive reasoning relates to the process of generating and selecting hypotheses to test, but where the premises do not guarantee the conclusion.

Abductive reasoning stands apart from the other modes of logical inference as it typically begins with a partial or incomplete set of observations, with a view to encouraging a 'discovery' of the likeliest – and often simplest – inference. Not to be confused with 'inference to the best explanation' (Campos 2011; Minnameier 2004), abduction is said to be based on *"nothing other than pure guess-work via an aesthetic process of musement",* which *"must follow no rules except the very law of liberty"* (CP 6.458 quoted in Salas 2009: 468).

Unlike the deductive and inductive approaches associated with every day and scientific reasoning based on empirical facts, observation and existing theory, abductive reasoning permits unrelated, unknown, and diverse hypotheses to enter the inquiry space to act as catalyst for an unstructured 'thought experiment', where creative leaps of imagination and/or visualisations that may scarcely seem warranted appear almost spontaneously in a form of *a priori* revelation. Although the products of such abductive posturing may at first appear irrational or even illogical, an understanding of the process behind such venturing – or what Peirce referred to as 'musement' (CP 6.460-461) – may pave the way for new avenues and insights which eventually lead to the generation of novel artefacts; artefacts arising from emergent concepts that would otherwise elude traditional inductive/hypothetico-deductive approaches.

As pointed out by Chiasson (2005), Peirce was of the firm opinion that a 'right' form of reasoning was eminently teachable and considered his theory of abduction as being essential – even overarching – to his central theory of pragmatism (Fann 2012: 47). 'Right' forms of reasoning referred collectively to the three normative modes of reasoning associated with induction, deduction, and abduction. Yet, more than a century after his death, Peirce's concept of abduction is still poorly understood (Chiasson *ibid.*).

2.7   Learning and inquiry

Before considering the differences between learning and inquiry, it is necessary to clarify the definition and use of the terms *enquiry* and *inquiry*. Despite a difference in meaning between both terms, the two continue to be used interchangeably, with many questioning any difference at all. While some definitions contend that the difference lies merely in local usage, with British English preferring to make use of *enquiry*, and US English, *inquiry*; the meanings implicit in both terms are far from identical when considered from a theoretical, knowledge management perspective, and must be clearly defined before proceeding any further.

When one *enquires*, the resulting *enquiry* refers to a question posed in a quest for truth, knowledge or information, and tends to be somewhat scalar or mono-dimensional in nature. To *inquire* via some form of *inquiry* entails investigative and temporal dimensions associated with the *processual* elements of learning and discovery as part of a *structured* approach to the acquisition of knowledge in the pursuit of truth. Put simply, *enquiry* is a request for truth, knowledge, or information, and *inquiry* represents the investigative process in pursuit of the same, over time.

Learning is defined (OED[*]) as the process of studying, teaching, and education. It is centred on the delivery of information, thus:

> **Learning:** *The acquisition of knowledge or skills through study, experience, or being taught.*

and inquiry is defined (OED[*]) as:

> **Inquiry:** *The action of seeking, esp. (now always) for truth, knowledge, or information concerning something; search, research, investigation, examination.*

Given these definitions, inquiry could be said to be learning *in action,* and, whereas learning may be inherently *linear* in nature – focussing on the establishment of simple cause and effect relationships – inquiry may be described as *circular* in nature (see Figure 2.2); and focuses on revealing recursive patterns in a changing environment.

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[*]*OED: The Oxford English Dictionary*

2.7.1 Inquiry

An inquiry is any process that has the aim of increasing knowledge, resolving doubt or solving a problem. A *theory* of inquiry is an account of the various types of inquiry, and a treatment of the ways via which each type of inquiry may achieve its aim. One of the aims of inquiry is to increase knowledge, which suggests that some form of discovery-led learning takes place during the process. Inquiry-based learning is therefore a form of active learning that begins with the proposition of a question, problem or scenario, as opposed to the simple presentation of established facts. The three types of theory associated with inquiry are closely allied to the three principal forms of logical inference: deduction, induction and abduction; and represent the classical model of scientific inquiry associated with Aristotle.

Inquiry is not a method, but a core learner-centred application of processual investigative steps that adapts in time and space to the surrounding environment. It is therefore reflexive in nature, and may be envisioned (Figure 2.2) as a circular path of question asking ('*Ask*'); investigating solutions ('*Investigate*'); creating ('*Create*'); discussing discoveries and experiences ('*Discuss*'); reflecting on newly-acquired knowledge ('*Reflect*'), and posing further, reformulated questions based on what has just been discovered (Bruce & Bishop 2002). Each step in the process leads to the next, thereby inviting further questions, investigations and opportunities for deeper discovery and further exploration; which in turn lead to more questions. Inquiry therefore, is very much a process of investigative discovery; the end result of which is the production of new knowledge via adaptive bouts of learning.
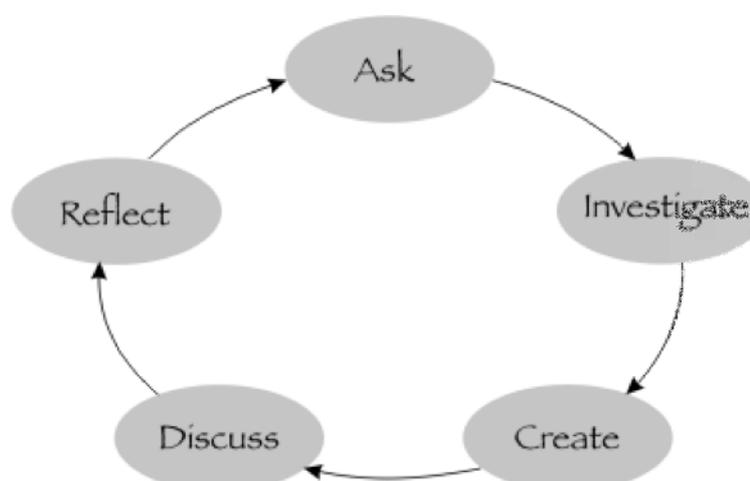
Figure 2.2   *Inquiry as a circular process of discovery*

Based on Dewey's early studies of child learners (Simpson 2001; Dewey 1956), learning always begins with the curiosity of the learner (the desire to learn something new), giving rise to '*the four impulses of the learner*' (Simpson 2001: 185), thus:

Impulse	Manifestations
The social impulse of communication or conversation;	Saying, communicating
The constructive impulse to make things;	Making, playing, shaping
The impulse to investigate into things; and	Finding out, inquiring
The impulse of artistic or creative expression.	Creating, fashioning

(Adapted from Simpson 2001: 185)

The intentional formulation of meaningful questions [by children] is inspired by a genuine curiosity prompted by something unusual or surprising, couched in a fun (child-friendly) environment. When coupled recursively with the stages of reflective action suggested in *How We Think* (Dewey 1997), one may envision an upwardly mobile path of inquiry where knowledge is created via a continuous cycle of the stated processes. It is interesting to compare Dewey's notions relating to child learning not only with Nonaka & Takeuchi's (1995) concept of the [organizational] knowledge spiral detailed in §2.8.4, but also with Peirce's description of retroductively-led abductive discovery; all of which will be discussed further as part of the theorising in Chapter 6.

2.7.2 Belief and doubt

Belief is a state of mind in which a person thinks that something is the case with or without the presence of empirical evidence to support it. The Oxford English Dictionary (OED) defines it as *"An acceptance that something exists or is true, especially one without proof"*. Reference to a belief '*without proof*' is of particular importance when distinguishing between the firm, positivistic beliefs based on the type of empirical observation associated with scientific endeavours, and Kant's notion of an *a-priori* knowledge-constituting belief, which [Kant claimed] may be asserted independently of the senses (Kant: CPR).

The negative sense of belief, *doubt*, represents an antonymous epistemological concept that will be introduced during the later stages of this study, as it is used extensively by Peirce as a basis for the generative impetus behind the processes leading to creative and innovative thought. Four quotes, all of which appeared in Peirce's essay *The Fixation of Belief* (Peirce 1877) summarising his thoughts relating to doubt, belief, and inquiry are quoted thus:

(i) The irritation of doubt causes a struggle to attain a state of belief. I shall term this struggle inquiry…

(ii) Doubt is an uneasy and dissatisfied state from which we struggle to free ourselves and pass into a state of belief; while the latter is a calm and satisfactory state which we do not wish to avoid, or to change to a belief in anything else.

(iii) The irritation of doubt is the only immediate motive for the struggle to attain belief. It is certainly best for us that our beliefs should be such as may truly guide our actions so as to satisfy our desires; and this reflection will make us reject any belief which does not seem to have been so formed as to insure this result. But it will only do so by creating a doubt in the place of that belief. With the doubt, therefore, the struggle begins, and with the cessation of doubt it ends. Hence, the sole object of inquiry is the settlement of opinion. We may fancy that this is not enough for us, and that we seek not merely an opinion, but a true opinion. But put this fancy to the test, and it proves groundless; for as soon as a firm belief is reached, we are entirely satisfied, whether the belief be false or true.

(iv) Unless we make ourselves hermits, we shall necessarily influence each other's opinions, so that the problem becomes how to fix belief, not in the individual, but in the community.

(Peirce 1877:1-15)

Deciding the point at which belief becomes fixed, i.e. when all reasonable doubt has been removed to the satisfaction of the inquirer, represents one of the important deviations that distinguishes Peirce's version of pragmatism from those of James and Dewey; both of whom advocated instrumental versions of pragmatism that focussed more on its potential as a utilitarian problem-solver (Borradori 1994).

2.7.3 Truth according to Peirce

According to Keith (2001) a recurring theme of pragmatism is the view that truth is connected to experience and inquiry. While Peirce avoids attempts to define truth, he instead posits that any claims to truth would not meet contrary evidence at the end of an indefinitely prolonged, hypothetical inquiry, and that at the end of the inquiry a community of inquirers would reach consensus regarding the truth of the claim (Keith *ibid.*). In *The Fixation of Belief,* Peirce (1877) claimed that four methods of inquiry are used to arrive at the truth of matters; the first three of which are essentially unreliable:

- The method of tenacity;
- The method of authority;
- The method of *a priori* reasoning;
- The method of science.

In making this statement, Peirce at once aligns his philosophy with that of rational, scientific endeavour, rejecting any notion of Kantian *a priori* reasoning; any authoritarian claims to truth imposed by church and/or state; and the tenacity of an individual's fixation on some persistent dogmatic belief, as all being unreliable.

2.7.4 Habermas and Böhm: ideal speech situations and *Dialogue*

The theory of communicative action is a contemporary social theory proposed by Habermas (1984) that sees language as the foundational component of society. Drawing on systems theory, social theory and psychology to make his point he attempts to "*ground the social sciences in a theory of language,*" (Habermas 1984: xiv) by suggesting that any claims of a universal nature must be based on a pragmatic outlook rooted in science and language. Communicative action is the vehicle via which exchange takes place between agents in the public sphere[3], and is premised on argumentation, discussion and discourse, where *"all concerned take part, freely and equally, in a cooperative search for truth, where noting coerces anyone except the force of a better argument"* (Habermas 1984: 198).

The *ideal speech situation* is a practical instantiation of communicative action and represents *"a situation in which everyone would have an equal chance to argue and question, without those who are more powerful, confident, or prestigious having an unequal say. True positions would prevail under these circumstances because they are more rational"* (Wallace & Wolf: 178). Habermas subsequently linked the ideal speech situation to a Kantian style of morals based on a discourse of ethics derived from the 'presuppositions of argumentation.' (Habermas 1983).

Habermas argued that, via careful application of the ideal speech situation it would be possible to create a system of ethics and morality (which he referred to later as "discourse ethics") resulting in undistorted communication, where rational consensus was formed from the collective contributions of the group. For an "ideal speech situation" to occur, members must adhere to the rules:

1	Every subject with the competence to speak and act is allowed to take part in a discourse
2a	Everyone is allowed to question any assertion whatever
2b	Everyone is allowed to introduce any assertion whatever into the discourse.
2c	Everyone is allowed to express their attitudes, desires and needs without any hesitation.
3	No speaker may be prevented, by internal or external coercion, from exercising his or her rights as laid down in (1) and (2)

(Habermas 1990:43-115)

---

[3] *Public Sphere: That place distinct from home, work and government where people are free to gather and talk openly about life. Said to have been steadily decreasing under the encroachment of large corporations and vacuous media. (Habermas 1962)*

It is not clear whether the theory of communicative action and the ideal speech situation provide a key to developing an overall understanding of the social worlds, but the approach has prompted scholars to include language and communication as part of the essential discourse concerning the formation of social reality (McCarthy 1981).

An alternative approach to Habermas's ideal speech situation, based on a similar premise, is the concept of *Dialogue* advocated by the physicist David Böhm. Böhm (1996) proposed a method of rational argumentation for any group of individuals willing to follow the simple approach outlined in Table 2.3. While it is considered to be more prescriptive than Habermas's ideal speech situation, engagement with Böhmian dialogue sessions allows groups to reach a mutual consensus based on a form of free (ideal) speech, devoid of the limitations usually imposed by agents of power and/or authority. Dialogue sessions are mediated by a controller to ensure that all contributions are free from any coercive forces that may exist within the group, and represent the true, unfettered opinion of each participant.

The parallels with Habermas's theory of communicative action and Böhm's concept of Dialogue are that both positively facilitate emancipation from the limitations present during standard discourse and/or argumentative exchange, and therefore provide an ideal forum whereby problems may be addressed collectively, where "*each utterance relies upon the anticipation of freedom from unnecessary domination*" (McCarthy 1981: 272-275).

Ideal speech situations, unlike conventional discussion or debate, offer a controlled environment whereby participants are governed by basic, implied rules towards reaching agreement. Dialogue takes the concept one step further: rather than merely reaching rational consensus, it seeks to promote enhanced learning by creating "free space" in to which something new may be invited.

Table 2.3   *Participant action in a Böhmian dialogue session*

The group agrees that no group-level decisions will be made in the conversation	In the dialogue group, we are not going to decide what to do about anything. This is crucial. Otherwise we are not free. We must have an empty space where we are not obliged to anything, nor to come to any conclusions, nor to say anything or not say anything. It is open and free.
Each individual agrees to suspend judgement in the conversation	Specifically, if the individual hears an idea he doesn't like, he does not attack that idea. "...people in any group will bring to it assumptions, and as the group continues meeting, those assumptions will come up. What is called for is to suspend those assumptions, so that you neither carry them out nor suppress them. You don't believe them, nor do you disbelieve them; you don't judge them as good or bad...
As these individuals "suspend judgement" they also simultaneously are as honest and transparent as possible	Specifically, if the individual has a "good idea" that (s)he might otherwise hold back from the group because it is too controversial, s(h)e will share that idea in this conversation.
Individuals in the conversation try to build on other individuals' ideas in the conversation	The group often comes up with ideas that are far beyond what any of the individuals thought possible before the conversation began.

Adapted from Bohm (1996:18-22)

Habermas's *Ideal speech situations* and Böhmian *Dialogue* are of significance to this study, as they add to the 'tool-box' of useful heuristics that may be applied towards any inquiring situation. Applicable in collective group settings, both techniques offer a prescriptive approach to decision making where all are encouraged to speak freely, without concern for any authority or power figures. From this perspective, both approaches may be of use during the early stages of inquiry to encourage the kind of abductive 'musings' that lead to the discovery of novel and emergent ideas; an approach that will be identified as being characteristic of *entrepreneurial inference*.

2.8   The DIKW pyramid

'Data', 'information', 'knowledge' and 'wisdom' are terms that have been used freely and interchangeably in reference to one another, but which have quite distinct and separate meanings (Jennex 2009; Rowley 2007). Understanding the inter-relationship and connections between the terms can contribute to a better epistemological understanding of the contours and limits of knowledge, its generation, and its management.

In terms of relevance to the present study, when faced with the ever-expanding and burgeoning corpus of information prompted by increased levels of storage capacity, resource interconnectedness, and the ability to query networks at high speed in response to a demanding 'knowledge' economy, very little gets converted to knowledge, and even less to wisdom. From an epistemological perspective, how we know and what we know has clear implications for the philosophical underpinnings that drives inquiry, therefore indicating a vast inefficiency in terms of the way data and information may be practically transformed in to useful knowledge and wisdom.
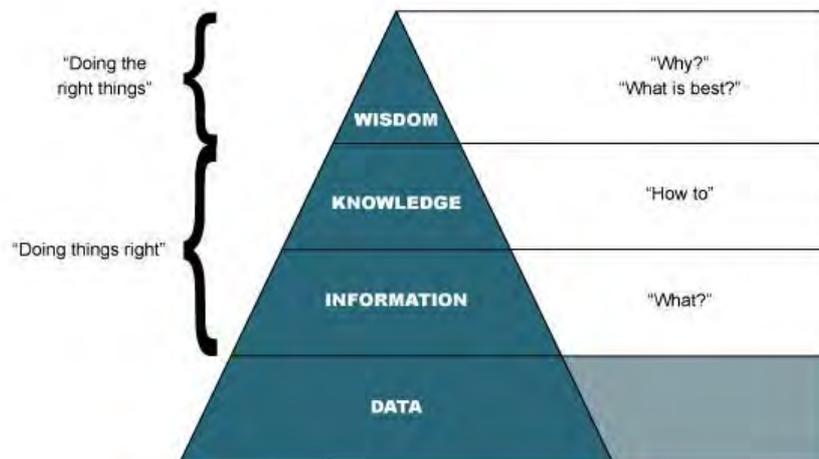
Adapted from Ackoff (1989a)

Figure 2.3   *The DIKW Pyramid*

Ackoff's (1989a) notion that data leads to information, which leads to knowledge, which in turn leads to wisdom is based on filtration, reduction, and transformation. Apart from being causal and hierarchical, the scheme is pyramidal in nature, as expressed by Figure 2.3, in that data are plentiful while wisdom is almost non-existent. Knowledge and experience combine over time to become wisdom, and is indicative of one's ability to apply these attributes critically or practically in order to make decisions.
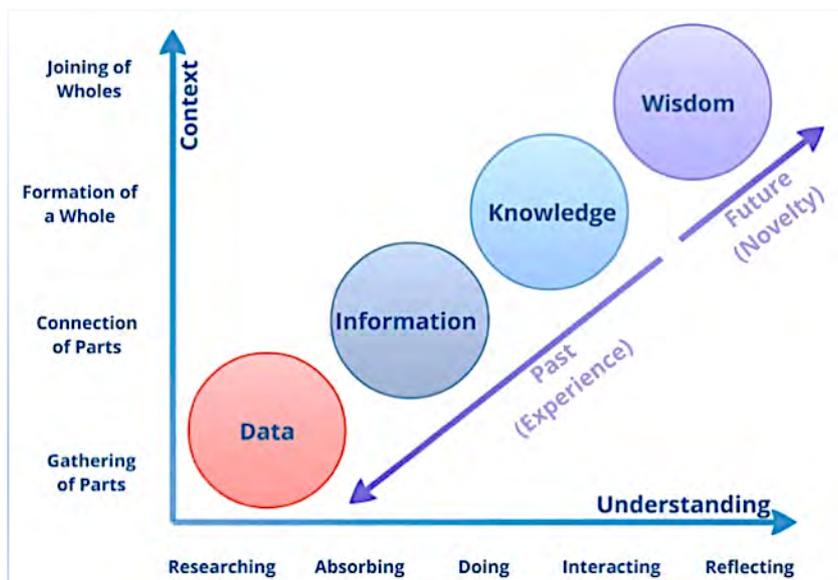
Adapted from Ackoff (1989a)

Figure 2.4   *Temporally relating DIKW to Context & Understanding*

Figure 2.4 offers an alternative version of the DIKW pyramid depicting the four [DIKW] constructs as dimensions of context and understanding. Ackoff (1989a) suggests that the first three categories of data, information and knowledge build up over time as part of an aggregated past experience informed by understanding *in context*. Wisdom – which is contingent on a history of accrued experience – proceeds to facilitate the possibility of a future based on this understanding, predicated on the systemic notions of *reflection* and the *joining of wholes*. In other words, wisdom is representative of a systems interpretation of a past cumulatively driven by data, information and knowledge.

2.8.1 Data, information, knowledge and wisdom

a) Data

Rowley & Hartley (2017) offer a definition for *data* as:

> discrete, objective facts or observations, which are unorganized and unprocessed and therefore have no meaning or value because of lack of context and interpretation.
>
> (Rowley & Hartley 2017: 5-6)

This definition suggests that data are mostly of use to machines in the form of *digital* data, where data in an ICT context is represented by symbols and signs that generally

have no human use or meaning until they have been re-arranged in to a usable format; at which point they become *information*.

In an experimental-observational context, *data* relates to the often-numerical measurements arising from observation as part of the experimental process. As with digital data, experimental data requires interpretation in to a meaningful format by means of further analysis, graph, table, or other summarised form of meaningful representation.

b) Information

Related to data and knowledge, information is categorised according to whether it is structurally or functionally distinct from data. Information is differentiated from data in that it is 'useful', and from knowledge in that it requires the cognisance of an observer, whereas information does not. Rowley & Hartley (2017) define *information* as:

> Organized or structured data which has been processed in such a way that the information now has relevance for a specific purpose or context, and is therefore meaningful, valuable, useful and relevant.
>
> (Rowley & Hartley 2017: 5-6)

c) Knowledge

A branch of philosophy in its own right, *epistemology* – the theory of knowledge, or knowing how to know – forms a crucial backbone to this study. Epistemology is primarily concerned with the descriptive knowledge-constituting distinctions of *knowing-that* and *knowing-how*, referring to the knowledge of a concept and the understanding of an operation respectively. It addresses not only the nature of knowledge, but also the justification and rationality of belief. When analysing managerial, or more specifically – entrepreneurial – decision making from an epistemological perspective it has important implications for dealing with the concepts of learning, inquiry, pragmatism and practical reasoning, as all rely upon a deep understanding of their epistemological significance.

Knowledge has traditionally been defined as *justified true belief* (Niiniluoto 2014). However, as Gettier (1963) points out, by demonstrating that a justified true belief may also be false the traditional view has not been without its problems; indicating that the traditional (classical) definition may be inadequate. The classical definition continues to be used, however, as it serves as an important point of reference for most epistemological arguments.

d) Wisdom

Sternberg (1990: ix) asserts that wisdom is "*about as elusive as psychological constructs get. It is perhaps for this reason that it is one of the least studied such constructs.*" Churchman (1982: 9) defines wisdom as "*thought combined with a concern for ethics,*" and at the peak of the DIKW pyramid, incorporates all of the lower levels of the pyramidal hierarchy.

Wisdom, as the outcome of an aggregated, applied set of experiences, is closely allied with perspectival thinking, or the ability to think perspectively (e.g. Haynes 2000). On account of its temporal dimensions, it reifies accrued knowledge with an element of pragmatic common-sense over time, and therefore represents the highest level of informed knowing. Despite the elevated status of wisdom however, Zeleny (1987) has called for inclusion of an additional upper tier to the DIKW model that extends beyond wisdom, termed '*enlightenment,*' and while this may be a valid addition with respect to the more transcendental dimensions of knowledge management, it is something outside the present scope of this study.

Practical wisdom, also referred to as phronesis, or simply *prudence*, and referred to by Bachmann, Sasse and Habisch (2018) as "*Management's no longer forgotten virtue,*" differs from other forms of knowledge on account of its complexity and its practical nature: it is an intellectual virtue of practical reasoning. Aristotle (Nicomachean Ethics: 1140b5) wrote that phronesis is "*a true and reasoned state of capacity to act with regard to the things that are good or bad for man.*" It addresses the ways in which people act in everyday situations, dealing with human action in terms of practical situations by looking at the question 'What *should* be done in this situation?' and represents a "*true and reasoned state to act with regard to the things that are good or bad for men*" (Ross 1984 translation NE:1140b5, quoted in Noel 1999: 273).

Discussed in book six of his *Nicomachean Ethics*, Aristotle established that Practical Wisdom draws on a general knowledge; a particular knowledge; an ability to reason towards a choice; and an ability to act on that deliberation. Practical wisdom may be summarised as:

1. A general conception of what is good or bad, related to the conditions for human flourishing;

2. The ability to perceive, in light of that general conception, what is required in terms of feeling, choice and action in a particular situation;

3. The ability to deliberate well; and

4. The ability to act on that deliberation.

(Aristotle: Nicomachean Ethics, Bk.6)

As pointed out by Nonaka & Takeuchi (2011), practical wisdom is similar to the Japanese concept of *toku,* a virtue that compels a person to pursue the common good in the pursuit of moral excellence as a way of life. Teleologically, the sentiment underpins the notion that businesses should – in addition to making a reasonable profit – also strive to exist to serve people and enhance mutual well-being; while at the same time shying away from excess profits, greed and other forms of wealth accumulation.

2.8.2 Knowledge management

Knowledge management (KM) is a relatively new field and is of particular relevance to knowledge workers contributing to a growing knowledge economy as part of an increasingly connected information age (Castells 2011). As Guo & Sheffield (2007) report, studies have demonstrated that the current state of understanding concerning KM is highly fragmented (Croasdell *et al.* 2003; Schultze & Leidner 2002; Alavi & Leidner 2001; Earl 2001; Rubenstein-Montano *et al.* 2001; Shin *et al.* 2001).

Moreover, the definition of knowledge as a concept has been subject to much discussion (Shin *et al.* 2001; Dretske 1999; Zack 1999; Kock & McQueen 1998; Kogut & Zander 1992; Bohn 1994), where it has been erroneously conflated with data and/or information; an object or a process; as a particular state of mind; as the ability to access information; or as pure capability. Guo & Sheffield (*ibid.*) suggest that the lack of agreement over a precise definition is partially responsible for the confusing array of theoretical approaches and frameworks, each of which has its own philosophical underpinning, research focus, and worldview; yet none of which seem able to provide a systemic, holistic view of KM. This has inevitably led to a distinct lack of consensus and coherence between theorists and practitioners in the emerging field. As a possible remedy Guo & Sheffield (*ibid.*) suggest that *Critical Systems Heuristics* (CSH: see §2.9.4) may address this deficiency by providing a framework for inquiry that supports diversity and integration via a synthesis of existing concepts. Such synthesis would be based on the identification of heuristics for individual choice (i.e. enhanced diversification) and improved integration

via collective (community, practitioner-based) coherence by applying Churchman's (1971) notion of the *inquiring system* (cf. §2.9.6), Habermas's theory of knowledge-constitutive interests (Habermas 2005), and communicative action (Habermas 1984) via the collective conceptual lens offered by Wenger's (1998) communities of practice (cf. §2.2.3). Furthermore, if such critical heuristics are successfully adopted, then their practical impact may lead to an enhanced ethical and moral wisdom, thereby fully supporting the definition of wisdom offered by Churchman in §2.8.1.

The discussion relating to KM has implications for this research in that it raises questions concerning the entrepreneurial management of knowledge – if indeed there is such a concept – and whether the entrepreneur enacts this independently or collaboratively as part of the management process. The critical heuristics and inquiring systems proposed by Ulrich (1983) and Churchman (1971) may offer some insight in to how such an understanding may be accomplished at both the individual and collective levels.

2.8.3 Reflection & reflexivity

Reflection is a state of mind related to the self that aims to improve future practice through a retrospective analysis of action. Considering the reflection-in-action process, reflection is post facto, where completed stages are critically considered before taking the next step. While reflection is future-focussed in that it seeks to improve practice through an understanding of the relative successes and failures of previous events, it also remains tied to the past, thereby allowing a past historical performance to inform future activity. Similar to Bourdieu's (1984) notion of *habitus* and Peirce's notion of *apperception*, reflection takes the form of a cumulative body of knowledge that may be used to improve future practice. According to Bolton (2010: 3), it can "*enable practitioners to learn from experience about themselves, their work, and the way they relate to home and work, significant others and wider society and culture.*"

According to Barge (2004: 70) reflexivity is an "*epistemological practice that emphasizes intellectual critique…a central concept that informs postmodern and critical approaches to managerial communication,*" relying upon the interconnectedness among persons by recognising the interplay between communications, context, meaning and action (Tomm 1988). Its focus is on providing practitioners with a tool that will simultaneously improve their communication, helping to make them aware of assumptions and priorities that shape their interaction with others. Reflexivity can be used to provide insight into priorities before reacting to others, and in this respect, can have an

immediate impact on improving practice, as practitioners are able to incorporate new insights into each iteration. It therefore acts as a form of adaptive, progressive learning.

Reflexivity has been a central focus within social science research since the 1980s (Ashmore 1989; Woolgar 1988), especially with respect to the study of knowledge management and inquiry. Fundamental to the research of Bourdieu (1990: 178) and his notions of social capital and habitus, it has become part of the general discourse surrounding management and organization studies (Segal 2010; Cunliffe 2009, 2002; Alvesson *et al.* 2008; Alvesson 2003; Antonacopoulou & Tsoukas 2002; Holland 1999; Weick 1999; Chia 1996). It is recognised not only as key to organisational learning and change, but also as an organising process enacted by individuals and groups (Schippers *et al.* 2008; Vince 2002).

Finlay (2002) points to the etymological root of the word 'reflexive' as meaning to 'bend back upon oneself,' which, from the perspective of inquiry, may be translated to refer to the thoughtful, self-aware analysis of the intersubjective dynamics that exist between the inquirer and the focus of inquiry. Reflexivity has also been described as an epistemological practice that places special emphasis on intellectual critique, and, in support of Finlay's etymological definition, Alvesson *et al.* (2008: 480) similarly summarises it as "*that which turns back upon and takes account of itself ... to explore the situated nature of knowledge.*"

While Schon's (1983, 1987) *The Reflective Practitioner* focuses mainly on the pedagogues associated with teaching and healthcare, reflexivity has been the subject of increased attention in management practice (Barge *ibid.*), as it became apparent that a unitary set of values could no longer be relied upon to inform organisational life. The pluralistic view of organising and communicating that reflexive practice encourages therefore helps managers to recognise that alternative interpretations of situations do exist 'out there' and that they must be considered as an equal part of any rational inquiry. Highlighting the link between agency and reflexivity, Maclean *et al.* (2012: 388) offer an actor-based definition for the term as "*the capacity of an actor to construct practical understandings (workable, everyday models) of the location of self within a social system, to act accordingly (strategically and tactically), and to reflect further and refine understandings in response to events and the consequences of actions taken.*"

In response to increasing concern that the dynamics and practical implementations of reflexivity in the workplace continue to be under-reported, postmodern (Hardy & Palmer 2009) and critical (Cunliffe *et al.* 2002) scholars have called for a reconsideration of management inquiry that emphases reflexivity and its role outside research practice, where it has been suggested that managers should endeavour to be more reflexive. The absence of a more reflexive attitude continues to be noted in the organizational literature (e.g. Alvesson & Spicer 2012; Cunliffe 2003, 2002), indicating that its wider adoption may be long-overdue. Furthermore, the role that reflection and reflexivity play in normative organizational settings should exhibit some degree of corresponding status with regard to entrepreneurial action in the context of the high-technology start-up. In other words, what is the significance – if any – of reflexivity itself during the innovative start-up phase? What processual elements are involved? How might technology inform and/or benefit from such process(es)? Such questions themselves form part of the reflexive element of this study, and contribute critically to the formation of theory in Chapter 6.

2.8.4 Tacit and explicit knowledge

The concept of tacit knowing, or tacit or informal knowledge – as opposed to formal, codified or explicit knowledge – was originally suggested by Polanyi (2009, 1967: 4), who famously asserted that "*we can know more than we can tell.*" The concept was further expounded in Polanyi (2009) and is said to form the bulk of what we know, representing the underlying framework that makes explicit knowledge possible.

According to Lam (2000) human knowledge exists in different forms: it may be articulated explicitly or manifested implicitly (tacit). Whereas explicit knowledge may be codified, i.e. abstracted and stored in the 'objective' world, tacit knowledge is defined as "*the skills, ideas and experiences that people have, but cannot be codified and may not be easily expressed or articulated by verbal means*" (Chugh 2015: 128). In the domain of knowledge management tacit knowledge cannot be fully codified, causing its transmission and acquisition to flounder without the help of language, visual, sensory or other non-verbal cues. Thus, successful transmission is contingent upon personal familiarity, regular contact and trust (Koners 2011).

Kikoski & Kikoski (2004: 72) further highlight the difference between tacit and explicit knowledge, thus:

- Tacit (not yet known): Private, unconscious/unaware, alogical, uncertain, fragile, soft, unstructured, indeterminate, unstable, indirect, subception, intuition/sensing.

- Explicit (known): Public, conscious/aware, logical, certain, strong, hard, structured, goal oriented, stable, direct perception, rules/methods/facts/proof.

According to Polanyi (2009) tacit knowing is associated with all conscious acts; it is not merely the institutional or context-specific knowledge that accumulates with experience (Lam 2000) over time. Nonaka & Konno (1998: 42) suggest that creative intuitions and hunches fall under the auspice of tacit knowing, which raises questions as to the origin of generative intuition and 'speculative' thought: surely, they must be based on *something,* unless it is the case that pure guesswork is involved, as suggested by Peirce in his description of the 'abductive musements' that precede creative thought (see §2.6.2). As Polanyi (1968: 42) points out: "*It is intuition that senses the presence of hidden resources for solving a problem and which launches the imagination in its pursuit. And it is intuition that forms there our surmises and which eventually selects from the material mobilized by the imagination the relevant pieces of evidence and integrates them into the solution of problem.*"

Fundamental to this study are the epistemological dimensions associated with the entrepreneur acting in a start-up environment: how does the entrepreneur acquire and retain knowledge in such turbulent, unpredictable environments? How is this knowledge codified and transmitted, and to whom? As this section will demonstrate, organization theory as it relates to larger organizations, while still relevant, is not always suited to the context of entrepreneurial activity in a start-up setting. Care must therefore be taken when considering the macro vs. micro implementations of theory, as well as its collective vs. individual relevance. For example, tacit knowledge has formed the basis for many studies in organisation literature but tends to focus mostly on the epistemologies of groups within the context of large organizations, as opposed to individuals in smaller, foundational entities such as start-ups. However, there remain many good reasons to believe why theories relating to tacit knowledge may still apply in other contexts.

In his work on artificial intelligence, Schank (1990: 24) argues that "*storytelling and understanding are functionally the same thing,*" and that "*intelligence is bound up with our ability to tell the right story at the right time.*" He further points out that sense is primarily made of the world via storytelling, or the application of narrative, suggesting that when something is experienced, a set of tacitly-maintained 'narrative' scripts are used

as general reference, or 'anchor' points via which meaning is secured and sense is ultimately made (Weick 1995).

Effective transfer of tacit knowledge generally requires extensive personal contact, regular interaction and trust (Goffin & Koners 2011). Tacit knowledge is not easily articulated or shared and tends only to surface when practiced in a particular context and when transmitted through social networks (Schmidt & Hunter 1993). It is further 'captured' when the knowledge holder joins a network, or the type of workplace or professional community of practice as advocated by Wenger (1998), such as a scientific research group or group of professionals working in the same specialized area.

Such tacitly-held scripts are built-up over a lifetime of experiences, emotions, observations, beliefs, ideals, schemata and other internalized information that comes to represent an aggregate 'worldview', thereby shaping the way each individual uniquely perceives the world. These 'narrative scripts' guide people in all aspects of daily life, but in their absence – or where the narrative is mismatched to the situation[4] – newly encountered situations cause individuals to be bombarded with unstructured, meaningless information that cannot be anchored to any existing knowledge frameworks.

The interaction between tacit and explicit knowledge is vital for creating new knowledge (Lam 2000), especially in organisational contexts, and has been codified in to Nonaka & Takeuchi's (1995: 71) 'SECI' (Socialisation, Externalisation, Combination, Internalisation) model as depicted in Figure 2.5; one of the most widely cited theories in knowledge management which represents the "*spiralling knowledge processes of interaction between explicit and tacit knowledge.*" (*ibid.*)

Given the knowledge creating capacity and relevance to social networks in organizational contexts, it is easy to see how the interplay between tacit and implicit knowledge offers key contributions to the epistemological underpinnings of this research. If existing KM theory can be re-framed to sit comfortably in the context of a twenty-first century information economy, where analogue social networks are fully integrated with digital social networks, and where massively interconnected information systems effect the instantaneous transmission in and between the knowledge embodied by such networks, then the implications for theory and practice stand to be significant.

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[4] *For example: the narrative used for driving a car differs from that used for riding a bicycle.*
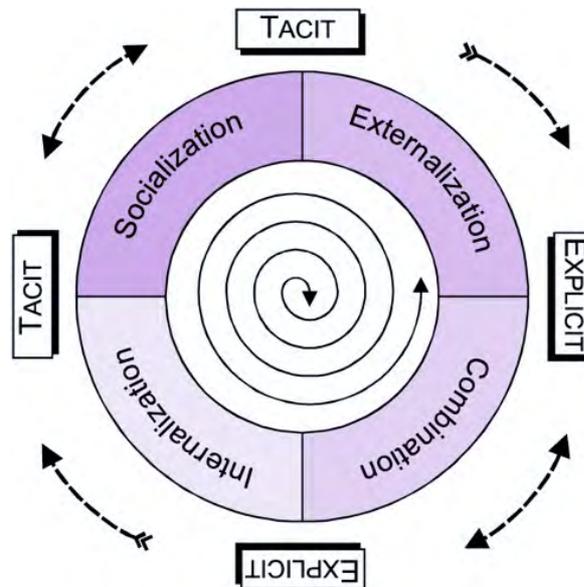
Source: Theorized by Nonaka and Takeuchi (1995)

Figure 2.5   *Nonaka and Takeuchi's knowledge spiral* (1995: 71)

The four knowledge conversion mechanisms are mutually complementary and interdependent, changing in response to the demands of context and sequence, and may be summarised as:

> *Externalisation* – moving from tacit → explicit: Metaphors and models help to express tacit knowledge explicitly.
>
> *Combination* – moving from explicit → explicit: Sorting and combining facilitates the manipulation of explicitly maintained systemic knowledge.
>
> *Internalisation* – moving from explicit → tacit: represents so-called 'operational' or 'in-house' knowledge via 'learning by doing'.
>
> *Socialisation* – from Tacit → Tacit: knowledge based on shared experiences, recognised as difficult to codify

Being able to codify the movement of knowledge between explicit, tacit, external and internal domains allows one to conceptualise the movement of ideas as they contribute toward the wider body of knowing, as maintained by a network; whether analogue, social (digital), or a combination of the two. The role of technology in effecting such movement is therefore undeniable, as the speed at which it operates now facilitates the transmission and dissemination of ideas that ripple throughout the network, immediately updating its knowledge repository, and thereby maintaining the most up-to-date version of events, as they are perceived in reality at that time.

2.8.5 Narrative

With high velocity environmental change comes not only increased speed and efficiency, but also a higher degree of complexity and uncertainty; and when faced with the need to make decisions in such business contexts, the mechanistic, prescribed narratives that once informed managerial and executive decision making in previous industrial eras now offer little relevance in contemporary digital settings characterised by disruptive change. A new narrative is therefore required to not only meet the demands of newly emergent artefacts, but to act as a cognitive bridge between the old and new paradigms.

> To say that all human thinking is essentially of two kinds – reasoning on the one hand, and narrative, descriptive, contemplative thinking on the other – is to say only what every reader's experience will corroborate.
>
> (James 1984: 2)

The term 'narrative' is suggestive of stories and story-telling, but the concept has a deeper meaning when applied to the context of organizations. As pointed out by Oliver & Jacobs (2007: 813) "*Guiding principles are knowledge structures that call to mind collective narratives…and are articulated and used heuristically to guide decision making in organisations.*" Guiding principles are therefore instrumental in the expression and transmission of a specific form of tacit knowledge (Linde 2001), which in turn has been directly linked to aspects of organizational learning (Oliver & Jacobs, *ibid.*). Von Krogh & Roos (1995) and Von Krogh & Nonaka (2000) also stress the relevance of narrative in their theories of organizational epistemology and organizational knowledge respectively, although they specifically relate to the context of large organizations.

How narratives shape world views relating to business is well documented (see, for example, Randels 1998), and has not only been cited as essential in the social construction of entrepreneurship in the coproduction of organizational identity (Downing 2005), but also in the context of ethical business inquiry (Bowie 1999).

It has long been recognised that those engaged in the creation and ongoing management of innovative business need guiding principles on which to ground their daily judgements, activities and responsibilities; especially where decisions leading to transformational innovation is involved:

> Innovation remains a management paradox — long-term survival requires a commitment to transformation via disruptive growth, but it's a challenge few companies address. Though the need to innovate is universally acknowledged, it's not enough for companies to merely get better. They have to become different — not just at their periphery through extensions of existing businesses, but in their core, through a commitment to disruptive growth. To solve the dilemma presented by a disruptive growth strategy, corporate leaders must address its inherent conflict. The author argues that sophisticated leadership communications is key, and that any attempt at transformational innovation will flounder and sink unless leaders acquire the capability to deploy the full array of narrative tools of leadership, and do so consistently over a period of years.
>
> <div align="right">Denning (2005: 11)</div>

Denning was referring explicitly to the case of large corporates here; highlighting in his paper a case study with IBM where, in such settings guiding narratives were seen to arise as a result of consensual, strategic planning; initiated and executed at board level and subsequently diffused throughout the organisation either tacitly or explicitly via the management hierarchy. It is via these narratives that the strategic goals and objectives of the firm were transmitted throughout the organisation. In this respect, narratives also represent a type of organisational learning, as identified in the works of Tsoukas & Hatch (2001).

Multiple narratives therefore exist within the hierarchical structure of larger organisations mediated by a complex web of mostly-tacit inter-subjective discourse. Recent research (Näslund & Pemer 2012) has shown that certain narratives tend to dominate more than others, thereby presenting an influencing contribution to organizational inertia. As a consequence, the organisation tends to change in line with the dominant narratives, which not only "*fix the meaning of events, but also the meaning of the labels available for sense making.*" (*ibid.*: 104)

As this section has demonstrated, the relevance of guiding narratives is well-established with respect to the corporate context (Denning 2005), and comparatively little is known with respect to the start-up entity operating as a micro-business. When the dynamism of technological change is coupled with an inevitable lack of business infrastructure – the case with respect to most contemporary start-up ventures – it is easy to see how available resources could be committed to the task of establishing essential sense-making narratives, if only as a strategic means of early survival. For inexperienced entrepreneurs, the only narratives available to them for sensemaking (Brown *et al.* 2008) exist as residual hangovers from their life experience to-date (social, educational, professional etc.). Even then, when faced with the demands of emerging technologies, such narratives will most

likely have expired, and if not, stand to offer little relevance to the needs of their new venture(s).

The need for narrative may also be viewed as a consequence of Kuhn's theory of taxonomic incommensurability, which arises from differences in classificatory schemes (Kuhn 1962). Fields of science divide subject matter in to a taxonomic order of kinds (Marcum 2015; Sankey 1998), and associated with each taxonomy is a lexical network represented by a distinct narrative. Technological change brings with it a change to the corresponding lexical network, which in turn leads to a taxonomical realignment of the field where the terms of the old taxonomies are progressively retired and become non-transferrable over time (Mizrahi 2015); thereby prompting a Kuhnian paradigmatic revolution.

When considered in the context of this study, the high turnover rate (also referred to as 'techno-churn') associated with ever-sophisticated technology leaves business operators with such a lexical vacuum, where the concepts, words and phrases associated with new technologies must first be acquired before any attempt may be made to sensibly engage with them. Tension arises from a continually emerging '*newness*' of technological '*things*' and '*artefacts*' which, after asserting themselves via diffusion (Lechman 2017; Rogers 2010; Nakicenovic & Grübler 1991) as indispensable tools of the high-technology trade, must have some form of guiding narrative via which they may be conceptualised and made sense of.

Problems encountered in a rapidly changing technological, business, and economic environment tend to be of a more complex and demanding nature, where the human creative potential is required to explore the socio-technical problem space in a uniquely reasoned manner. Unless a paradigm-appropriate way of handling such change can be used to help with the creation of guiding narratives to aid with the decision-making process, making a decision runs the risk of being based on flawed reasoning and being 'shoe-horned' in to past paradigmatic narratives, which may lead to bad judgment calls and potential failure.

The concept of narrative is relevant to this research as it plays a fundamental role during the *sensemaking* stage of inquiry, which is the first of three core conceptual categories that underpin this study: *Sensemaking*, *Structured inquiry* and *Principled praxis*. As the study unfolds, it will become evident from theoretical and practical perspectives that a

well-constructed narrative provides the essential cognitive bridge that forms not only a personal understanding of emergent technologies, but also, as a form of intersubjective learning, facilitates the wider transmission of knowledge relating to them.

2.9 The systems approach

This research is about change, and how the agents of business and venture creation interact and cope with change. To maintain pace with an ever-changing environment, analysis must include provision for an ongoing process of critical reflection. Whether change is exogenously and/or endogenously situated, an approach is needed that can accommodate the dynamic nature of change as it relates to a temporally and spatially evolving entity. A solution may be found in what is commonly referred to as the systems approach, the development of which is widely credited to Churchman (1979).

Jackson *et al.* (2010) define the systems approach as a problem-solving paradigm. It considers the attributes of an entire system to achieve the objective(s) of a system, which is to solve a problem. The systems approach allows the designer to manage, encapsulate, and anticipate complex behaviors, and allows the designer to anticipate and design for emergent behaviors. It's origins can be traced back to the 1950s, where the theories concerned with the optimisation and efficiency of process, procedure and strategy developed and advocated during the post-war decades played a key part in not only laying the foundations for the expanding discipline of Operations Research (OR) and Management Science (MS), but also their part in sustaining and developing the strong post-war economies based predominantly on industry and manufacturing.

The quantitatively-biased, mechanistic thinking associated with the 'hard' systems approach of early-years OR persisted for a number of decades after the war, and served a definite purpose in terms of the growing demands of the burgeoning industrial boom. It was not until the 1970s that Stafford Beer began to 'humanise' the machine, with publications like *The Heart of the Enterprise* (1979), *Brain of the Firm* (1972), and *Diagnosing the System* (1985). Here, it was becoming clear that in order to solve complex problems, human and biological metaphors could usefully be applied to the analysis of operational and management aspects of organisations, and the agents driving them. The technique was later adopted by Burrell and Morgan (1979) in their sociological analysis of the organisation, paving the way for a better understanding of the way in which the human element actively contributed to the structure and ongoing existence of organisations. Attributing human traits, emotions and intentions to non-human entities

was thus seen to play an increasing role in firms that had once been dominated by numerically-precise, command-and-control hierarchies (Seddon 2003) which had, until then been driven by Taylor's scientific management and Fordist mass production techniques.

Human/biological metaphors were instrumental in the move towards a general system approach, prompting early socio-technical researchers to suggest the concept of the 'open system', which recognised that systems are inherently embedded in environments that directly affect the way they behave. The idea was directly analogous to that of the biological cell and was first suggested by the Austrian biologist von Bertalanffy (1969), who advanced the founding ideas for a future general systems theory (von Bertalanffy, *ibid.*).

2.9.1 Systems thinking and operational research

The practical origins of systems thinking may be located within the field of Operational Research (OR); a discipline of Anglo-American conception that arose in response to the logistic demands of military operations during the resource-starved years of World War II. Here, scientists of varying disciplinary background were assembled to work on complex issues associated with military operations, applying mathematical models to optimise resource deployment (Churchman 1970); providing purely quantitative solutions to mechanically defined problems.

During the post-war decades, OR's uniquely systemic approach to problem solving had been dominated by a 'goal seeking, positivistic' model (Paucar-Caceres 2011) associated with complex numerically-based issues, which began to give way to a softer, more socially aware endeavour capable of addressing issues in other, less numerate areas. OR's systemic approach to problem solving became recognised for its potential to address issues centred around the 'human factor', with the title of Beer's (1968) book eponymously referring to management science as "*the business use of operations research*". The overtly 'hard' quantitative nature of the field thus began to give way to the recognition of 'softer' human-based problems, with the advent of Soft Systems Methodology (Checkland 1981; Wilson 1984; Checkland & Scholes 1990). The subsequent advent of critical systems thinking (CST) prompted by Flood & Jackson (1991) highlighted the future utility of the systems approach in terms of its ability to critically re-frame problems characterised by chaos and unpredictability, as originally suggested by Churchman (1967).

Systems thinking incorporates 'holism' as one of its primary tenets, where holism stands for the synergistic notion that all properties of a given system cannot be explained by its component parts alone. Viewed as an approach to problem solving that attempts to balance holistic thinking with Descartes's scientific reductionism, the systems approach seeks to understand the nature of complex systems by taking a 'big picture' view of the overall system, including its constituent parts, where collective phenomena that are more than the sum of the individual parts may be observed to emerge (the synergistic viewpoint). The holistic and reductionist views, rather than contradicting or detracting from each another, are complementary; with each offering validity and utility in their own rights, depending on which viewpoint is taken.

Systems thinking has been developed as a set of practical habits guided by a practical philosophical framework, and is based on the belief that the component parts of a system are best understood in the context of their relationships with each other and with other systems, rather than in isolation. While the systems approach is sometimes accused of being 'too holistic' (e.g. Jackson 2003; Checkland 1999), this is in fact one of the main reasons why the approach has seen increased relevance in the framing of complex and 'wicked' problems (Cabrera & Cabrera 2015).

The systemic foundations of management science

Systems thinking is a discipline within Management Science that aims to solve problems by understanding systems on account of the links, interactions and dependencies between the components that make up the system. The systems 'approach' is another way of describing systems thinking *in action* and encourages the critical re-framing of problems and proposing solutions based on holistic inquiry.

This study seeks to embrace the true spirit of management inquiry by adopting a *critical systems approach* throughout, via the combined application of Critical Systems Theory (CST) and Critical Systems Heuristics (CSH), as advocated by Ulrich (1983). Both CST and CSH represent the latest incarnation of a progressive systems movement, which has, since its early OR years, gradually evolved to recognise the need to include a socialised 'human' element within its broader remit.

In advocating a greater adoption of the systems approach, Mulej (2007: 347) declares that "*many observers find that humankind is in crisis due to a lack of holism and too much reductionism – in human thinking, insight, decision-making and action – caused by*

increasingly narrow specialisation in the professions and disciplines." Such calls for a revised worldview aimed at a holistic/realist approach to inquiry and decision making have been heard in one form or another for many decades. As engineers and problem solvers began to realise that many of the more complex problems with which they were faced were unavoidably intertwined with the nuances and complexities introduced by the 'human' element, questions that could no longer be addressed by the 'hard' systems approach of OR alone began to invite solutions from a 'softer', more holistic and pliable interpretation of not only the problems themselves, but also those asking the questions. This took in to account not only the hard-coded statics associated with machines, but also the 'pliable', often less-than-rational opinions of the human beings that ultimately controlled them. The notion of a 'Soft Systems Methodology' (SSM) was originally conceived by Smyth & Checkland (1976) and Wilson (1990, 1984), with an updated version relating specifically to the management of change recently published by Wilson & Van Haperen (2015).

2.9.2 Background to the systems approach

The holistic viewpoint may be seen as a 'top-down' approach, in contrast to a reductionist approach, which is viewed from a 'bottom-up' perspective. The reductionist approach has traditionally underpinned the majority of systems analysis methodologies, such as SSADM (Structured Systems Analysis and Design Methodology), and OMT (Object Modelling Technique) when addressing complex business problems, but recent years have seen the introduction of models based on a mixed holistic/reductionist approach.

According to Jackson *et al.* (2010: 1-2), nine rules constitute the elements of a systems approach:

- Identification of the elements of a system;
- Division of elements into smaller elements;
- Grouping of elements;
- Identification of the boundary of a system;
- Identification of the function of each element;
- Identification of the interactions among the elements;
- Definition of the system's environment;
- Synthesis of the systems;
- Proving the system

As outlined in Table 2.4, the essence of systems thinking lies in its ability to see inter-relationships and connections – rather than linear cause-and-effect chains – and in seeing processes of change, rather than individual snapshots (cf. Senge 1990).

Table 2.4   *Comparing linear thinking with systems thinking*

	Linear Thinking	Systems Thinking
Causality	There is a direct connection between problem symptoms and their underlying causes.	System performance is largely determined by interdependencies among system elements that are indirect, circular, and non-obvious.
Time	A policy that achieves short-term success ensures long-term success.	The unintended and delayed consequences of most quick fixes neutralise or reverse immediate gains over time.
Responsibility	Most problems are caused by external factors beyond our control.	Because actions taken by one group often have delayed negative consequences on its own performance as well as the behaviour of others, each group tends to unwittingly contribute to the very problems it tries to solve and to undermine the effectiveness of others.
Strategy	To improve the performance of the whole, we must improve the performance of its parts. Tackle many independent initiatives simultaneously to improve all the parts.	To improve the performance of the whole, improve relationships among the parts. Identify a few key interdependencies that have the greatest leverage on system-wide performance (i.e. leverage points) and shift them in a sustained, coordinated way over time.

Adapted from Stroh & Zurcher (2012)

2.9.3 Critical Systems Thinking (CST)

As Ulrich (2003) explains, Critical Systems Thinking (CST) is a systems framework that attempts to bring unity to the diversity of different systems approaches. Between the years of 1988 and 1991, Flood and Jackson produced a substantial body of literature communicating and refining their own evolving version of CST, which had been quite influential (Midgley 1996). Of the five original commitments to CST initially proposed by Jackson (1991), they became three when it was noticed that the combined complementarism of methodological and theoretical awareness could be replaced by a single commitment to methodological pluralism. Furthermore, Jackson's other commitment to social awareness could be viewed as an implicit part of an overall commitment to emancipation. Accordingly, the five commitments were reduced to three, with those remaining being ratified by Schecter (1991) and Flood & Jackson (1991), and summarized by Midgley (*ibid.*) as:

- *Critical Awareness* – examining and reexamining taken-for-granted assumptions, along with the conditions that give rise to them;
- *Emancipation* – ensuring that research is focused on "improvement," defined temporarily and locally, taking issues of power (which may affect the definition) into account;
- *Methodological Pluralism* – using a variety of research methods in a theoretically coherent manner, becoming aware of their strengths and weaknesses to address a corresponding variety of issues.

(Adapted from Midgley 1996: 11)

2.9.4   Critical Systems Heuristics (CSH)

Critical Systems Heuristics (CSH) provides a framework of questions about a program, including what is (and what ought to be) its purpose and its source of legitimacy, and who are (and who ought to be) its intended beneficiaries. It was proposed by Ulrich (1983) as an applied methodology, arising in response to questions concerning the choice of boundaries by rational decision makers, and how they may be used to explore and justify the limits to inquiry via constructive debate between stakeholders and other interested parties. CSH emphasises an orientation towards practical (rather than theoretical) goals, as well as recognizing the role of the researcher as an agent of change, rather than a passive observer.

Where to 'draw the line' in terms of declared boundaries became an inevitable point of debate when deciding what should be included - and perhaps more importantly - what should be *excluded*, as part of the decision-making process. As noted by Midgley *et al.* (1998: 469), *"the question of what system boundaries are to be used in analysis is essentially an ethical question because value and boundary judgements are intimately related… inevitably led to ethical questions relating to intimately-related value and boundary judgements."*

CSH went on to form the backbone of Ulrich's 'new approach to practical philosophy' (Ulrich 1983), offering managers, planners and other stakeholding parties a conceptual framework that allowed them to develop, apply and perhaps most importantly to practice an ethos of practical reasoning. CSH therefore offers a means of practically applying systems thinking aimed at rationally identifying and justifying the normative content of purposive action. Furthermore, should such ideals transpire not to be fully attainable, CSH offers a set of alternative pathways via critical solutions which ensure that neither the involved decision makers, planners, experts, or affected citizens fall prey to a utopian objectivist illusion (Ulrich 1983).

Building on the work of Churchman (1971, 1979), Ulrich (1983) initially developed CSH to assist with the complexities associated with social problems, and in so doing proposed an approach to 'socially rational planning,' advocating a framework for reflective practice based on a practical philosophy within a systems setting. CSH incorporates the notion of boundary critique within its very definition, and is therefore able to handle boundary judgments in a systematic and critical manner. CSH addresses four principal problem areas:

- ***Basis of motivation*** – Where does a sense of purposefulness and value come from?

- ***Basis of power*** – Who is in control of what is happening and who is needed to ensure a successful outcome?

- ***Basis of knowledge*** – What experience and expertise support the various claims asserted?

- ***Basis of legitimacy*** – Where does the legitimacy lie, and who is able to validate and/or guarantee claims to legitimacy?

Ulrich (1983) then proceeds to allocate three questions to each of the problem areas, resulting in a twelve-question set of is/ought dichotomous pairs; thereby reflecting the factual (is) and value (ought) dimensions of the situation respectively (see Table 2.5).

Table 2.5   *Checklist of boundary questions; the answers to which inevitably flow as normative premises into any systems design for system 'S'.*

"SOURCES OF MOTIVIATION"
1	Who ought to be the *client* (beneficiary) of the system S to be designed or improved?
2	What ought to be the *purpose* of S, i.e., what goal states ought S be able to achieve so as to serve the client?
3	What ought to be S's *measure of success* (or improvement)?

"SOURCES OF POWER"
4	Who ought to be the *decision taker*, that is, have the power to change S's measure of improvement?
5	What *components* (resources and constraints) of S ought to be controlled by the decision taker?
6	What resources and conditions ought to be part of S's *environment*, i.e., should not be controlled by S's decision taker?

"SOURCES OF KNOWLEDGE"
7	Who ought to be involved as *designer* of S?
8	What kind of *expertise* ought to flow into the design of S, i.e., who ought to be considered an expert and what should be his/her role?
9	Who ought to be the *guarantor* of S, i.e., where ought the designer seek the guarantee that his/her design will be implemented and will prove successful, judged by S's measure of success (or improvement)?

"SOURCES OF LEGITIMATION"
10	Who ought to belong to the *witnesses* representing the concerns of the citizens that will or might be affected by the design of S? That is to say, who among the affected ought to get involved?
11	To what degree and in what way ought the affected be given the chance of *emancipation* from the premises and promises of the involved?
12	Upon what *worldviews* of either the involved or the affected ought S's design be based?

Adapted from Ulrich (1987)

Although Ulrich (1987, 1983) originally proposed the list in the format presented in Table 2.5, it was also inspired by similar efforts on the part of Churchman (1979: 79, 1971: 43)

and Checkland (1981: 223); although its justification within the realm of critical heuristics is claimed by Ulrich to be independent of the two cited authors (Ulrich 1987).

It is clear from the foregoing analysis of problem contexts that there stand to be as many potential solutions as there are stakeholders with differing worldviews and levels of expertise, and for this reason Churchman (1971) describes the process of 'sweeping in' knowledge and ideas from as many diverse sources as possible, thereby increasing the likelihood of a universally acceptable solution – or set of solutions – to an otherwise wickedly complex problematic. Here, the term 'wicked' – originally used in a social planning context (Churchman 1967) – refers to the resistance offered to resolution, as opposed to anything evil.

CSH is not a prescribed methodology, but a way of encouraging reflective thought and reflexive action, where both the means and ends become the subjects of inquiry. It is a method of purposive evaluation which, via the 12 boundary questions listed in Table 2.5, is designed to outline and provoke a form of 'boundary critique' (next section), and attempts to establish what is (and what *ought* to be) the purpose, source of legitimacy and intended beneficiaries with regard to a declared problematic.

To ensure rigorous application of the boundary critique, each question in Table 2.5 is answered in response to its 'is' and 'ought' formulation, where any discrepancies between the two are likely indicative of some unresolved boundary issue. As there are no 'correct' answers, it is quite possible that the boundaries need to be moved as the inquirer recursively analyses the position until a stable satisfactory state is reached. However, owing to the temporal dynamics of many situations in rapidly changing environments, it may be that some solutions possess only temporary validity, and the inquirer must remain alert – via an on-going critically reflective attitude – to the changing and evolving needs of the solutions, as well as the initial problems themselves.

Boundary critique

Boundary critique (Torres-Cuello *et al.* 2018; Ulrich 2000, 1996) aims at disclosing the inevitable partiality encountered when making decisions. It is the methodological core idea of CSH (Ulrich 1983) and is based on the premise that no individual may claim complete impartiality, with the consequence that some parties are apt to benefit more than others owing to partial selectivity by the inquirer.

As an essential component of CSH, boundary critique was first discussed by Churchman (1971), who, in following the work of Hegel, suggested that by using a process of dialectical self-reflection, insight relating to the boundaries defining an inquiry could be gained, ensuring which facts and norms should be considered relevant, and which should be excluded. As pointed out by Midgley (2000: 137) *"...the boundary of analysis is crucial. What is to be included in, or excluded from, any analysis is a vital consideration: something that appears to be an improvement given a narrowly defined boundary may not be seen as an improvement at all if the boundaries are pushed out."*

As Santos & Eisenhardt (2005) also contend, boundaries are crucial to a systems appreciation of the organization, where each organizational entity needs to establish boundaries – and the conditions associated with those boundaries – in order to distinguish the organization from the environment in which it operates and defines its domain of activity (Aldrich & Ruef 2006; Scott 2003).
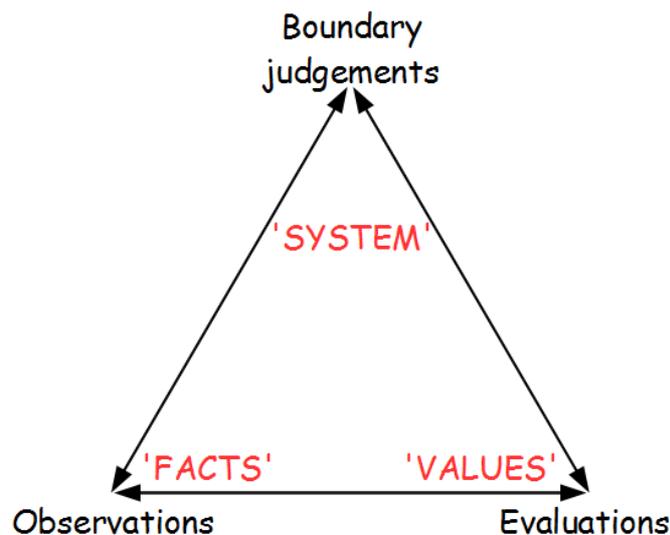
(Source: Ulrich 2000)

Figure 2.6   *The 'eternal triangle' of boundary judgements, observations and Evaluations.*

Considering Figure 2.6, Ulrich (2017) explains that the facts that we observe and the ways in which they are evaluated depends on how the system of concern is bounded. One sees that, because of the interdependence that exists between boundary judgements (system), observations (facts) and evaluations (values), new facts become relevant should the boundaries of the reference system or value judgements ever be modified.

2.9.5 Total Systems Intervention (TSI)

Based on the philosophy and principles of CST, Total Systems Intervention (TSI) represents an alternative approach to planning, design, problem solving and evaluation. It recognises that managers wishing to use a systems methodology are often confronted with a variety of approaches, and experience difficulty when choosing which may be most relevant to their problem(s). Developed by Flood & Jackson (1991) TSI is a framework, or meta-methodology, based on a range of systems metaphors that attempts to bring together various systems approaches to enable creative problem solving. Alternatively put: it is a process that enables problem solvers who stand firm with the original holistic intent of systems thinking (Flood 1994) to deploy a 'spread' of methods. TSI employs Morgan's (2006) work on metaphor by applying two of the theoretical schemata in a systems direction. The process behind TSI can be best described as the use of systems metaphors in their application towards the encouragement of creative thinking with respect to the various problems faced by organisations and managers.

Much debate has surrounded the practical application of TSI, and whether it is based on critical systems thinking, or merely common sense (Ho 1994). TSI seems to have received little attention in the literature, with only a handful of documented interventions relating to practical applications of the approach, such as its application towards improving business intelligence systems (Venter & Goede 2018); addressing ICT systems failures (Nakamura & Kijima 2011); or the design of IS systems (Warren & Adman 1999). However, despite the paucity of scholarly output relating to its practical use and uncertainty about whether it should be client- or practitioner-centred (Flood 1995), Flood continues to recommend TSI as a new approach to problem solving.

The various strands of systems thinking outlined in this section have traditionally addressed three distinct areas of problem context: the technical, the practical, and the emancipatory; addressed respectively by traditional OR, Checkland's SSM, and Ulrich's CST/CSH approach. Flood (1994: 235) suggests that TSI is "*an approach to problem solving in any organization that stands firm with the original holistic intent of systems thinking,*" but questions have been raised concerning the exact classification of problem contexts, the inconsistency between creativity and choice, and aspects of practice (e.g. Mingers 1992; Tsoukas 1993; Cummings 1994), as quoted in Murthy *et al.* (1997).

With respect to their implications for this research, the various aspects of systems thinking outlined are cited as useful tools, to be implemented on a 'call-off' basis in to a wider framework of decision-making heuristics informed by other philosophical and conceptual domains. The heuristics selected will be sensitive to the type of problem to which they are to be applied, but it is expected that when they are applied together, they will combine to offer a formidable form of *Principled praxis* based on an idealised entrepreneurial mindset.

2.9.6 Churchman's inquiring systems

As noted by Mitroff (2019) and Ormerod (2006), Churchman's *Design of Inquiring Systems* (1971) was rooted in the philosophy of pragmatism, where his concept of the 'inquiring system' was formulated around the characteristics of five distinct schools of philosophy; each of which Churchman had profiled to deal with a particular type of problem space in accordance with historical systems of philosophical thought. The notion of the inquiring system refers to an organizational system able to produce, shape or influence the worldviews of decision makers, and forms the underlying basis of understanding, and thus coping, with wicked messes (Mitroff, *ibid.*). Churchman's five inquiring systems are summarised in Table 2.6.

Table 2.6   *Churchman's Five Inquiring Systems*

Inquiring System	Basis
Locke(an)	Begin with a blank sheet and gather evidence. No prior assumption of any theory required. Truth is validated via consensus and direct observation/experience. Seeks consensus, 'middle-of-the-road' solutions. Experience reigns over rigour. Bureaucratic systems (military, government etc.) and statistics are good examples of Lockean inquirers.
Leibniz(ian)	Start with the current body of knowledge and build upon it. Best suited to dealing with well-structured problems, e.g. the kinds of mathematical/computational problems encountered in OR.
Kant(ian)	Examine empirical evidence and the current body of knowledge from as many views of a problem as possible. Suited to ill-structured or 'wicked/messy' problems that elude clear consensus. Effectively combines the Leibnizian (theoretical) approach with the data input of the Lockean.
Hegel(ian)	Engages with a process of dialectical reasoning. Direct confrontation of thesis and antithesis. Experts may arrive at opposing views despite identical starting points. Truth arises from the dialectical tension created through the conflict and confrontation of opposing views. The development of strategic plans within a management environment represent use of the Hegelian inquirer.
Singer(ian)	A master 'inquiring framework' for use as an overarching management theory. Builds on the other four inquiring systems by frowning on final consensus and placing an emphasis on continual refinement, rather than static snapshots. Also advocates imagery to validate truth, and ethical considerations to justify action. An overall concern for the morality of systems.

Source: van Gigch (2013)

The purpose of Churchman's approach in terms of using past systems of philosophical thinking was to provide an appreciation for the role of historical wisdom, and to locate – within these historical designs – the features that could be usefully transferred to contemporary inquiry and design; especially in terms of knowledge acquisition. The objective was to impart particular properties to an inquiring system that would allow it to solve the complex problems associated with modern social systems, where the system must be able to translate problem solving in to action.

The Singerian inquirer is the most versatile as it relies on the other four inquiring systems to conduct its inquiry. According to Churchman (1971) any situation may be understood by a combined application of one or more of the four, where inquiry proceeds on an inclusive, whole-systems basis. In a time that was yet to be dominated by technological change, Singer presciently recognised that continual progress and change would require an increasingly pragmatist take on philosophy, where philosophy as *thinking* would be required to give way to philosophy as a pragmatic form of *doing* (Ormerod *ibid.*). Accordingly, the Singerian inquiring system represents the most evolved, pragmatic member of the group.

Churchman (1971) outlined five philosophical sources to inform the majority of inquiry (as he perceived it) via the lens of systems theory. Haynes (2002) further advanced a (sixth?) 'Heideggerian' inquiring system as a basis for phenomenological inquiry. This research chooses one of Churchman's inquiring systems (the Kantian inquirer) and applies it in conjunction with its own formulation of what could be referred to as a 'Peircean' inquirer, based on the philosophy of C.S.Peirce. When considered, the philosophies of Kant and Peirce together offer a systemic lens 'tuned' to the ethical and moral/duty bound aspects of inquiry, while at the same time encouraging a pragmatic outlook via the implementation of Peirce's pragmatic maxim.

Table 2.7 *Properties of learning associated with Churchmanian inquiry*

System	Closed	Open	Open/Closed	Open	
Learning Style	Behavioural Single loop	Consensual Generative	Cognitive Generative	Generative Double loop	
Learning Mechanism	Simple error detection and correction	Reduction of equivocality	Knowledge scan Model Matching	Synthesis by Objective mediator	Trial and Error
Learning Level	Low	High	Multilevel	High	Multilevel
Learning Framework	Procedural	Strategic Architectural	Procedural Architectural	Architectural	Procedural Strategic
Learning Source	Syntactic	Pragmatic	Pragmatic Semantic	Semantic	Syntactic Pragmatic
Learning Orientation	Normative	Developmental Capability		Developmental	
Developmental Orientation	Apprentice	Specialist Generalist		Renowned	

Adapted from Courtney et al. (2005: xv)

2.10 Pragmatism

Pragmatism is of key significance to this research because it is widely recognised as a problem-solving philosophy (Farjoun *et al.* 2015) able to address contemporary problems and theoretical questions. Pragmatist ideas are able to transcend the perennial problems associated with agency and structure, and are well-suited to a better understanding of the contemporary challenges associated with change and complexity. Farjourn *et al.* (*ibid.*) also note that recent years have seen organizational scholars draw on pragmatism in the study of a wide range of other phenomena, many of which are also cogent with the ideas driving this study; namely: innovation and creativity (Adler & Obstfeld 2007); institutional change (Berk & Galvan 2009); ethics (Wicks & Freeman 1998); virtual work (Bailey *et al.* 2012); knowledge (Carlile 2002); organizational learning (Elkjaer 2004) and organizational boundaries (Whitford & Zirpoli 2014).

Etymologically, the origin of the word 'pragmatism' may be traced to the Greek πρᾶγμα (*pragma*), '*a thing, a fact*', which comes from πράσσω (*prassō*), '*to pass over, to practice, to achieve*'. Pragmatism as a contemporary philosophical tradition has a complex history, with its foundational elements going back as far as Aristotle[5] and Plato. Pragmatism as a a certain set of beliefs vs. pragmatism as a methodology (Burke 2013) is indicative of the changing nature of pragmatism over time, which may be a reflection of the way in which the truth of and belief in propositions are also apt to change and evolve with time.

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[5] *Aristotle: Metaphysica, Book VIII, 1045a.8–10*

Unlike other branches of philosophy, pragmatism has become a much-fragmented body of knowledge, often criticized for its ambiguity and lack of focus (Shusterman 2016; Lovejoy 1908), with differing takes on its interpretation and meaning being offered by its various proponents. The three originators of American Pragmatism: Charles Sanders Peirce, William James and John Dewey each offered differing formulations of how pragmatism should be viewed: James is interesting because of his particular brand of radical empiricism; Dewey, because of his understanding of inquiry as being both cognitive and action-oriented, and Peirce because of his background in the logic of inquiry – especially abduction (or retroduction) – and the type of logical inference associated with it.

Charles Sanders Peirce (1839-1914), the American philosopher, logician, mathematician and scientist, was the founder of a philosophical movement that began in the United States, which he called *pragmaticism*; later referred to by others (c.1870) as 'American Pragmatism', or simply 'Pragmatism' when differentiating Peirce's own scientific philosophy from the conceptions and theories of later contributors to the field. Peirce made contributions in many fields, but most significantly to the field of logic; much of which now falls within the domains of epistemology and the philosophy of science. Although primarily attributed to Peirce, the term originated from his earlier readings of Kant (Burke 2013) – where, according to Peirce (CP 5.3) *"the writer was led to the pragmatic maxim by reflection upon Kant's 'Critique of Pure Reason'."*

The contemporary origins of pragmatism may be traced to two foundational perspectives: the first relates to *The Metaphysical Club* (Menand 2001) founded by Peirce and James while at Harvard in the 1870s, where the formative ideas for pragmatism were initially conceived as a result of the cooperative efforts of critical discussions within the club (Thayer 1982: 21). The second perspective may be sourced from the first written history of the movement, traced back to the publication of a paper by Peirce in 1878 entitled *'How To Make Our Ideas Clear'* (Peirce 1878) which concerned the operation of thought and the clarification of meaning.

Peirce's unique formulation of pragmatism is adopted, as unlike Dewey's it is rooted in his earlier study of Kantian philosophy, and thereby provides a direct conceptual link to the moral and ethical dimensions of reason and inquiry; both of which are of interest to this study and will be explored further in Chapter 6.

2.10.1   C.S. Peirce and the pragmatic maxim

In contrast to James and Dewey who viewed pragmatism as a *full* philosophy applicable in all the traditional philosophical areas, to Peirce, the main function of pragmatism was more limited and narrower in scope: it was to assist the philosopher and scientist in making their ideas clear and well-reasoned, a sentiment articulated in Peirce's essay *How to Make Our Ideas Clear* (Peirce 1878).

Peirce suggested that human inquiry depends on real doubt, and not just Cartesian (or hyperbolic) doubt; a method popularized in Western philosophy by René Descartes as a systematic process of doubting, where the truth of one's beliefs, ideas, thoughts and matter are doubted in order to best determine that which is true. Peirce argued that, in order to understand a conception, his pragmatic maxim should be considered, which states that one should:

> Consider the practical effects of the objects of your conception. Then, your conception of those effects is the whole of your conception of the object.
>
> (Peirce 1878: end of §11)

2.10.2   The pragmatics of James and Dewey

As students of Peirce, William James and John Dewey developed their own particular strands of pragmatism. James lectured extensively in the area during the closing years of the nineteenth century, and it was the ideas set forth in these lectures that brought widespread recognition to the area (James 1975: xii). The lectures represented a 'crystallisation' of earlier studies, spanning some twenty years with which James had been occupied, mostly in his role as psychologist. Here much of the basis for pragmatism may be traced back to his teleological theory of mind, espoused in what was the nexus of his philosophical thinking at the time, *The Principles of Psychology* (James 1890), as well as his readings of the French philosopher, Renouvier, whose analysis of interest-laden and purposeful aspects of thought were of lasting and permanent interest to James.

As stated by Thayer in his introduction to James (1890), James thought that he had discovered a solution to the problem of free will and action in Renouvier's writings, and in asserting that his will was free will, part of his first act of freedom after reading Renouvier was to declare:

> …the sustaining of a thought *because I choose to* when I might have other thoughts' — need be the definition of an illusion. At any rate, I will assume for the present — until next year — that it is no illusion. My first act of free will shall be to believe in free will.
>
> <div align="right">(James 1870, quoted in Perry 1948)</div>

James did not believe that the argument of 'whether we have free will, or whether all of our actions are determined by what has gone before' could be resolved either analytically or empirically; but by merely cultivating a *habit* of free will, i.e. choosing to believe that we have free will, and subsequently acting in accordance with that belief, would free will be enjoyed. James's pragmatic approach therefore was the notion of free will as an independently autonomous *habit* located within and emanating from the self. His suggestion that we may be able to free ourselves from the endless introspective analytical and philosophical deliberations by simply *doing* was, as noted by Ormerod (2006) typical of James's unique take on pragmatism.

2.10.3   Pragmatism as it relates to OR and systems thinking

Ormerod (2018, 2006) points out that pragmatism has largely been ignored by the OR academic community, citing the tendency of other academics in the field (e.g. Jackson 1999) to oppose 'any descent into pragmatism' by rejecting it outright in preference of it being 'under the controlled guidance of theory'. Citing Mingers (2000) in Ormerod (*ibid.*), Mingers argues:

> …in the OR/MS context there are three main problems with instrumentalism: (i) it does not provide information about why a particular theory or model does or does not work; (ii) it does not contribute towards an understanding of the way in which things work since it does not claim to generate any explanations, and (iii) it also only provides a relatively ineffective criterion of truth.
>
> <div align="right">(Mingers 2000: 1258)</div>

What is the point of pragmatism if it is not to enable the unrestricted exercise of free will? If academics wish to deconstruct, analyse and philosophise on such matters, then this is what they should do, and indeed do, as evidenced by the multitude of extant theories relating to truth, knowledge and reality. However, those confronted with the everyday demands of running a business will hardly be concerned with the theoretical, let alone philosophical dimensions of practice, and should be allowed to just *be* as directed by Peirce's pragmatic maxim, and James's notion of free will.

OR looks to theory in support of practice, supporting professional activity rooted in practice. The contemporary view of OR is that it should aim to be practical *and*

instrumental; implying that OR practitioners should be open to the adoption of a pragmatic approach in the execution of their professional practice.

In other words, the incorporation of a pragmatist approach could be positively adopted as a habit within the realm of business/entrepreneurial reasoning; the only question remaining would be whether a pragmatic outlook is encouraged directly, or as an element of practice as part of an OR/applied systems intervention enacted by professionally trained practitioners.

Ormerod (2006) cites a number of reasons for believing that pragmatism could serve practitioners of OR well; namely that:

Table 2.8   *Twelve reasons why pragmatism could serve practitioners well*

1	Pragmatism fits what we do, how practitioners behave in practice
2	Pragmatism supports an empirical (in other words scientific) approach
3	Pragmatism emphasises the uncertainty and changing nature of our findings
4	Pragmatism recognises the individual psychological nature of meaning
5	Pragmatism holds that inquiry is social, as is knowledge
6	Pragmatism supports a theory of learning based on experience, experimentation and action
7	Pragmatism addresses morality, social interests and politics
8	Pragmatism places theory in the service of practice
9	Many OR approaches can find support in the philosophy
10	Pragmatism's stance on many things seems surprisingly modern
11	Pragmatism's biological approach should stand it in good stead to adapt to new science
12	Pragmatism is flexible enough to accommodate other philosophical positions

(Adapted from Ormerod 2006: 905-907)

In an argument against pragmatism, Mingers (2000) critically contends that (i) it is oblivious to why a theory or model may or may not work; (ii) it does not contribute to any understanding of the way things work, as it does not guarantee any explanations; and (iii) it does not aspire to any effective notion of truth. However, as Raitt (1979) and Dando *et al.* (1977) point out in an earlier defence of pragmatism: *"we do not ask if it is true, only if it works – we validate, not verify"* (Raitt *ibid.*: 835) and *"The overall aim … is to contrive devices by which … the system can, in some sense, be supposed to work better"* (Dando *et al.* 1977: 90).

The role of pragmatism as it relates to OR is important because OR is a professional practice rooted *in* practice, where the questions it deals with are related to the practical requirements of decision making, paying respect to, and recognizing the importance of the habitual application of the scientific approach, historical progress (over time), and context. As noted by Ormerod (*ibid.*) pragmatism "*fits what we do, how practitioners behave in practice, and is flexible enough to accommodate other philosophical positions.*"

Indeed, recent discussions in the literature point towards the concept of a revised operational research based on pragmatic thinking, otherwise referred to as 'Smart OR', which White *et al.* (2016: 177) defined as, "*the creative use of Big Data and hard and soft OR to enhance behaviour and positive results for decision-makers.*"

2.11   Effectuation theory

The theory of effectuation advanced by Sarasvathy (2008, 2001) describes an approach to decision making that attempts to explain entrepreneurial action (Dew *et al.* 2009; Baker & Nelson 2005). As pointed out by Perry *et al.* (2012: 837-838), it "*challenges conventional theories by questioning the universal applicability of causation-based models of entrepreneurship (Stevenson & Gumpert 1985) to the entrepreneurial process*". It is a way of thinking intended to serve entrepreneurs in the process of opportunity identification and new venture creation, especially when faced with the uncertainty and unpredictability encountered during the early years of venture formation.

Effectuation theory is of interest to this study because it too focusses on entrepreneurial decision making during the formative years of a new venture. The theory also relies on the notion of the 'expert entrepreneur' in its analysis, which also corresponds (in part) with the principal unit of investigation deployed during this research exercise. This section further explores the similarities and differences between effectuation as an approach to entrepreneurial decision making, and the objectives of this study in offering alternatives to the causally-based decision making paradigm of the corporate manager.

Effectuation theory builds on the earlier work of leading management scholars (e.g. March 1982), including Herbert Simon, with whom Sarasvathy co-authored a research paper (Sarasvathy, Simon & Lave 1998) detailing a study that compared the activities of entrepreneurs with bankers in relation to their perspectives on risk. In terms of a general

positive overview, effectuation was described by The Society for Effectual Action (2016) as:

- An idea with a sense of purpose;
- Reasoning that is a type of human problem solving;
- A logic of entrepreneurial expertise.

Furthermore, the increasingly pervasive nature of technology and the transformative effect it is having on contemporary business prompted March (2006) to describe effectuation as the "*technology of decision making.*"

Sarasvathy's support for the cognitive basis of high-performance entrepreneurship led to a study in 2001 based on the empirical analysis of some 27 experienced (as opposed to novice) entrepreneurs. The theory was introduced by addressing the question of what makes entrepreneurs entrepreneurial; or, in the language of Gartner (1988: 47) '*How can we know the dancer from the dance?*' At the same time, it challenged existing research in the field of entrepreneurship that has, in the past, been otherwise limited to two principal assumptions:

1) that entrepreneurship is either a genetic or acquired personality trait or psychological condition (risk seeking),

and

2) that entrepreneurs take advantage of opportunities created by inefficient market forces, regulation, and scientific breakthroughs.

A theory of 'effectual reasoning' was advanced in response to the research carried out by Sarasvathy (2001) which centred on the decision processes employed by entrepreneurs. Here, she suggests that the entrepreneurial approach to inquiry is different from the type of causation encountered in the rational choice paradigm setting of corporate culture. Roach *et al.* (2016) suggest that this difference specifically serves entrepreneurs in the process of opportunity identification and new venture creation during the early stages of entrepreneurship, where thinking and decision making tend to outperform causal thinking.

Indeed, the effectual logic of reasoning is seen as working in direct opposition to traditional managerial (causal) thinking. It operates from a constructivist ontology, where the future is shaped by people, and because the future is wholly determined by those who create it, predictions of future states are meaningless. Because they think effectually – as opposed to causally like their managerial or strategic counterparts – entrepreneurs are

entrepreneurial: they maintain a steady belief in a future that is yet to be made, implying that human action may control the future, but cannot necessarily predict it.

From an effectual perspective, it is therefore more useful to understand and work with those who are engaged in decision-making activities that select the most appropriate future in to reality from an infinite choice of possibilities. Accordingly, effectual 'logic' is deployed only during the early stages of venture formation, where the future is inherently unpredictable. This aspect of effectuation therefore corresponds with the underlying premise of this research, which centres on the early-years of new venture formation.

When compared to other theories of entrepreneurship, effectuation is a relative newcomer which appears to be at a crossroads and has yet to attract further empirical testing and critical analysis (Arend *et al.* 2015). Opinion seems very much divided. Dew & Sarasvathy (2002) state that "*science is at its best when constructed by the hands of many…and therefore effectuation is an evolving idea.*" She is also of the opinion that entrepreneurship is something that can be taught, and that the entrepreneurial 'method' should by "learned by everyone" (Sarasvathy 2012).

Table 2.9   *The five core principles of effectual logic*

"Bird in Hand" Principle	Entrepreneurs do not start with a set of well-defined goals, but begin with what they already have in terms of abilities, experience and a potential network of allies. In the absence of pre-existing Entrepreneurs tend to default to the 3F's, or "friends, family and fools" in order to 'kick-start 'their venture.
The "Affordable Loss" Principle	Focus is not on profits, but possible losses and their minimisation
The "Crazy Quilt" Principle	Cooperate only with parties that can be trusted. Such parties can help mitigate 'affordable losses' by extending credit, providing free advice, allowing 'freebies' etc.
The "Lemonade" Principle	Embrace the surprises that arise from uncertainty. Look towards leveraging contingencies. View surprises positively, rather than clinging to existing goals.
"Pilot-in-the-plane" Principle	Amalgamation of other principles.

Adapted from Sarasvathy (2008: 15-16)

A model of effectuation in action was advanced by Sarasvathy, where expert entrepreneurs applied the theory to lower the venture risk by applying the five so-called 'principles' of effectuation, as summarised in Table 2.9.

The theory was evaluated in a study by Arend *et al.* (2015), who offered a comprehensive critique based on the traditional perspective that good theory is practical, and in quoting Lewin (1945: 132) that, "*…much is gained, [however,] if one realizes that neither scientific nor practical results can be expected without adequate development of the theoretical aspect of the work.*" In criticising Read *et al.* (2016), Arend *et al.* (*ibid.*: 549) further suggest that: "*Effectuation theory should not be considered as a theory, but as a collection of marketing choices that includes its construction as an umbrella of previously established concepts, its misrepresentations of what it contrasts with, and its 'form' as the kind of message that people want to hear.*"

In spite of the theory having many followers who recognise its future potential, it appears to have just as many detractors, with some (e.g. Chiles *et al.* 2007) finding it "*under-defined and unoriginal,*" and others (Perry *et al.* 2012) point to the lack of evidence supporting its theoretical claims; concluding that effectuation has yet to be properly tested. Although the theory has been in circulation since 2001, its audience remains divided in opinion and appears to be at a crossroads, having yet to attract further empirical testing and critical analysis, as highlighted by Arend *et al.* (2015).

Recent debates concerning effectuation theory build on concerns previously elicited by Arend *et al.* (2015) by highlighting further limitations (e.g. Wierenga *et al.* 2018) relating to it's disregard for spatiality, or indeed, temporality. Others have made positive attempts to develop the concept further by finding consonance with components such as bricolage (Servantie & Rispal 2018) and Actor-Network Theory (Murdock & Varnes 2018); with its relevance to social media and entrepreneurship also noted by Mumi *et al.* (2018).

Furthermore, effectuation has been used as a heuristic for conceptualising and operationalising constructs relating to social entrepreneurship (Dwivedi & Weerawardena 2018). With the above examples in mind, recent discourse on effectuation therefore offers some reassurance regarding not only the improved future utility of the theory, but also goes some way towards validating the findings of this research, as the same conceptual artefacts that will be later identified during the analysis stage of this study concur with even the most up-to-date literature on effectuation theory.

Chapter 3 - Methodology

3.0   Introduction

Chapters 1 and 2 introduced the general area of interest, its background, and consideration of the research problem, explaining why the phenomenon of entrepreneurial inquiry is an important, yet underdeveloped area within the field of business inquiry; especially in the context of the start-up micro-business entity.

Chapter 3 consists of three parts:

> Part I   - Methodology
> Part II - Overview of grounded theory
> Part III - Applying grounded theory

Part I: Methodology

3.1   Research design

According to Crotty (2012: 2) research design is characterised by four main features, which may be summarised thus:

- What *methods* do we propose to use?
- What *methodology* governs our choice and use of methods?
- What *theoretical perspec*tive lies behind the methodology in question?
- What *epistemology* informs this theoretical perspective?

Easterby-Smith *et al.* (2012: 18) illustrate research design via a tree trunk metaphor where the outermost, exposed aspects of the trunk represent research methods and techniques, and the innermost rings signify the foundational roots of ontology and epistemology; without which the outer rings could not be sustained. The analogy demonstrates the need for all four aspects to be coherent and consistent if a viable research design is to be realised.

The importance of the research question(s) which form the foundational basis for all research inquiries is often understated in the literature. As Farrugia *et al.* (2010: 278) point out: "*interest in a particular topic usually begins the research process, but it is familiarity with the subject that helps define an appropriate research question for a study*". Questions then arise out of a perceived lack of knowledge, or knowledge *gap* within a subject area or field of study.

Crotty (2012: 2-6) summarises the four steps of the research process as:

- The researcher adopts a particular epistemological stance. i.e. one that relates to the nature of knowledge. For example: objectivism or subjectivism.
- The epistemological stance underlies the ensuing research and determines the selection of a theoretical perspective. For example: positivism, interpretivism etc.
- The theoretical perspective is implicit in the research question(s), and therefore dictates the choice of methodology. For example: grounded theory, Ethnography etc.
- The methodology informs the choice of research method(s) employed. For example: case study, focus group, interview, survey by questionnaire, etc.
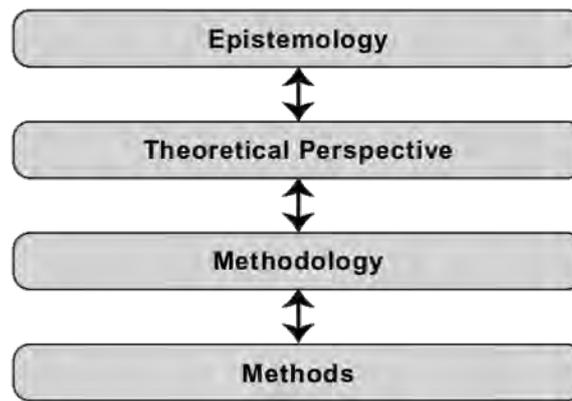
Figure 3.1 *Four basic element of the research process (Crotty 2012: 4)*

3.2 Philosophical assumptions

Those working in the field of organizational research are faced with numerous, inescapable decisions concerning the philosophical assumptions that underpin their specific area(s) of interest. Driven initially by the research question(s), such choices determine the ontology, epistemology, and the nature of inquiry driving their research; ultimately informing which methodological approach(es) may be appropriate, which methods of data collection may best serve the study, and therefore the kind(s) of results the research may be expected to deliver. Figure 3.1 illustrates how, according to Crotty (2012), the four basic elements of the research process inform one another.

Even between established theorists, however, discrepancies still exist as to how research should proceed. For example, while Creswell (2013) and Quinlan (2011) contend that the researcher should consider ontological and epistemological frameworks, Crotty (2012) omits ontological considerations from his prescription of the research process, reasoning that its mutual dependency with epistemology renders it difficult to differentiate between the two in the context of an overall approach to research (*ibid.:* 10). Other discrepancies are also exhibited within and between scholarly understanding of what should represent a paradigm. For example, Quinlan (*ibid.*: 13) contends that social constructivism is a research paradigm, whereas Crotty (*ibid*.: 5) is of the opinion that it is epistemology that drives the *selection* of a research paradigm.

3.2.1 Paradigmatic comparison

According to Sarantakos (1993: 30) a paradigm is a worldview or "*set of propositions that explain how the world is perceived,*" informing the researcher as to "*what is important, what is legitimate, and what is reasonable*" concerning systematic inquiry.

Kuhn (1962: 45) describes a research paradigm as being *"the set of common beliefs and agreements shared between scientists about how problems should be understood and addressed,"* and is that which may be characterized, according to Guba (1990), via its ontology, epistemology and methodology. Denzin and Lincoln (2005: 183) expand on Guba's characterisation by describing paradigms as the researcher's 'net' of basic beliefs based on ontological, epistemological and methodological assumptions. According to Fossey *et al.* (2002: 718) a paradigm refers to *"a system of ideas, or world views, used by a community of researchers to generate knowledge. It is a set of assumptions, research strategies and criteria for rigour that are shared, and even taken for granted by that community."* Regardless of the various nuances involved, it remains incumbent on the researcher to select the research paradigm most appropriate to the needs of the research question(s) and stated research objectives. Creswell (2013: 5), Crotty (2012) and Quinlan (2011: 13-14) each explain how philosophical theory is applied during the construction of frameworks that enable researchers to select the most appropriate research paradigm.

In quoting van Burg & Romme (2014), Karatas-Ozkan *et al.* (2014) state that the field of entrepreneurship research is *multi*paradigmatic, in that it conveys different perspectives on what entrepreneurship is, how entrepreneurial processes can be explained, and how different forms of entrepreneurship can be understood. Contrastingly, a review of the literature by Hlady-Rispal & Jouison-Laffitte (2014: 597) led them to conclude that entrepreneurship was a *pre*paradigmatic field, observing that *"quantitative and positivist approaches with an orientation toward the validation of theories, constructs and relationships"* dominated the field, and that the focus of debate still centred on the *nature* of the entrepreneurial paradigm.

3.2.2 Positivism and post-positivism

Positivism represents a long tradition of thought about science composed of two theoretical dimensions: one as an epistemology, and the other as a theory of progress (Zammito 2004). For many post-positivists however, positivism is epistemologically and ontologically flawed, with Annells (1997) noting that that the post-positivist paradigm is characterised by an objectivist epistemology underpinned by a critically real ontology, where 'critically' according to Crossan (2003: 53) *"implies that, as in positivism, the need for rigour, precision, logical reasoning and attention to evidence is required, but unlike positivism, is not confined to what can be physically observed."*

The post-positivist paradigm "*offers the opportunity to examine the subtleties of the phenomenon of entrepreneurship by placing emphasis on a range of its dimensions and the interplay between dimensions*" (Anderson *et al.* 2012, quoted in Karatas-Ozkan *et al.* 2014: 589), and, given that post-positivist approaches centred on qualitative research design have been "*demonstrably underrepresented in entrepreneurship research*" (Hindle 2004: 577), the field of entrepreneurship, characterised by dynamic, complex and emergent processes makes post-positivism particularly relevant to the epistemological underpinnings of this study. Furthermore, the paradigm is strongly associated with the original grounded theory approach to analysis (Levers 2013; Glaser & Strauss 1967).

3.2.3 Interpretivism

Opposite to the post-positivist paradigm is the interpretivist paradigm. The interpretivist paradigm typically uses qualitative methods relying on naturalistic approaches such as interviews, focus groups and the analysis of existing texts (hermeneutics). It developed as a critique of positivism in the social sciences and is a paradigm concerned with the social context of systems (Oates 2006; Klein & Myers 1999; Galliers 1991). Interpretivist research "*is guided by the researcher's set of beliefs and feelings about the world and how it should be understood and studied"* (Denzin & Lincoln 2005: 22).

As Cohen & Crabtree (2006) state, interpretivism is based on a relativist ontology, where reality is constructed intersubjectively through the meanings and understandings developed socially and experientially. Interpretivist positions are based on the theoretical belief that reality is socially constructed, and that epistemologically, what we know is negotiated within cultures, social settings, and relationships with other people.

3.3   Epistemology

The Stanford Encyclopaedia of Philosophy[1] offers a narrow definition of epistemology as "*the study of knowledge and justified belief*". Guba & Lincoln (1994: 108) offer a broader definition as "*the nature of the relationship between the knower or would-be knower and what can be known,"* and Crotty (2012: 3) defines it as "*the theory of knowledge embedded in the theoretical perspective and thereby in the methodology*". It deals with the "*nature of knowledge, its possibility, scope and general basis,"* (Hamlyn 1995: 242) and provides a philosophical grounding that determines what kind of

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[1] *https://plato.stanford.edu*

knowledge is possible, and how its legitimacy may be conferred and validated (Maynard 1994: 10).

Table 3.1   *Methodological implications of different epistemologies*

Ontologies	Realism	Internal Realism	Relativism	Nominalism
Epistemology / Methodology	Strong Positivism	Positivism	Constructionism	Strong Constructionism
Aims	Discovery	Exposure	Convergence	Invention
Starting points	Hypotheses	Propositions	Questions	Critique
Designs	Experiment	Large surveys; Multi-cases	Causes and Surveys	Engagement and Reflexivity
Data types	Numbers and Facts	Numbers and Words	Words and Numbers	Discourse and Experiences
Analysis / Interpretation	Verification/ Falsification	Correlation and Regression	Triangulation And comparison	Sense-making; Understanding
Outcomes	Confirmation of theories	Theory testing And generation	Theory generation	New insights and actions

Adapted from Easterby-Smith et al. (2012)

Other theories of knowledge are advanced by different researchers according to the theoretical perspective adopted. For example, whereas Easterby-Smith *et al.* (2012) offer four epistemological theories with four corresponding ontologies (Table 3.1), Guba & Lincoln (1994), Landry (1995), and Johnson & Duberley (2003) suggest as many as five: logical positivism, conventionalism, postmodernism, critical social theory, and critical realism.

This research is based on an interpretivist approach, which contends that knowledge is socially constructed and results from the interpretation of real events. It is therefore said to be 'observer dependent' and so relies upon the meaning of constructs as they apply to phenomena. In view of an interpretivist approach therefore, the study does not seek merely descriptive data, but looks for an understanding of the social formation of problem perspectives.

3.4   Ontology

Ontology has variously been described as the "*nature of* reality" (Lincoln & Guba 1985: 37) or the *"study of being"* (Crotty 2012: 10). It is closely tied to epistemology in that both represent important elements of the philosophy of knowledge, and when together, create a holistic view of knowledge. As noted by Crotty (*ibid.*), the two are very much complementary in that a certain epistemological stance implies certain ontological assumptions, and certain ontological assumptions point to a specific epistemology. As an

example, if one were to take an ontologically realist stance where realities exist externally to the mind, then the corresponding epistemology would suggest an objectivist outlook where meaning exists independently of consciousness.

According to Easterby-Smith *et al.* (2012: 19) four schools of ontology relate to the construction of reality, as outlined in Table 3.2:

Table 3.2   *The four schools of ontology relating to the construction of reality*

Ontology	Realism	Internal Realism	Relativism	Nominalism
Summary	The world is 'real', and science proceeds by examining and observing it	The world is real, but it is almost impossible to examine directly	Scientific laws are created by people to fit their view of reality	Reality is entirely created by people, and there is no external 'truth'
Truth	There is a single truth	Truth exists, but is obscure	There are many truths	There is no truth
Facts	Facts exist and can be revealed through experiments	Facts are concrete, but cannot always be revealed	Facts depend on the viewpoint of the observer	Facts are all human creations

Adapted from Easterby-Smith et al. (2012: 19)

3.4.1 Direct realism and critical realism

In order to create theory (new knowledge) Glaser (1998: 26-27) points out that the realist paradigm requires a methodology that involves the researcher collecting and analysing data that allows for the emergence and conceptualisation of latent social patterns and structures. Direct realism, also referred to as *naïve realism*, which has also been described in terms of "*what you see is what you get*" (Crumley 2016: 116). In other words, naïve realism portrays the world as it is experienced directly via the human senses.

Despite the absence of a uniting framework, set of beliefs, methodology or dogma, critical realism remains notoriously difficult to define. Emerging from the post-positivist crisis in the natural and social sciences during the 1970s and 1980s, it situates itself as an alternative paradigm, also referred to as '*transcendental realism*' or '*critical naturalism*' and is a relatively new meta-theory for the social sciences. This suggests that it is not a methodology, or even a theory, but a reflexive philosophical stance that aims to provide an informed account of science that may be used to help inform empirical investigations.

Critical realism was developed by Bhaskar (1978, 1979, 1986) in response to the difficulties encountered maintaining a realist position when faced with criticism targeted at empirical and naturalistic views of science. It was offered as an alternative philosophy of science that suggests a better understanding of causal force in social affairs, where causality within natural science (Bhaskar 1975, 1979) rests on structured 'generative mechanisms,' with deep social structures underpinning all social activity (Steele 2005).

Drawing on the original works of Roy Bhaskar (*ibid.*) and other scholars (e.g. Little 2016; Porpora 2015; Vandenberghe 2015; Elder-Vass 2010; Gorski 2008; Sayer 2000; Archer 1982, 1995; Lawson 1997; Steinmetz 2014, 2003, 1998), critical realism combines a general philosophy of science with the philosophies of social science, and in so doing, articulates an interface between the natural and social worlds. It is a philosophical approach to research that is eminently suited to the research goals and objectives of this project in that it recursively encourages critique as the basis for a rational, pragmatic approach to understanding. Indeed, Putnam (1990, 1981) contended that realism and pragmatism are not necessarily exclusive approaches but are much more powerful taken together than when considered separately, as they "*jointly embody the necessary tension at the heart of social constructivism: the dynamic relationship of belief and doubt, confidence and humility, in the social enterprise of learning about nature*" (Proctor 1998: 354).

Although this study does not adopt a *critically real* position *per se*, a realist view of being in the ontological domain is adopted, accepting that the epistemological domain is driven by a relativistic view of knowledge as having been socially and historically conditioned (Bhaskar 1978). According to a Peircean take on realism, this position represents the very essence of a pragmatist outlook, in that it borrows from the elements of positivism, constructionism and interpretivism that are most fitting, reframing them in to a philosophy that champions research and initiates change. Unfortunately, critical realism has faced significant challenges relating mainly to its accessibility, as much of the original work by Bhaskar is generally impenetrable by anyone other than scholars of the philosophy of science, and therefore has received limited attention. For the purposes of this study therefore, its potential as a future position is acknowledged, but will not be taken any further.

3.5   Strategies of inquiry

Creswell (2009 :11) states that strategies of inquiry, *approaches to inquiry* (Creswell 2007), and *research methodologies* (Mertens 1998), all refer to the various types of qualitative, quantitative, and mixed methods designs, or models that provide specific directions for procedures in a research design.

As noted by Goulding (2005), prominent academic journals have witnessed a steady increase in the number of papers deploying qualitative approaches to research; and while it may be some way from representing a paradigmatic revolution of Kuhnian (1962) proportions, it is fair to say that qualitative research is no longer viewed as merely 'speculative', or 'soft', as was the general contention previously.

Methodology is driven by the choices made in terms of epistemology and ontology (see Table 3.3) and is defined by Crotty (2012: 3) as the "*strategy, plan of action, process or design*" that informs the use of research methods. The same theoretical perspective may support differing methodologies via the application of different research methods.

Until the early 2000s positive approaches characterised by quantitative methods dominated the field of entrepreneurial research (Gartner & Birley 2002; Ucbasaran *et al.* 2001), meaning that the majority of scholarly output published in leading journals was deductive and quantitative (McElwee & Atherton 2005; Chandler & Lyon 2001), and could therefore be said to be lacking somewhat in methodological diversity.

Table 3.3   *Strategies of Inquiry*

Quantitative	*Qualitative*	*Mixed Methods*
• Experimental • Non-experimental, (survey, questionnaire)	• Narrative research • Phenomenology • Ethnography • Grounded theory • Case study	• Sequential • Concurrent • Transformative

Adapted from Creswell (2009:12)

This research adopts a qualitative approach. Denzin & Lincoln (2005) suggest that qualitative research is associated with an interpretive philosophy, as it needs to make sense of the subjective and socially constructed meanings expressed about the

phenomenon being studied. Indeed, of the strategies listed in Table 3.3 it is reassuring to note that the particular approach under consideration with respect to this study is grounded theory: a research strategy nominally associated with the qualitative approach.

3.6   Research methods

'Methods', as distinct from 'methodology' are defined by Crotty (2012: 3) as *"the techniques or procedures used to gather or analyse data related to some research question or hypothesis,"* and refer to what is done in order to collect data and carry out investigations. According to Creswell (2009) methods are concerned with the forms of data collection, analysis and interpretation that researchers propose for their studies. The sole method of data collection used during this study was the face-to-face, semi-structured interview.

Management research tends to rely heavily on the use of survey questionnaires, and although they were not used as the main source of empirical data during this study, a short questionnaire (see Appendix Q) was used during the respondent selection stage to construct and populate the respondent profiles presented in Appendix A. The questionnaire was used as a pre-interview screen to ensure that respondents met the basic definition of 'entrepreneur', as outlined in §2.1.

3.7   Interview as method

Mason (2002) cites the interview as the most common modality deployed for collecting data as part of a qualitative methodology. The acquisition of what Easterby-Smith *et al.* (2012: 126) refer to as *"natural language data"* involves the collection of information, or data, from organizational members in order to gain insights in to social and organizational realities. Via a series of semi-structured, in-depth interviews, the worldviews, perceptions and opinions of individuals and/or groups may be discovered through the language they use.

In their review paper *"How many qualitative interviews is enough?"* Baker & Edwards (2016) discuss adequate sample size when conducting research interviews. The authors concluded that, in the light of transcribing thousands of hours of interviews in the 'publish or perish' world in which researchers live, between 'a dozen and sixty interviews' may be taken as a guide, with thirty being the mean.

The qualitative data collected in support of this study was represented the views and experiences of some 15 distinct interview respondents, each of whom required a number of follow-up sessions to clarify certain aspects of data that was felt to be missing or was in need of further elaboration. When these follow-up sessions (in person, by telephone, via Skype etc.) are taken in to account, the actual number of interview sessions exceeds 50. Where an interviewee's story spanned several sessions, transcripts and/or the field notes for each session were concatenated to form a 'master narrative' for subsequent analysis.

3.7.1 Interviewee Sampling

Spradley (1979: 25-26) outlined a number of preferred interviewee qualities via three principles pertaining to the 'excellent informant'; the second of which states that "*it is necessary to locate 'excellent' participants to obtain excellent data.*" Morse (2010: 231) adds to this by outlining what constitutes the ideal respondent with specific respect to a grounded theory approach: "*An excellent participant for grounded theory is one who has been through, or observed, the experience under investigation.*" Participants must therefore be experts in the experience or the phenomena under investigation, and fulfil some or all of the following criteria:

- Who has the relevant experience?
- Who is accessible?
- Who is willing to provide the relevant information?
- Who is most able to provide the information?

Given the considerable difficulty in securing respondents as part of a targeted (purposive) sampling approach, it was clear that I would need to rely on existing professional contacts as part of a sampling effort initially based on convenience (Easterby-Smith *et al.* 2008: 217). The Silicon Valley based ('**EX**emplar') respondents were professional executives, generally regarded as being 'at the top of their game,' and would have been impossible to book had it not been for the prior relationships and rapport that I had nurtured and maintained over the years with Silicon Valley based entrepreneurs in my field of specialisation (telecoms). The power of personal recommendation was critical to securing interview time with all U.S. based participants. Indeed, I was reminded on more than one occasion that the time allocated to my interview was probably worth *x*-thousand dollars, and had it not been for the personal introduction received from a highly-respected mutual acquaintance, my request for interview time – along with the many others doubtlessly

received each year from hopeful researchers – would have been summarily refused. For these reasons, I felt especially privileged to have been granted an audience at all.

UK-based respondents were much easier to deal with. Again, sampling was based initially on a convenience approach, where associates from my existing business network identified as possible contenders were invited to take part in the study. Many of those initially approached declined, but on several occasions offered potential candidates from within their network of associates; and in the event that those referrals were not able to assist either, would also put forward contacts from *their* network of contacts. The cascading power of a so-called 'snowball' approach to sampling (Atkinson & Flint 2001; Biernacki & Waldorf 1981) was therefore recognised not only for its ability to identify hidden populations of otherwise inaccessible respondents, but when coupled with the power of personal introduction, represented a formidable means of securing interviewees that may otherwise have been inaccessible.

3.7.2 Respondent selection

Research participants with past and present experience in the creation and ongoing management of high-technology start-ups were identified specifically on account of their familiarity and experience operating in high-velocity technology environments, and it was the recollections of these respondents that were used to build a natively sourced, empirical narrative to feed-in to a comprehensive grounded theory study.

Unless created by way of merger, acquisition or other management buyout, most-all of the larger firms in existence today have a historical timeline that can be traced back to their formative days as a start-up entity. Each of these companies began life as the idea of a founding individual or group of founding members, typically beginning with little in terms of starting capital or other resources. It is on the strength of this common background that the idea of collecting a group of 'exemplar' interviewees was based, where so-called 'expert entrepreneurs' who now occupied senior positions within established corporations, were sought as interview respondents.

In making the distinction between exemplar/expert (EX) and novice 'start-up' (ST) entrepreneurs, Sarasvathy's (2009: 21) definition of the expert entrepreneur as "*a person who, either individually or as part of a team, has founded one or more companies, remained a full-time founder/entrepreneur for 10 years or more, and participated in taking at least one company public,*" was adopted during the selection process.

Availability played a crucial, yet unavoidable role during the respondent selection stage, as interviewees were understandably averse to spending any time that did not directly contribute to the trading activities of their company. It was only via a protracted period of careful negotiation with an existing network of colleagues and acquaintances that the author was able to secure a series of 45-minute slots with each of the respondents.

Other than the need for individuals to have been engaged with the business of venture creation long-enough to be able to constructively reflect on the operational 'highs-and-lows' of the hi-tech start-up during its formative years, the criteria for respondent selection were not particularly specific. It was expected that such individuals would have (by now) reached a senior executive position, able to rationally contrast between then and now, and would able to offer a longitudinal view of the various milestones and break-points that had been pivotal to the successes (and failures) of the firms with which they have been involved. The selection criteria could therefore be summarised thus:

    i)   Founding member(s) fitted the entrepreneurial profile outlined earlier in this section, as distinct from non-entrepreneurial employees;

    ii)   They represented a typical example of an established, successful Silicon Valley tech company;

    iii)   The interviewee had survived the early start-up years. Whether the earlier venture(s) were still operational was not at issue; it was the fact that the respondent had successfully navigated the processes and demands of a challenging start-up environment that mattered.

3.7.3 Approaching Respondents

The approach to research is based upon a set of original empirical data which is broadly longitudinal in nature and is expected to address the birth-to-grave range of relevant experience encountered by respondents during their active years in the field. As part of the initial selection process respondents were asked to complete a pre-screening questionnaire (See Appendix Q), which was used to assess early experience gained in surviving the formative years of one or more start-up ventures (for ST and EX respondents), and also any later experience gained as the (EX) entrepreneur matured in to more executive roles.

The screening process was used to ensure that all data, as well as any derivatives concluded or theorised from it, would relate only to those who could be continuously identified as acting entrepreneurially in terms of their current and/or historical business

activities, and who had participated in the early formation of one or more ventures, either alone or as part of a small founding group.

While the 10-year break-point relating to degrees of experience was applied in accordance with Sarasvathy's (2009) expert selection criteria (see previous section), care was taken during the pre-screening process to ensure that the start-up/novice (ST) respondents – especially those claiming significant levels of experience – had nevertheless *also* participated directly in the early stages of venture formation, as opposed to simply taking-on the management of a pre-existing firm, or having been appointed by investors as a professional board member to guide the early direction of a start-up.

Not all candidates were accepted. For example, a potential respondent indicated that he had successfully managed a family firm for a number of years, and then made the decision to establish an independent consultancy, described as a 'spin-off' from his previous activities in the family business. While this individual clearly had owner/manager experience as an employee in a family firm, he had yet to fully experience the formative stages of business generation, and so was excluded from the study. While the data from such respondents was extremely attractive from a convenience sampling perspective (Etikan *et al.* 2016; Robinson 2014), the potential for their data to corrupt the emergent concepts – as well as any subsequently ensuing theory – from immersion in anything other than an ab-initio start-up situation was too great a risk to take.

3.8   Interview Staging

The data collected as part of this research exercise consisted of some 40 hours of recorded interview data taken from 15 responding interviewees, collected over a period of four years.

Exemplar Respondents

The research employed a two-stranded approach to empirical data collection, with each strand addressing a particular demographic of business owner/managers at different stages of their business careers. First, a round of interviews was conducted with a set of seven 'exemplar' respondents. The 'exemplar' interviews took place over a period of four years, facilitated by several trips to Silicon Valley. In each case the interviewee occupied a CxO executive position (CEO, CFO, CTO, CIO etc.), or that of president or divisional vice president; with the nearest British equivalent to these designations being Director or

Managing Director. Each of the respondents had been in the business for 'the long haul', having worked as founder or invested stakeholder with one or more firms during the crucial formative years. Although the firm(s) with which they were involved with at the time of interview may have been subject to successive buyouts and/or mergers over the intervening years, these individuals were able to draw on entrepreneurially active career spans of between 10 and 18 years. As they were still very much active in their role, the exemplar interviewees were uniquely placed to offer 'now' and 'then' comparative views as an essential part of their narrative, thereby providing a uniquely longitudinal perspective to the data in response to the interview questions.

The research applied a grounded theory approach to inductively discover new and existing concepts associated with reasoning that arise from a detailed analysis of the data gathered from the interviews, conducted with established and successful high technology companies based in Silicon Valley, California. The rationale behind choosing such high profile established corporates being that the 'exemplar' dataset may lead to an indication of best practice decision making in the creation and ongoing operation of new business, as the subject firms must clearly have been doing something right to not only reach such a position in industry, but to also have survived up to that point.

3.8.1 The pilot study

As explained in van Teijlingen & Hundley (2001) the 'pilot study' is a preliminary, small-scale version – or trial run – of a full-scale study (Polit *et al*. 2001: 467). It helps researchers to refine their initial approach to a study by "*obtaining an entry point in to the universe of reference and socialisation in which meaning making occurs*" (Nunes *et al.* 2010: 74), and also act as a preliminary means of testing research instruments (Baker 1994: 182-3) such as questionnaires, interview protocols or other approaches to method.

Referred to alternatively as 'feasibility' or 'proof of concept' studies, pilot studies have traditionally been associated with quantitative approaches to scientific and sociological research (e.g. Lancaster *et al.* 2004). Recently however, they have been increasingly recognised by qualitative researchers as a crucial step towards acquiring early contextual sensitivity through the collection of essential information, seen as representing a crucial element of best practice research underpinned by good study design (van Teijlingen & Hundley 2001, 2002). It was further suggested (*ibid.*) that the inclusion of a pilot study may increase the likelihood of success but does not necessarily guarantee it. Pilot studies

therefore offer the possibility of a unique focus that may enhance the likelihood of a more successful outcome, potentially helping to avoid much wasted time during the main study.

The acquisition of early contextual sensitivity is especially appropriate when the researcher is considering a grounded theory approach: Nunes *et al.* (2010) advocates the inclusion of pilot studies as part of a grounded theory research design. He contrasts and compares the use of four different grounded theory projects to highlight the benefits of deploying a pilot study, where the pilot studies served the purpose of initiating novice researchers in to interview techniques, relating to interviewees, conceptual and theoretical memoing, and constant comparison and coding. Furthermore, he demonstrated that pilot studies did indeed improve theoretical and contextual sensitivity.

The pilot interviews

Two pilot interviews provided by 'exemplar'[2] entrepreneurial respondents (refs. **EX1** and **EX2** respectively – see Appendix A) formed the starting point for this research. They established a base-line for the entire study, where a 'lite' GTM-informed conceptual analysis of their transcribed narratives set out to uncover issues of general concern relating to technology and change, and which may yield areas of interest worthy of further investigation.

In the spirit of an inductive approach, where initial assumptions remain intentionally minimal (i.e. no tangible hypothesis), the two respondents were given free-reign to discuss issues pertaining to technology and change as they saw fit. Explained in the closing paragraphs of this section, the pilot study served to encourage the emergence of further research questions able to drill-down further, to deeper – perhaps more embedded – aspects directly associated with the problems of technological change already cited by the pilot respondents.

The impact of recent technological change emerged as the most dominant and pressing general point of common concern between the two pilot interviewees; a fact reflected by the emergence of the first conceptual sub-category, SC1 – *Adapting to change*. Specifically, the respondents focussed on recent (post 2000CE) advances in interactive technologies that enhanced accessibility and communication between people, systems,

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[2] *'Exemplar' respondents were experienced entrepreneurs who had navigated the entrepreneurial life-cycle several times, and who had reached senior executive or CxO level in the high-technology [corporate] sector.*

and the ever-expanding corpus of information stored within and between them. The kind of transformative technology under discussion was relatively new, having only been in circulation since the advent of what O'Reilly (2009) referred to during a 2004 conference as 'Web 2.0' (see §1.3.4).

In stark contrast to the relatively passive, unidirectional technologies now retrospectively referred to as 'Web 1.0' that had dominated the 1990s and the first few years of the new century, the disruptive technologies being discussed by respondents were based on the concept of mass sharing and collaboration, where massively-interconnected networks facilitated by sophisticated telecommunications networks were combining with 'smart', 'always-on' devices to allow real-time interaction between disparately-based resources (human- and non-human). This network of socially connected individuals with the ability to partake in instantaneous global broadcast (e.g. YouTube, Vimeo, Twitter, Instagram etc.) was what Castells (2004) generally referred to as 'the networked society.'

Where did the research questions come from?

The importance of the research question as fundamental to every aspect of a GT study cannot be underestimated (Willig 2013: 72). Unlike other research approaches, GT requires only an *initial* research question upon which the researcher focusses attention (Strauss & Corbin 1990: 37-40). It serves to identify the *general* phenomenon of interest, while at the same time not making any assumptions about it. Strauss & Corbin (1990: 38) also recommend that it should orientate the researcher towards action and process by posing '*How…?'* rather than *'What…?'* questions. As the research progresses, theoretical sampling and theoretical sensitivity to the field via further interviews and additional analysis encourages the emergence and adoption of more research questions.

When analysing the pilot data, two further areas of substantive concern began to gain traction: respondents were concerned not only with general issues relating to technological change raised by the first research question (adapting, re-skilling etc.), but also indicated in their narratives that the 'Web 2.0' technologies to have appeared since 2004/5 were beginning to have a noticeable impact on the way in which they approached decision making and creativity. Further concern was expressed regarding the moral and ethical dimensions associated with this kind of technology, and how its 'creeping' prevalence stood to impact on them and those connected to them. The concerns expressed

remained vague at this stage; the purpose of this study was now to encourage the wider emergence of these issues via rigorously applied rounds of GT analysis.

3.8.2 Interview protocol

The author conducted face-to-face, long-form narrative interviews with respondents over a four-year period, between March 2010 and March 2014. As mentioned by Fletcher (2007) and Larty & Hamilton (2011), narrative approaches represent a particularly powerful means of building theory in relation to entrepreneurship, especially when conducted as part of a grounded theory approach.

All interviews were scheduled to take place on site at the respondent's usual place of work, and in a private room so as to minimise any chance of disruption or breach of confidentiality. Prior to the interview session, each respondent had been sent via e-mail a short 'profile questionnaire' (see Appendix Q for template), the purpose of which was to:

i)   follow-up to an e-mail sent two weeks before (See Appendix Q) introducing the background details, purpose, goals and objectives of the study; as well as introducing the parties involved (university, researcher, supervisors);

ii)   establish whether or not the respondent met the requirements of the study (See §3.7.2 Respondent Selection) via an attached questionnaire (see Appendix Q);

iii)   outlined the ethical rules of the study, describing how their responses would remain confidential, and how their data would be treated during, and after the study;

iv)   solicit the respondent's willingness to be included in the study; reminding them that they may withdraw from the process at any time without notice or reason.

During the interview

Respondents were given complete freedom to recount their story in their own words, being allowed to focus on the areas that they felt were of importance in response to the research questions. As suggested in Gubrium & Holstein (2012: 353), sound interview strategies help the researcher see beyond anecdotal recollections and other artefacts of little conceptual relevance. Consequently, grounded theorists must be active during the interview, remaining alert to the possibility of interesting leads (Kvale & Brinkman 2009; Kvale 2007; Rubin & Rubin 2005; Seidman 2006).

When it became apparent that a respondent might be struggling, she/he would be prompted with open-ended questions of the form "*tell me more about…*" in order to elicit

additional information, or to encourage further elaboration on a particular topic, point or set of points, with the occasional interjection "you mentioned *AAA* (and *BBB*) earlier, please could you elaborate further…", taking care not to interrupt again until a discernible break in topic had been detected. Once it was clear that the respondent felt they had reached a self-determined conclusion in response to the research questions, and/or any pre-agreed time limit had been reached, the interview was concluded by the researcher, taking the professional courtesy of not allowing any of the sessions to over-run.

Respondents were thanked for their time at the conclusion of each interview and asked if they had any objection to the occasional follow-up communication, should any details need to be clarified or expanded upon. As part of a 'snowball sampling strategy' (see §3.7.1) interviewees were also asked if they could think of any associates who might be interested in taking part in the study, and on many occasions provided the details immediately. All respondents indicated a willingness to engage in further communication, should the need arise.

Post-interview considerations

It was only after each interview that recollections relating to potentially 'missing elements' began to emerge. As soon as practically possible after each session therefore, I felt compelled to make my own additional field notes, often made while sitting in the car before leaving the interview venue. It was crucial that as many nuanced aspects of the session were captured while still fresh in memory and easy to recall.

Replaying the dialogue repeatedly in my mind immediately after the interview not only contributed to the clarity of the notes taken, but also had the unexpected effect of further consolidating thoughts. While the information was still fresh for recall, I would dictate thoughts, reflections and insights in to a voice recorder during the drive home, which, in conjunction with the post-interview notes taken would be transcribed later to form the post-sessional field notes (see Appendix F). To do any less would have left me with the feeling of an incomplete and somewhat deficient data set, lacking the personal nuances, emotions and gestures that an audio session – or notes taken during the session – just would not have been able to capture. This was especially useful as it added an additional 'emotive' layer to the proceedings; a feature that would have been otherwise absent in the audio recording had a respondent expressed say, surprise, or made use of some

hand/facial gesture or other non-verbal cue to communicate a point, or emotional state in some way.

Clearly, one way of preserving the entire face-to-face encounter would have been to capture sessions on video, where not only the audio narrative but also the visual elements could have been preserved; thereby offering a comprehensively 'rich' picture of the session. However, a number of respondents were opposed to an audio-only recording of the interview, let-alone an *audio-visual* recording, and in some cases requested that I only make written notes, without an audio recording.

3.9   Retrospective research

Each of the respondents taking part in this study possessed at least five, and as many as twenty, years of prior entrepreneurial experience (see Appendix A for individual profiles) and were therefore able to draw comparatively on the present and historical cases as they related to their longitudinal experience; often relying on the contrasting benefits or disadvantages between two extremes to make their point. The comparisons entailed positive and negative distinctions between past and present; with the past referring predominantly to a pre-2000 existence, prior to the mainstream proliferation of so-called 'Web 2.0' ICTs, described in §1.3.4.

As pointed out by Cox & Hassard (2007), social science methods for researching the past have received much less attention than methods that assist in an understanding of the present, or for predicting the future; and although the use of history has become increasingly discussed and more widely applied (Greenwood & Bernardi 2014), the potential relevance of the concept of temporality remains under-researched as an area of management and organisational studies (Cox & Hassard *ibid.*), and so empirical studies have thus remained sparse.

When contrasted against a mainstream management science built on modernist science keen to emancipate itself from the dogmas and ideologies imposed by authority and traditional values, Lyotard's (1984) 'grand narratives' of progress and emancipation advanced by enlightenment thinking have also tended to displace and marginalise the past. As Cox & Hassard (*ibid.*: 476) point out, *"in both its interests and practices, modernism therefore looks to the future rather than to the past, for its emphasis rests on hope, prediction and control for a better future."*

In the context of this research, historical recollections via retrospective methods allow respondents to offer a longitudinal picture at both ends of a temporally distinct, yet empirically real, working environment. Given the timespans involved with respect to this study, the effective scope of the project could be extended from the usual limitations associated with a doctoral research project (4 years), to an effective time span covering some 25+ years (c.1990 – 2017). Here, 1990 represents the earliest year at which the oldest interviewee had reached working age; therefore, placing all respondents in the under-50 age demographic at the time of publication of this thesis. Contrastingly, the eldest of the 'millennial' participants (of the 'ST' non-exemplar type) were in their late-20s, and, unlike their older (EX) counterparts who had experienced working life prior to the advent of a 'Web2.0' world, could only ever claim to know a life characterised by such technologies, as a normative aspect of their home and working environment.

Cox & Hassard (*ibid.*) describe four positions outlining retrospective research; the first of which, *Controlling the Past*, focusses on attempts made to maximise accurate recall or to prevent sources of error or bias. This position recognises that historically based recollections may have become distorted, confused or embellished over time when attempting to uncover or capture the truth. Described by Golden (1992: 849) as *"the pitfalls in retrospective accounts,"* problems associated with qualitative research attempting to access the past have been typified by faulty memories, oversimplifications and rationalisations, coupled with the concept of 'hindsight bias' (Azar 2000; Fischhoff 1975), which describes the way memory changes as one learns of later outcomes related to past events. Miller *et al*. (1997: 189-190) further cited simple memory lapses as a source of faulty post hoc recall.

In an attempt to reduce such errors and avoid biased recall, particular remedies have been proposed (e.g. Golden 1992: 855) to minimise any adverse impact on the quality of data. By following *"guidelines generally associated with proper retrospective data collection"* (Miller *et al.* 1997: 201, quoted in Cox & Hassard, *ibid.*): rigorous undertakings to assure respondents of the permanent confidentiality of any data gathered from them; the use of free rather than forced questioning during interviews; and a focus on simple facts, concrete events and the avoidance of extended anecdotal or 'story-based' narratives, have all proved effective in reducing error.

Miller *et al.* (*ibid.*) suggest that if such guidelines are followed, then *"scholars could be truly comfortable with the idea that retrospective reports are not fiction."* In a subsequent response to Miller, Cox & Hassard (*ibid.*) point out Golden's call for researchers to be critical of retrospective data, arguing that *"if significant efforts are made to minimize retrospective biases and error, and these data can be validated, then retrospective data may well provide unique access to past organizational events"* (Golden 1997: 1251).

In addition to *Controlling the Past* - the first of four positions on retrospective research – three other positions are outlined in the Cox & Hassard paper, and may be summarised thus:

> **_Interpreting the past_** – not concerned with obtaining a clear picture of a past reality, but on its present interpretation. Understanding of the present is informed by construction of past reality, sympathetic to Berger & Luckmann's (1966) idea that present reality is socially constructed.
>
> **_Co-opting the past_** – where causal explanations link the past and the present, rather than attempting to gain access to the past from the present or understanding how constructions of the past affect the future.
>
> **_Representing the past_** – does not assume that the present is ontologically independent of the past, and time is represented as a one-dimensional unitary form which is 'objective, absolute, homogeneous, linear, evenly flowing, measurable, readily divisible and independent of events'
>
> <div align="right">Summarised from Cox & Hassard (2007: 480-487)</div>

It should be clear from the above descriptions that *co-opting the past* and *representing the past*, based on realist and anti-realist ontologies respectively have no significance in the context of this research, as respondent narratives focus on the comparative differences between past and present, as opposed to any suggestion of causality (co-opting the past).

However, *interpreting the past* does hold significant currency for this study, as it suggests that an understanding of the present may be enhanced by an understanding and appreciation of a past reality, and this outlook is sympathetic to the constructivism of an interpretivist approach which complies with the founding tenets of grounded theory as originally stated by Glaser & Strauss (1967). With respect to this study, the particulars of events recalled in the present or past were not at issue; it was the perceived *difference* between the two as it related to the recalled level of situational agency with/without the presence of ICTs, and its impact on approaches to reasoning and decision making in the course of building and running their respective entrepreneurial venture(s).

3.10 Reliability and validity in qualitative research

Morse *et al.* (2002) asserted that reliability and validity were terms pertaining uniquely to the quantitative paradigm and were therefore not relevant to qualitative inquiry (Altheide & Johnson 1998; Leininger 1994). This resulted in a move away from the use of reliability and validity in qualitative inquiry during the 1980s (Morse *et al. ibid.*) in a shift to 'ensure rigour'. In recent decades, reliability and validity have therefore been subtly supplanted by other metrics relating to the overall significance, relevance, impact and utility of qualitative inquiry.

3.11 CAQDAS: the case for data analysis software

Recent advances in technology have prompted the development of software tools to assist with the organisation and analysis of qualitative and non-numerically gathered data. All fall under the general remit of *Computer-Assisted Qualitative Data Analysis Software* (CAQDAS), with some now referring to 'CAQDAS 2.0' to accommodate the recent trend of integrating traditional CAQDAS software with Web 2.0-based collaborative platforms, where communities of users may share techniques and other information (Di Gregorio 2010). Despite recent advances however, Roberts & Wilson (2002: §21) remind us that "*the first and foremost point to make about the use of computers in qualitative data analysis is that computers do not and cannot analyse qualitative data.*"

The use of CAQDAS packages, especially among early career researchers, has been the subject of some critical attention (e.g. Rodik & Primorac 2015) where the epistemological position adopted by these applications suggests the possibility of a "*positivistic approach to the natural world*" (Roberts & Wilson 2002: §5-6), thereby opening up the possibility for potential conflict and possible confusion with the goal of qualitative researchers, which is to perceive reality from the naturalistic perspective of human actors. Furthermore, it has been suggested that CAQDAS has the potential to turn qualitative research into a rigidly automated process that neglects the roles of human interpretation and reflection (Kelle 1995) where users undertake complex analysis without fully understanding the principles of the techniques they are applying (Johnston 2006; Weitzman 2000; Richards 1998).

St.John & Johnson (2000) highlight some of the advantages of CAQDAS: freedom from manual and clerical tasks; saving time; being able to deal with large amounts of qualitative data; increased flexibility, and having improved validity and auditability of qualitative research. However, they also raise a number of concerns: the privileging of

coding and retrieval methods; increasingly deterministic and rigid processes; reification of data; increased pressure on researchers to focus on volume and breadth rather than depth and meaning; the learning curve associated with the software package itself, and a distraction from the real work of analysis.

The majority of functions and features built in to existing CAQDAS packages focus on the marking, classification and retrieval of text. In line with the observations of Roberts & Wilson (*ibid.*), novice researchers are frequently warned that CAQDAS packages are not – and never have been – intended to analyse data in any substantive fashion; they are merely data management and organizational tools there to assist the researcher in his or her efforts to makes sense of the data. It has even been suggested that newcomers begin by manually coding using pen and paper, and then moving on to computer-based analysis.

During the early stages of this project various CAQDAS packages were considered, and NVivo was selected on account of its general availability and popularity in the qualitative research community. The use of CAQDAS to manage a growing list of codes and their many interrelationships was considered on a number of occasions, but each time the need to retain direct 'hands-on contact' control of the data meant that a manual approach always won-out over any software-based approach.

During this study I tried several times to adopt a CAQDAS environment based on NVivo; however, each attempt further convinced me that is was not a fitting approach for this study, as more and more mental energy and time was being spent accommodating the coding and organising preferences of the software, which seemed contra to the natural flow of order dictated by the adopted GT approach. Suspecting that there may have been a fundamental incompatibility with NVivo and my particular approach, I considered another CAQDAS package called 'ATLAS.ti', which resulted in a similar experience and set of outcomes to those encountered with NVivo.

I concur with Saldaña's (2016: 29) recommendation that coding should be manually documented on paper (and not on a screen), as there is "*something about manipulating qualitative data on paper and writing codes in pencil that gives you more control over and ownership of the work.*" (Saldaña *ibid.*). While NVivo did prove useful as a means of organising and arranging the data, when it came to analysis and the need to make conceptual connections, nothing could replace the physical act of touching and shuffling some 293 slips of paper, each containing narrative excerpts, and rearranging them in to conceptual groups and other collections that exhibited some form of thematic congruence.

Part II: Grounded theory - an overview

3.12 Introduction

With reference to a better understanding of business and management phenomena, the experimentation and rigidity of scientific approaches within the positivist paradigm do not necessarily lead to a better understanding of the naturalistic world. Recognised as a well-established, widely recognised, credible and rigorous methodology (Glaser 2001), grounded theory (hereafter referred to as 'GT') offers a credible alternative via a systematic, inductive approach to developing theory in a bid to better understand complex social processes (Glaser 1978).

GT has developed as an approach to data analysis aimed at understanding particular social phenomena in naturalistic settings. Of particular relevance to this study is that the GT approach has also been recognised as having practical value to practitioners in assisting them to better read and manage their setup (Partington 2000), and as further agued by Locke (2001: 95), the approach is "*particularly appropriate to researching managerial and organizational behaviour, as it captures the complexity of the managerial process and is proficient to examine complexities due to its ability to generate a comprehensive account of organisational action in context.*" Rather than offering descriptions of what is going on, GT highlights contextual explanations and is therefore able to provide a theoretical lens for the researcher and practitioner in pursuit of a better understanding of workplace practice.

Furthermore, in terms of its suitability for entrepreneurship research, Douglas (2004: 62) asserts that "*Grounded theory offers the entrepreneurship researcher appropriate inquiry processes with which to address research issues at the micro-level of entrepreneurial activity. Investigating, in minute detail, the entrepreneur and his or her immediate environment are well suited to the grounded theorist.*"

3.13 What is grounded theory?

GT is a qualitative research method originally developed by Glaser & Strauss (1967), where the generation of theory from data is the researcher's principal aim. The purpose of GT is to develop theory about particular phenomena of interest, and while some may identify or even confuse GT with abstract theorising (blue skies thinking), the theory is always *grounded* in empirical observation, where concepts emerge from the data, and not the data itself. As explained by Glaser:

> In grounded theory the analyst humbly allows the data to control him as much as humanly possible, by writing a theory for only what emerges through his skilled induction. The integration of his substantive theory as it emerges through coding and sorting is his verification that the hypotheses and concepts fit and work and are relevant enough to suggest. They are not proven; they are theory.
>
> (Glaser 1992: 87)

GT is a retrospectively inductive method of research that relies on a grounded and intuitive starting point of pure knowledge supported by a corpus of representative data. The research goals (theory) are, to begin with, unknown, but are guided initially by broadly-based, generative research questions (see §3.8.1), which evolve during the iterative stages of coding and indexing (sorting); both of which are features specific to GT.

GT is a complex iterative process, where the initial research question is intended to be used as a general pointer for the direction of research, while at the same time not being static or confining in any way. However, as the researcher begins to gather data, the core theoretical concepts begin to emerge, and may be readily identified with an emerging area of research interest, thereby inviting further research questions able to point towards a substantive, more specific area of investigation.

3.14 Philosophical Considerations

A full understanding of the GT approach depends partly upon an awareness of its ontological, epistemological and methodological perspectives. Although its founders claim it to be philosophically unbiased, GT is based on an interpretative philosophical approach derived from the theoretical framework of symbolic interactionism.

Whereas Strauss & Corbin (1990, 1998) explicitly embrace the qualitative paradigm, Glaser claims that grounded theory is neutral and "*as issue free as research can get –*

conceptually abstract of issues and subject to modification by constant comparison," (Glaser 2003: 115), rejecting the divide that exists between positivist and interpretivist paradigms. Paradigmatically therefore, GT could be viewed as distinct, with its own principles and procedures.

As outlined by Holton (in Bryant & Charmaz 2010: 267), scholars have variously positioned GT as positivist (Charmaz 2000); interpretivist (Lowenberg 1993); pragmatist (Locke 2001); realist (Lomborg & Kirkevold 2003; Partington 2000, 2002; Patton 2002); and neo-empiricist (Johnson *et al.* 2006). Many persist in positioning classic grounded theory within the positivist paradigm, noting the predominance of a realist ontology and a positivist epistemology (*ibid.*: 513).

Glaser & Strauss (1965, 1967) drew much of the theoretical inspiration for GT from the philosophical writings of the American pragmatists Dewey, James and Peirce. In line with the theme of entrepreneurial agency that runs throughout this research, GT is portrayed as an in-depth, rigorously thorough set of processes that stand to reveal an understanding of human action in context from the perspective of the agent (emic), rather than from dominant nomothetic inquiries and etic interpretations (Luthans & Martinko 1987; quoted in Douglas 2004)

3.14.1   Epistemology of grounded theory

Guba & Lincoln (1994: 108) describe epistemology as "*the nature of the relationship between the knower or would-be knower and what can be known,*" and according to Schreiber & Stern (2001: 180), "[*epistemology*] *may be seen both as a philosophy of human knowing and how one learns about it,*" who then proceed to make the distinction between GT and quantitative methods, thus:

> In contrast to quantitative methods, in which the researcher is the expert, in grounded theory the researcher defers to the experience of the participant, who has experience with the phenomenon of study. The researcher's job is to investigate the socially constructed meanings that form the participants' realities and the behaviors that flow from these meanings. That is, we want to know how they understand and act within their worlds. What can be known of the covert and overt behavior of participants is negotiated between the researcher and participant, toward a shared understanding. Clearly, in our view, the epistemology of grounded theory is steeped in symbolic interaction.

<div align="right">(Schreiber & Stern 2001: 180)</div>

However, Glaser & Holton (2005) dismiss the above view as patently wrong, claiming that it is pure rhetoric in the quest for worrisome accuracy. Quoted in Glaser & Holton (*ibid.*), May (1994) argues that expert knowledge consists of the capacity [of the

researcher/analyst] to know where to look and the ability to 'ferret out' similarities and differences based on their experience. Far from the claims of Schreiber and Stern that "*the researcher defers to the experience of the participant*" (see above quotation), May (*ibid.*) contends that, although the ability to enter the field with an open a mind as possible has its advantages, her experience in the health care arena was an undeniable asset, implying that it is impossible for researchers with prior experience and/or expertise in the field to transcend their experienced view. She further adds that *"expert analysts are virtually always informed by extant knowledge and use this knowledge as if it were another informant"* (May *ibid.*: 19). Responding to May's contention, and in defence of the researcher possessing an existing knowledge of the field under investigation, Glaser & Holton (2005: 8) add "*experienced researchers are therefore more able to suspend their knowledge of a literature and research field based on their skilled, competent research ability to stay in control of options and thereby stay open.*" Researchers are therefore better positioned to spot preconceptions since they are more aware to begin with (Morse 1994), although they must carefully exercise choice when it comes to "*staying open to what can emerge*" (Morse *ibid.*) and allowing what they already know to enter the frame of reference. In other words, expert analysts must know exactly how and when to 'bracket' their existing knowledge of the field when the need to 'stay open' arises in a research situation.

3.14.2   A systems view of GT

Glaser & Strauss (1967: 32) stated that grounded theory could be viewed "*dynamically, as an ever-developing entity, not as a perfect product;*" a sentiment subsequently echoed by Stillman (2006) who demonstrated that grounded theorists and practitioners alike think systemically by applying powerful methodologies that are fundamentally rooted in systems thinking. Stillman (*ibid.*: 498) goes on to explain how grounded theory itself represents "*an evolving modification of systems thinking...consistent with the process of open, self-renewing systems,*" where theorists "*contribute their own novel structural changes, patterns, and processes designed to meet the requirements of their particular frameworks.*" Grounded theorists therefore adapt systems theory by applying unique principles and methods that are not only empowering but are also able to capture 'reality-in-flight' (Pettigrew 2003); potentially transforming it "*through solutions geared to optimal and sustainable social and organizational change.*" (Stillman *ibid.*: 503)

Grounded theorists positively embrace the modification of theory as time, place and context evolve, allowing new information to impact theory as it emerges from the constant comparison of conceptual indicators (Stillman *ibid.*), even during the very late stages of analysis. As theory will always adapt and evolve systematically in step with the social, political scientific and cultural milieu (Kultygin 2003), its development can be said to be a social process situated within the larger context of time and place. Accordingly, as an 'ever-evolving process' (Glaser & Strauss 1967: 9) grounded theory derives from and responds dynamically to the zeitgeist in which it is rooted.

3.15 GT research design

A typical grounded theory research design includes the elements outlined in Table 3.4. Which type of grounded theory determines which steps are included; for example, the classical 'Glaserian' approach does not encourage the use of initial research questions or a literature review, whereas the Straussian variant does. Note also that the order of steps shown do not necessarily indicate the exact order of events: for example, analytic memoing may be incorporated with data collection in step 2. Similarly, constant comparison may run continuously from step 4 until theoretical saturation is reached.

Table 3.4   *The elements of grounded theory research design*

1. Formulation of the research question(s)
2. Theoretical sampling
3. Interview transcribing and Contact summary
4. Coding: Data fragmenting and Data naming
5. Developing conceptual categories
6. Constant comparison
7. Analytic memoing
8. Growing theories

According to Cresswell (2009: 13) GT research is designed around two primary characteristics: i) the constant comparison of data with emerging categories, and ii) the theoretical sampling of different groups to maximize the similarities and difference between datasets. The approach 'sensitizes' the research to a particular area of study, as opposed to providing hypotheses. The underlying rationale of the approach is that answers to the problem under investigation are already 'grounded' within the collected data, and that their successful discovery is directly related to the analyst's skills relating to the development of conceptual indicators and their comparison with other artefacts.

3.16 Comparing grounded theory with phenomenology

Qualitative methods in particular are embraced by researchers because such approaches allow for a rich and detailed exploration of the lived human experience (van Manen 2016). However, it has been noticed (Morse 1989) that there is a tendency to blur distinctions between some qualitative approaches, resulting in somewhat eclectic combinations of their various elements.

Furthermore, Baker *et al.* (1992) note that grounded theory and Phenomenology are two commonly applied methodologies that continue to be misrepresented, with the resulting research tending to suffer from 'method slurring', where, as Baker *et al.* (*ibid.*: 1355) suggest "*it is not uncommon for an investigator to purport to use one or the other, while in fact elements of each are combined.*"

Phenomenology is concerned with the study of phenomena: the discovery of their essence or the 'appearance' of things (Cohen 1987) as 'things in themselves'. The aim therefore is to offer a description of the world as it is experienced by various participants to an inquiry, in order to discover commonality between meaning in the analysis of the empirical observations exhibited by a given phenomenon. (Baker *et al.* 1992)

3.17 Which version of grounded theory?

Glaser is generally perceived as remaining more in tune with the 'original' or 'classical' version of grounded theory, especially in terms of how data is analysed; whereas Strauss (in conjunction with Corbin) attempted to reformulate the original version (see Walker & Myrick 2006; Heath & Cowley 2004; Glaser 1992), as data analysis was deemed to have been poorly covered by the first publication (Glaser & Strauss 1967). Strauss and Corbin published two books in an attempt to clarify contentious and vague aspects of the data analysis aspects of GT (Strauss & Corbin 1998; 1990), however, the updated approach to analysis was widely criticised, with Glaser (1992) claiming that it represented a departure from classical grounded theory to the point of promoting an entirely new method that was "*...forced, full, conceptual description*" (Glaser *ibid.*: 5); with Melia (1996: 370) referring to it as "*...programmatic, overfomulaic and rigid.*" Glaser asserted that the reformulation no longer adhered to the spirit of classical GT, and therefore represented a completely different method.

In these publications, Strauss & Corbin (1998) and Corbin & Strauss (2008) explicitly refer to deduction followed by validation and elaboration but make no reference to verification. Whether verification should be an outcome of grounded theory or not seems to represent the basis of the conflict between the two authors (Heath & Cowley 2004; Boychuk Duchscher & Morgan 2004; Holloway & Wheeler 2002; MacDonald 2001; Charmaz 2000), citing that the role of induction had been overstated (Bryant & Charmaz 2010; Heath & Cowley 2004) with respect to grounded theory.

While Strauss & Corbin (1990) offer a more prescriptive approach to grounded theory by specifying the step by step approach to be taken by the researcher, Glaser's (1992) approach is viewed as the more flexible of the two: those who adopt his model tend to find the approach to data analysis more liberating (Boychuk Duchscher & Morgan 2004; Heath & Cowley 2004; McCallin 2003), as central concepts are easily encouraged to emerge inferentially from the coding process, thereby reflecting key issues or problems as perceived by the actors. Contrastingly, those following a Straussian approach prefer to adhere to clearer, more prescriptive guidelines with respect to the analysis stage (Heath & Cowley 2004; McCallin 2003; Kendall 1999; Melia 1996; Glaser 1992).

Paradigmatically, the Glaserian approach to GT leans more towards post-positivism (Annells 1996) and based on its philosophical roots leans more towards the critically realist ontology inspired by Bhaskar (1979). Corbin & Strauss (2008) rejected the post-positivist label in preference to a constructivist paradigm of inquiry, thereby recognising the nature of the inquirer and participants.

In line with the early stages of a qualitative research project, Strauss supports the formulation of a research problem followed by research questions, as the researcher is able to draw on his experience and knowledge (Corbin & Strauss 1990; 2008). However, Glaser (1992; 1998) rejects both, claiming that the process should begin with neutral, loosely-stated research questions.

When considering the ongoing debates concerning the various incarnations of GT, the resulting conclusion must be that there is no 'one' way associated with the approach, and whichever way is adopted ultimately rests with the preferences of the analyst, and perhaps more importantly, the 'fit' of a particular approach with the demands of the research at hand. This study has therefore elected to implement a hybridised version of GT, where the most appropriate elements from each variant are adopted (see Table 3.5).

Table 3.5   *Grounded theory variants*

Glaserian Approach	*Straussian Approach*
Begins with general wonderment (an empty mind)	*Have a general idea of where to begin*
Emerging theory, with neutral questions	*Forcing the theory, with structured questions*
Development of a conceptual theory (abstraction of time, people and place)	*Conceptual description (description of situations)*
The theory is grounded in the data	*The theory is interpreted by an observer*
Inductive method	*Inductive-deductive method*
The researcher is passive, exhibiting disciplined restraint	*The researcher is active*
Data reveals the theory	*Data is structured to reveal the theory*
Coding is less rigorous, a constant comparison of incident to incident, with neutral questions, categories and properties evolving. Take care not to 'over-conceptualise'; identify key points	*Coding is more rigorous and defined by technique*
Two coding phases or types:	***Three types of coding:***
Simple *- fracture the data, then conceptually group it* ***Substantive*** *– (open or selective) to produce categories and properties*	***Open*** *- identifying, naming, categorising and describing phenomena)* ***Axial*** *- the process of relating codes to each other* ***Selective*** *– choosing a core category and relating other categories to that*
Regarded by some as the only 'true' Grounded Theory Methodology (GTM)	*Regarded by some as a form of Qualitative Data Analysis (QDA)*

(Adapted from Halaweh et al. 2008)

3.18 "Health warnings" with respect to grounded theory

A number of 'health warnings' accompany the use and deployment of grounded theory, as stated by Douglas (2004: 60); namely, that:

> the researcher…must take particular care to avoid imposing concepts that reflect the researcher's own epistemological predictions, rather than those emerging from interaction with the study site, its participants and subsequent data.
>
> Douglas (2004: 60).

GT is a self-defining methodology in that it lends itself to a variety of subjective interpretations. It is this aspect of the theory that leaves one with a somewhat ambiguous and vague feeling about its actual purpose when attempting to offer a definition for it. For

reasons that will become evident, GT also carries with it a number of 'health warnings', resulting in the research of those who choose to use it being possibly viewed with some suspicion at least, and scepticism at most. By its very nature, GT offers a controversial approach to tackling an *area* of research interest, where the concepts and theory emerge after a number of successive iterations. Operating in almost reverse fashion, this is in direct contrast to the traditional research approach and represents perhaps a fundamental source of concern regarding GT. GT also differs from other qualitative research methods in that it focuses on the freedom of the researcher in order to maximize impartiality.

This mode of qualitative study has spread from its original use by sociologists to the other social sciences, including management science. Despite its wider use, the general case for GT's credibility has not been helped in the past as it has unfortunately been the source of confusion when published qualitative researchers have cited GT as their methodological approach, but their work has then gone on to bear little actual resemblance to it (Health Warning #2, as stated in Douglas (*ibid.*)).

3.18.1   No pre-research literature review

One of the most problematic issues relating to the unique approach adopted by grounded theory is how and when one is expected to consult existing literature in the subject area during the course of the study. Glaser & Strauss (1967: 37) explicitly advised against any form of pre-research literature review in the substantive area of research, thus:

> An effective strategy is, at first, literally to ignore the literature of theory and fact on the area under study, in order to assure that the emergence of categories will not be contaminated by concepts more suited to different areas.
>
> Glaser & Strauss (1967: 37)

While both perspectives on GT recognise the role of existing literature when developing new theory – and whether it should be used or not – Glaser (1992, 1998) strongly discourages the use of any literature during the early stages of research to avoid 'tainting' or 'forcing' the data with any preconceptions that the researcher may harbour. He suggests that the extant literature should only be consulted once any substantive theory begins to emerge. Contrastingly, the Straussian approach to GT contends that the literature may be consulted at any phase of the process (Corbin & Strauss 2008).

The literature review associated with GT-based research differs somewhat from other methodological approaches in that it has the specific purpose of marginalising a comprehensive review in pursuit of minimising the potential for any literature distortion

when developing the emergent categories (Glaser 2001). By restricting the scope of the review, it thereby ensures a reduced likelihood that the data will be manipulated to support existing theory and findings (Glaser & Strauss 1967; Strauss & Corbin 1990). Given that the literature review is a crucial stage in any research endeavour – if not only to highlight gaps in the body of knowledge – it has been suggested that "*to plunge into field research without delving in to the relevant literature would be folly*" (Schreiber & Stern 2001: 58). While every researcher would no doubt possess *some* residual or background knowledge relating to the area under investigation – especially if the researcher approaches the study as expert analyst (see §3.14.1) – no researcher could ever claim to be 'contamination-free.'

(Based on ideas from Ragin, 1994)
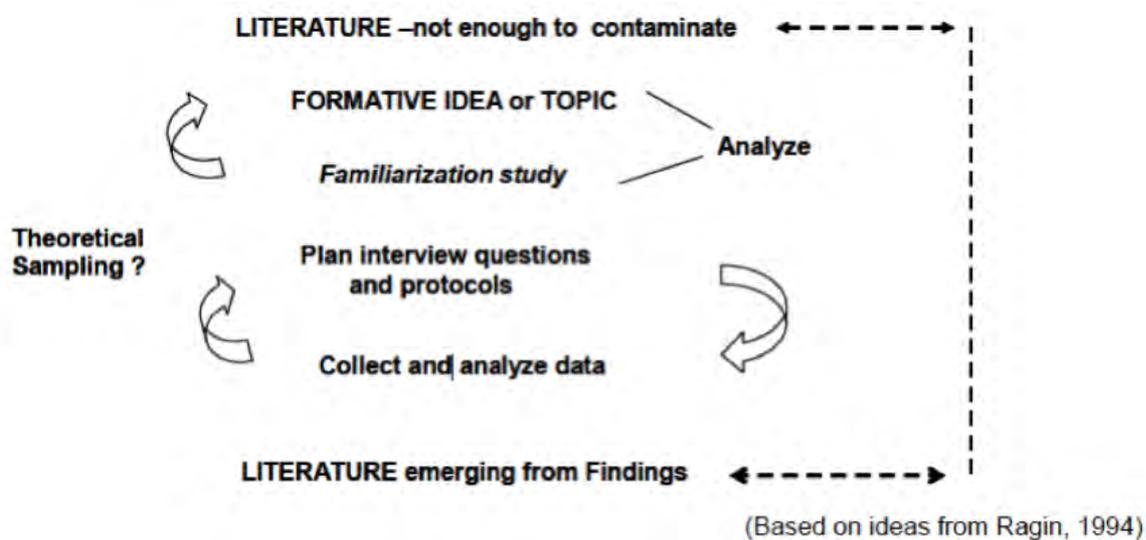
Figure 3.2   *The place of literature review in GT analysis*

As pointed out by Lakatos (1978: 15) *"there are and can be no sensations unimpregnated by expectations."* Glaser and Strauss did not completely overlook the issues of prior knowledge and the potential of the literature review to 'taint' it, as, in *The Discovery of Grounded Theory* (Glaser & Strauss 1967: 3) they declare that: *"Of course, the researcher does not approach reality as a tabula rasa. (S)he must have a perspective that will help see relevant data and abstract significant categories from [his/her] scrutinies of the data."*

3.19 Evaluation

It is important for any researcher who adopts the grounded theory approach to ensure the credibility of their work. The quality of quantitative research in terms of the effectiveness of the research strategies or approaches adopted may be evaluated by examining the internal validity, external validity and reliability (Sikolia *et al.* 2013; Gill & Johnson 2011). However, research based on grounded theory lacks the same degree of credibility enjoyed by the quantitative-positivist paradigm, which has generally been regarded as credible and scientific research.

Rather than assuming that verification is possible only through follow-up quantitative research, Strauss & Corbin (1994) explain that already inherent within the constant comparative data analysis stage of GT is a form of validation, where the steps taken already represent a valid form of verification. In another publication, Strauss & Corbin (1990: 295-310) outline the four primary requirements for evaluating grounded theory:

1. It should fit the phenomenon, provided it has been carefully derived from diverse data and is adherent to the common reality of the area;

2. It should provide understanding, and be understandable;

3. Because the data is comprehensive, it should provide generality, in that the theory includes extensive variation and is abstract enough to be applicable to a wide variety of contexts; and

4. It should provide control, in the sense of stating the conditions under which the theory applies when describing a reasonable basis for action.

(Strauss & Corbin 1990: 295-310)

3.20 Rationale for choosing grounded theory

Grounded theory was a particularly attractive option for this study as it positively encourages inclusion of the researcher's own relevant experience, as stated by Glaser & Strauss (1967: 253):

> The core categories can emerge in the sociologist's mind from his reading, life experiences, research and scholarship; [furthermore] no sociologist can possibly erase from his mind all the theory he knows before he begins his research. Indeed, the trick is to line up what one takes as theoretically possible or probable with what one is finding in the field.
>
> Glaser & Strauss (1967: 253)

Here, the authors agree that no researcher enters the process as a blank slate, or 'tabula rasa', acknowledging that the true skill of the analyst lies in being able to bracket subjectively experienced prior life narratives while maintaining an open mind to new concepts as they emerge from the data. As the conceptual categories emerge and begin to take shape and gain explanatory power, the researcher may then reconcile the empirical evidence with life experience, critically comparing prior experience in the field to what is known to be theoretically possible or probable.

As mentioned in the introduction to this section, GT positively embraces Glaser's 'all is data' dictum, suggesting that attempts to re-model GT along constructivist lines may be a misnomer. In defence of the original GT methods (Glaser 2002), Glaser argues that GT is a perspective-based methodology relying on multiple perspectives (interviewee, researcher, popular media etc.) that transcend abstraction and do not aspire to issues of accuracy, but tell a story; thereby freeing the researcher from "*data worry and data doubts*" by focusing on concepts that fit and which are relevant (Glaser 2002: para. 3).

While Glaser admits that constructivism plays some part in GT by stating that: "*researchers are human beings and therefore to some degree reify data when trying to symbolize it in collecting, reporting and coding the data. In doing so they may impart their personal bias and/or interpretations – ergo this is called constructivist data,*" (Glaser *ibid.*: para. 24), he nevertheless continues to maintain that it should not be used as a justification for remodelling GT, despite the calls of Charmaz to the contrary (see Charmaz 2000: 523-524).

Part III: Applying grounded theory

3.21 Introduction

Part II of this chapter provided an overview of the methodological rationale for grounded theory adopted by this research. Rather than follow the classical 'Glaserian' model or the adapted approach advocated by Strauss and Corbin (see §3.17), it was felt that a hybridised implementation based on the most appropriate elements from each would best serve the aims and objectives of this study.

This section provides a detailed description of the processes used to conceptualise empirical indicators from the native data collected during interview sessions, where data was sourced from the transcripts of interview recordings, and/or the field notes made during and after interview sessions.

Throughout the process of conceptualisation, researchers must trust their intuitive sense when eliciting properties from data in its native state. Recalling Glaser's (2001: 145) assertion that 'all is data', no matter how general, 'avant-garde', or insignificant an emerging concept may appear to be, it nonetheless represents part of the 'lived experience' of respondents (van Manen 2016) and researchers must be prepared to bracket any personal biases or opinions in order to allow theory to freely emerge. Conceptual analysis centres on the researcher's ability to be theoretically sensitive, meaning that it depends on their ability to generate concepts from the empirical data, and relate or group them according to normal models of theory in general (Glaser 1978: 1-17; 1992: 27-30, 49-60).

3.22 The grounded theory approach

'All is data' is a fundamental axiom of GT, implying that information from *any* source entering the sphere of interest is taken in to account, logged, coded and indexed for future categorisation. Field notes, conversations, notes taken during interviews/focus groups, and media/journal articles are all afforded equal merit in terms of their potential for contribution. The key idea of the GT approach is not to taint the researcher's outlook with any preconceptions, but to allow the creative processes applied to produce unique concepts and a theoretical framework on which to hang those concepts.

The researcher is expected to gather data from as many diverse sources as possible; sources that contain not only direct links with the area of interest, but also those loosely related materials taken from casual encounters with the topic, for example: newspaper articles, television shows, conversation transcripts etc. Being armed with the broadest possible base knowledge of the root topic from the beginning provides a good foundation for the ultimate drill-down to a core premise.
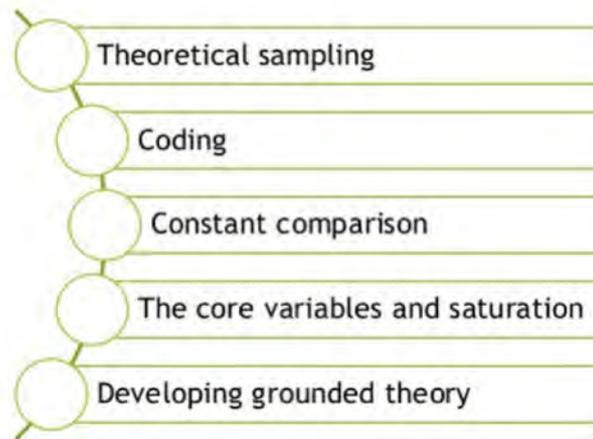
Figure 3.3   *The stages of grounded theory*

Once data has been gathered, it is then *coded* (the analytic processes via which data are fractured, conceptualised, and integrated to form a theory) word-by-word, segment-by-segment; with codes being assigned to particular phenomenon. The researcher then looks for the occurrence of codes generated by one data set that also appear in other data sets. Multiple appearances of the same or similar codes across diverse data sets are then *categorised* to provide a theoretical analysis. Figure 3.3 outlines the five stages of grounded theory, and Figure 3.4 – reproduced from Saldaña (2016: 14) – illustrates the coding model implemented during this study.

Figure 3.4   *A streamlined codes-to-theory model for qualitative inquiry*

3.23 Codes and coding

3.23.1   What are codes and what is coding?

In qualitative data analysis, a code is a researcher-generated construct that symbolises or 'translates' data (Vogt *et al.* 2014: 13), and which, according to Saldaña (2016: 4) "*most often takes the form of a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data.*" The importance of accurate coding was highlighted by Strauss (1987: 27), who stated that "*any researcher who wishes to become proficient in qualitative analysis must learn to code well and easily. The excellence of the research rests in large part on the excellence of the coding.*"

The portion of data represented by an individual code is determined by the researcher and represents his or her subjective interpretation of what that code represents. Charmaz (2001) describes coding as the 'critical link' between data collection and their explanation of meaning, where the data may be represented by interview transcripts, participant

observation, field notes, journals, documents, or other audio-visual sources. Codes therefore attribute interpreted meaning to each individual datum for the later purpose of pattern detection, categorisation, building of theory and other aspects of analysis (Saldaña 2016: 4).

Which coding method to assign to a study is related to the central and related research questions (Saldaña 2016: 70). Accordingly, the answers that a researcher seeks will influence the specific coding choices made during the research planning and design stage. Research questions should also harmonise with the philosophical assumptions underlying the methodology, in that the epistemological and ontological positions taken should be compatible.

As noted by Saldaña (2016: 25), Friese (2014) contends that qualitative research projects should never venture into the thousands for a final number of codes, recommending between 50 and 300. Whether these numbers refer to unique occurrences of individual codes or include multiple occurrences of the same code is unclear, but the number of codes expressing each of the three distinct grounded phases of this study were 513, 939 and 755 respectively (see Appendices S1, S2 and S3). Codes appearing more than once are counted and contribute towards a stronger expression of their driving properties. Codes occurring just once are labelled as 'self-referents' on account of their solo presence, but may still contribute to a strongly elicited concept when considered across the whole study, and so must never be excluded. Self-referents can be found in the lower rows of the conceptual indicator tables in the 'RQ*x*' Appendices.

Whether viewed as one large GT study, or three 'staged' phases of GT inquiry, the number of codes, properties and the conceptual indicators driving them was considered to be perfectly adequate for the task at hand. When viewed from the perspective of a single, all-encompassing GT endeavour, the total number of codes yielded somewhat exceeded Friese's recommendations, but when considered as an inter-related, three-phased GT approach, the numbers were within an acceptable range. Furthermore, when the duplicates and sole-referent 'outliers' were excluded, the number of total codes reduced significantly.

3.23.2 Open coding

Open coding is common to the initial stages of many types of qualitative data analysis, including the GT approach deployed here. It begins with the line-by-line comparison of incidents to each other in the data. Open coding helps to develop the analyst's theoretical sensitivity by encouraging the detection of patterns, similarities and affinities between the concepts and themes embedded within the data.

3.23.3 Substantive coding

Substantive coding is the process of distilling, via conceptualisation, the empirical essence from the data in which the theory is grounded. Incidents are excerpts of raw, empirical data containing properties that point towards one or more conceptual indicator or category, and from which a grounded theory is eventually generated.

During early coding iterations, codes tended to be overly-descriptive and repetitive; a point taken by the researcher to indicate that more comparison is needed in order to further fracture the data and reduce any conceptually-dense codes to those of a more conceptually-loose nature. Overly descriptive codes take the form of many-word expressions (e.g. *Learning how to cope with change*), whereas the less conceptually-imbued codes are limited to fewer expressive key words (e.g. *Adapting to change)*.

Table 3.6   *Types of Coding*

Open	*Axial*	*Selective*
• Conceptual or Thematic? • Identify possible concepts/themes • Elicit from data • Form initial categories by breaking down, comparing, and conceptualising or thematising, the categorising data	• Identify a central phenomenon • Search for related concepts/themes in data • Explore causal conditions among related groups • Identify the context and intervening conditions • Specify Strategies • Delineate the consequences	• Select core categories by identifying key concepts/themes • Link to other categories via storyline • Validate those relationships by explaining, rather than describing • Fill in categories that need further development

3.23.4 Axial Coding

Termed 'axial' because coding occurs around the *axis* of a category, categories are linked at the level of their properties and dimensions (Strauss & Corbin 1998). Once the open codes have been labelled, itemised and grouped, axial coding is the process used to re-build data that has been fractured via open coding. The data is re-organised so as to identify causal relationships between the categories and sub-categories. The aim is to make explicit connections between categories and sub-categories, where the explanation and underlying relationships between categories that account for the phenomenon to which they relate are brought together to form a 'paradigm model.' Data coding at this level is intended to elevate the data to higher levels of abstraction, and as the coder becomes more theoretically sensitised to the data and the coding procedure, the fit between conceptual indicators and category becomes more apparent.

3.23.5 Selective coding

In selective coding, the core category is identified and systematically related to other categories. During the process, categories are further developed by refining relationships over various iterations, which in turn are progressively validated against the data. As the categories become more integrated, theory begins to appear. The process may be summarised thus:

- Explication of the story line
- Relating subsidiary categories to the core category using the paradigm model
- Relating categories at the dimensional level, by understanding the range of values that a category may have. For example, the category 'disposition to learning' may have a range of values between *highly disposed* and *motivated*.
- Validating relationships against data
- Further refinement of the storyline

All categories are based around the 'core' category which represents the central phenomenon under investigation. Once identified, a storyline is developed that restates the research question in terms of its relation to the core category.

3.24 The elements of grounded theory

3.24.1 Constant comparison

As a systematic methodology involving the construction of theory through the analysis of data (Faggiolani 2011; Martin & Turner 1986), the 'Constant Comparison Method' (CCM) is especially relevant in the case of grounded theory (Glaser 1992; Strauss 1987; Glaser & Strauss 1967). In conjunction with theoretical sampling it represents the core activity of any qualitative research endeavour. However, the method appears to be poorly understood in terms of its practical application to research practice, and especially in the context of a GT study (Boeije 2002).

Glaser and Strauss (*ibid.*) assert that constant comparison is essential to the development of any theory grounded in data; a sentiment echoed by Tesch (1990), who contends that it underpins all analysis in grounded theory:

> The main intellectual tool is comparison. The method of comparing and contrasting is used for practically all intellectual tasks during analysis: forming categories, establishing the boundaries of the categories, assigning the segments to categories, summarizing the content of each category, finding negative evidence, etc. The goal is to discern conceptual similarities, to refine the discriminative power of categories, and to discover patterns.
>
> Tesch (1990: 96)

Comparison forms an essential element of the inductive cycle of inquiry, and constant comparison refers to the recursive, reflective element of the process that enables discovery in the form of theoretical sampling. The recursive interplay between data and researcher is crucial to the reflexive aspect of the process. Data are acquired, analysed, and then reflected upon when compared to alternative presentations of the same underlying theme. The emergence of novel concepts arises as a result of the fully engaged, reflexive researcher.

CCM may be summarized by a series of five steps:

1. Comparison within a single interview.
2. Comparison between interviews within the same group.
3. Comparison of interviews from different groups
4. Comparison in pairs at the level of the couple.
5. Comparing couples.

The importance of CCM should not be underestimated (Boeije 2002), as it permeates every stage of the grounded theory process from the moment the first set of data are

acquired, to the final moments of theoretical saturation and the generation of substantive theory. Its presence throughout the procedure ensures that the analyst is forced to stop, think, and critically reflect on the relevance and fit of new artefacts, and how they may be assimilated in to the growing corpus of existing data.

Constant comparison is where the researcher gets a chance to exhibit his or her proficiency at weaving emergent concepts in to a constantly evolving and expanding corpus of data, comparing what has just arrived with what has gone before, and highlighting any connections that become apparent during the process.

3.24.2 Data fragmentation

The excerpts of representative data used in this research are fragmented samples, all of which have been drawn from the master interview transcripts and field notes during the data collection and other stages of analysis. These fragments are used to highlight specific examples of conceptual coding via constant comparison and the interchangeability of indicators. Connections are made between codes and ideas, and streams of analytical thought are recorded by the analyst as the research progresses towards the development of a substantive theory.

Excerpts from the narrative transcripts are quoted directly in Chapter 5 (the data analysis chapter) and have been included so as to empirically support the analyst descriptions accompanying them. The complete set of narrative excerpts is reproduced in the appendices and arranged according to the conceptual relevance with respect to each research question (detailed in Appendices RQ1, RQ2 and RQ3, respectively). The reader is encouraged to consult the complete corpus of data used during the development of codes, concepts and properties, should the example(s) in the main text not provide sufficient clarity or depth of understanding.

Rather than reproducing the interview transcripts in full, it was felt that the data would be best presented as fragmented excerpts. To include the full interview transcripts, all field notes and all memos would have been unnecessary, not only because of the constraints on space in this type of document, but because the fragmented excerpts had already been identified as conceptually relevant to the study during the early stages of open coding. The remaining (unclassified) sections of narrative were therefore no longer relevant to the study.

3.24.3   Dimensional analysis

While dimensional analysis represents a powerful means of capturing the breadth of conceptual meaning during the analysis stage, it has received only passing reference in the mainstream GT literature related to coding (e.g. Saldaña 2016; Bryant & Charmaz 2010), with a few exceptions (e.g. Kools *et al.* 1996; Strauss & Maines 1991). Despite the relevant paucity of literature dedicated to the process, it represents such an important aspect of the overall GT process that I felt a deeper exploration of its significance would be beneficial; particularly as much time, care and attention was taken to ensure the correct allocation of dimensional properties to their corresponding conceptual indicator during analysis.

To give an overview of dimensional analysis in action, a quote from the table of properties informing the sub-category *Experimenting* (RQ1:SC8) is presented:

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
entrepreneur as scientist; experimentation (x3); trial-and-error; high cost; thrive on experimentation; creative experimentation; adapt approach; risk taking (x2); change variables (x2); inventive; challenge norms; changing objectives; variable environment; multiple attempts; 24/7 experimentation; success; failure rate; initial conditions; variable technology; life analogy; contingent; frequent failure; high rate of failure; low hit rate; perseverance	***Experimenting (29)***

The lead conceptual indicator, and that from which SC8 eponymously takes its name – *Experimenting* – is defined by 29 contributing properties; 25 of which are distinct once the duplicates have been discounted. When scanning empirical data for like groupings, it should be remembered that one is also searching not only for synonymous and antonymous meanings, but also for diametrically opposed, or polar opposites, as well as any properties possessing interim antithetical or antipodal qualities along the same conceptual scale.

When engaging with the process of constant comparison, and especially when searching for suitable indicators to interchange, it would often be noticed that, as the number of contributing properties congregated around a concept (i.e. they became 'sticky'), two indicators that had previously been distinct would begin referring to the same, or very closely allied, concept. For example, when considering RQ2:SC4 *Access to knowledge*, the two concepts *Big data* (11 indicating properties) and *Corpus* (10 indicating properties), which emerged at different points during analysis, were considered to be identical, thus:

comparison web-sites; meta-search (x2); consumer impact; optimised results; big-data; on-line aggregators; accelerated search; linked content; enhanced retrieval; manual research processes	*Big data (11)*

and

vast corpus (x2); abundant content; saturated environment; daunted inaction; Information overload; reliability; quality of service; transient; content providers	*Corpus (10)*

represented ideal 'merger' candidates to form a single, much larger conceptual indicator consisting of 21 properties. The label '*Big data*' was retained, as it not only subsumed the notion of *Corpus*, but it was also felt to be more reflective of a much larger, merged entity, and therefore preserved the contemporary 'future-situated' nuance much better than the mono-dimensional dryness of a mere 'corpus' of data. The final conceptual indicator therefore became *Big data* (indicating properties now 21)*,* thus:

comparison web-sites; meta-search (x2); consumer impact; optimised results; big-data; on-line aggregators; accelerated search; linked content; reliability; enhanced retrieval; manual research processes; vast corpus (x2); transient; abundant content; saturated environment; daunted inaction; quality of service; Information overload; content providers	*Big data (21)*

In making this move, conceptual indicators that had previously ranked fifth and sixth respectively in the coding of RQ2:SC4 *Access to knowledge* now took on a higher-ranked position (third), meaning that *Big Data* now outranked *Creative thinking* (RQ2:SC5) and *Co-dependent inquiry* (RQ2:SC6) in terms of the number of properties expressed by moving two positions up in the table. Had this been a purely quantitative, or mixed methodology approach to research, such merging of conceptual data may have been of significant statistical concern, but from the perspective of a purely qualitative endeavour, resulted in no impact on the final analysis or building of theory.

Before making any significant changes to the conceptual order, it was necessary to ensure that the changes being made were consonant and closely resonated with the context of the original narrative excerpt, as well as any supporting conceptual memos. Furthermore, merging concepts like this could only ever be carried out by the analyst, as the process relies heavily on his/her privileged knowledge of the situation i) as it was expressed non-verbally during the interview; and ii) as it related to the researcher's own accrued experience in the field over a prolonged period of professional engagement; and iii) as it relied on the researcher's ability to know when to 'bracket-off' any residual knowledge.

In order to ensure continued contextual clarity of the emerging concepts with the raw data that gave rise to them, the constant comparison and interchange of indicators required frequent referral back to the native narrative excerpts, the field notes (if any) associated with them (see Appendix F), and any pertinent conceptual memos (see Appendix M). The importance of the analyst's role during this stage was clear: in order to correctly surmise an appropriate conceptualising label for each set of indicating properties, a constant stream of (reflexively) creative engagement was required of the analyst in order to recall the situational nuances and non-verbal cues as they were uniquely experienced when interacting with the respondents. This included not only a cogent recall of interview sessions and the non-verbal cues and nuances contained therein, but also the matter of follow-up conversations, telephone calls and e-mail exchanges, as documented in the field notes.

This recursive process of breaking-down, rearranging, reconstructing and merging properties within their assigned conceptual indicators, as well as frequent re-assignment of properties from one group to another upon the realisation of freshly associated nuances that may have been previously overlooked or missed, was a clear indication that the concepts were maturing, and was an encouraging validation of their continued and ongoing relevance to the study. For each conceptual indicator, this process of exchanging, merging and refining continued throughout the analysis, and indeed in to and during the later stages of the project.

For example, the grouped properties *out of work, remote location,* and *office distractions* were initially coded to *environmental setting;* later simplified to *'setting'* in the context of the conceptual indicator *Creative thinking* (RQ2:SC5). This remained the case for much of the analysis, until another distinct code, *Receptive state,* began to emerge and feature quite prominently; eventually becoming the second-ranking conceptual indicator. As the concept matured and developed further, and as more properties were added to the group via the interchange of indicators, comparison with conceptual memos, and any other data that may have presented itself in the interim, it became clear that *Setting* had now become a recessive concept whose relevance was contained within – and whose properties exhibited a greater degree of fit and relevance for – the much larger conceptual indicator *Receptive state*. As a stand-alone concept therefore, *Setting* was subsumed in to part of the larger group of properties expressing *Receptive state*.

The processes and procedures driving the constant comparison and conceptual interchange of indicators have been explained at length in the various grounded theory texts (e.g. Saldaña 2016; Charmaz 2006; Glaser & Strauss 1967), but it was not until the processes involved had been practically engaged with that a complete understanding of what they were supposed to achieve could be fully appreciated. It soon became apparent that merely reading about grounded theory as a methodology was quite different from the level of understanding gained from engaging repeatedly and exhaustively with the various stages of discovery involved. Repeated exposure to the method *in practice* served to clarify a fuller understanding of dimensionalisation in particular; much more than any theoretical reading of the various GT texts alone could ever have achieved.

3.24.4   Memoing

Regardless of the version of grounded theory adopted, memos serve a variety of purposes, with their central role lying in the construction of theoretical categories (Charmaz 2014). Glaser (1978) considered that memo-writing represented the core element of theory generation and provided the pivotal step of breaking categories in to their various components and encouraging the elaboration of codes. Glaser (1978: 83) defined the memo as *"theorising the write-up of ideas about codes and their relationships as they strike the analyst while coding…"* and *"a memo can be a sentence, a paragraph, or even extend to several pages."* They therefore take the form of informal analytical notes that help to provide the critical link between the various ideas and concepts provided by the coded and the categorized data.

Memos serve not only as an aide-memoire to the researcher, but also track the progressive development of the core concepts and underlying categories as analysis proceeds; thereby acting as a form of 'thought log' throughout the process. As a consequence of their adaptive 'work in progress' nature, memos are often annotated with later amendments and updates as the idea(s) expressed in earlier memos develop and mature in line with emerging understanding and new developments.

Discussed in detail by Martin & Turner (1986) and Strauss (1987), the writing of memos is described as a key part of the grounded theory process. Memoing not only represents an important way of maintaining a record of the analysis as it proceeds, but helps to depict the relationship between concepts; at the same time ensuring that the researcher remains grounded during the process. The importance of memo writing was also pointed out by Birks *et al.* (2008: 69) in quoting Polit-O'Hara & Beck (2006), who said that:

> All tasks in the conduct of research…are subordinate to the writing of memos for the recording of ideas, musings and reflections. Regardless of how inconsequential these thoughts, feelings and impressions may initially seem, creation of a record in the form of a memo ensures the preservation of such ideas that may later prove significant.
>
> Birks *et al.* (2008: 69)

Glaser (1998: 177) explains that theoretical memoing represents "*the core stage of grounded theory methodology,*" stating also in Glaser (1992: 8) that "*memos are the theorizing write-up of ideas about substantive codes and their theoretically coded relationships as they emerge during coding, collecting and analysing data, and during memoing.*" Glaser (1978) implores the researcher to consider memo writing a priority, so as to ensure the retention of ideas that may otherwise be lost.

As part of this study, some 346 conceptual memos were logged during the six-year period between 2010-2016. Memos were often as short as a couple of sentences, but in some cases ran to several pages of text. Some also included graphical representations of concepts in the form of diagrams, figures, or anything else identified as being able to help clearly depict an emerging relationship. Like constant comparison, memo-writing is not a discrete stage that occurs at a specific point in the analysis, but weaves its way throughout the whole process until theoretical saturation is reached. As well as initiating and maintaining productivity in the researcher (Charmaz 2006), a well-developed practice of memo writing ensures that the researcher remains fully engaged with the process from the very beginning.

Similar to the extensive set of field notes compiled during the data collection stage of the study, the conceptual memos taken also presented a problem in terms of their sheer number and volume; extending to some 120-pages. For the sake of brevity therefore, it was decided to include only a representative selection of some of the more interesting memos (see Appendix M); all of which are cross-referenced (where relevant) in the main body of theorizing text forming Chapter 5, and to a lesser extent, Chapter 6. To have included all 346 memos, either within the main body of text, or as a fully inclusive supplementary section would have considerably increased the size of the thesis, and so the decision was made to reference only those twenty 'exemplar' entries that were considered to best convey the conceptual and theoretical relevance of the essential role they played during the construction of theory.

3.24.5   Sorting and writing-up

The final two stages of the GT process are *sorting* and *writing up*. When sorting, memos are sorted, and fractured data is re-assembled to generate theories that explain the main concepts in the studied area. During the sorting process, new ideas are often generated, resulting in new memos which are re-absorbed in to the iterative process.

At the writing up stage, the process is almost complete. It is expected that theoretical concepts will have converged and the different categories are shown to be related to each other and the core variable. The material is now at a point where ideas may be presented with the relevant data and contrasted with existing knowledge in the field to form new theory, and written output may be arranged in to a highly readable and scholarly context. Chapter 6 represents this stage of the process.

———————

Chapter 4 - Conceptual Elaboration

4.1 Introduction

Chapter 3 outlined the GT method and approach to data collection. It also explained why grounded theory represents an ideal approach with respect to this study, and why a hybrid version of GT was best placed to serve the methodological and philosophical needs of the research. The previous chapter also explained how the pilot interviews had served their expected purpose in guiding a vaguely scoped initial research question to reveal two, more tightly defined, questions (§3.8.1); thereby revealing three substantive areas of concern expressed by the respondents: areas that could now be investigated further by the addition of thirteen more interviews to the study. Once the data from all fifteen respondents had been transcribed, the process of conceptual elaboration could begin.

This chapter details the approach used to elaborate conceptual indicators from the native data collected during interview sessions. Throughout the process of conceptualisation, researchers must learn to trust their intuitive sense when eliciting properties from data in its native state. Recalling Glaser's (2001: 145) dictum that '*all is data*', no matter how general or insignificant an emerging concept may appear to be, it nonetheless represents part of the 'lived experience,' (Berglund 2007; van Manen 1990) of the researched – and (in this case) the researcher – and so the researcher must be prepared to recognise and bracket any personal biases or opinions in order to allow theory to freely emerge.

Conceptual analysis relies on the researcher's theoretical sensitivity, meaning that it depends on their ability to generate concepts from the empirical data, and relate or group them according to normal models of theory in general (Glaser 1978: 1-17; 1992: 27-30, 49-60). To reaffirm this, Glaser (2007: 117) states that the GT researcher should "*just do whatever emerges as data, as pacing, as substantive codes, as theoretical codes in a substantive area*," and that "*theoretical codes, like context, must emerge as relevant, and earn their relevance.*"

4.2 Developing conceptual categories

The following sections detail the journey taken by the researcher during the conceptual development of two exemplar sub-categories that emerged in response to RQ1. Concepts began to emerge during the earliest stages of analysis, all the way through to later rounds where core categories began to emerge via the enduring persistence and 'stickiness' of

the stronger, more dominant conceptual indicators. The reader will be guided through the process of conceptual elaboration otherwise referred to as 'the constant comparison and interchange of indicators' (see §3.24.1). Worked examples pertaining to the conceptual elaboration of RQ1:SC1 – *Adapting to change* and RQ1:SC5 – *Locus of operation* are hereby provided. Rather than attempting to describe the mechanics of the process any further, it was determined that a step-by-step walk through of the technique would serve towards a fuller, more practical understanding. Figure 4.1 provides a 'schematic walk through' of the Grounded Theory coding process, and Figure 4.2 provides a summary of sub-categories and emergent core categories to have emerged from the analysis.

4.3   Conceptual elaboration: an overview

The process of constant comparison begins once the first interview is concluded. The analyst reviews the interview transcript, reads any field notes, and begins to 'scout' for general themes, concepts and ideas within the native data, while at the same time asking questions like:

- What is this data a study of?
- What category does this incident indicate?
- What is actually happening in the data?
- What is the main concern faced by the participants?

Adapted from Glaser (2004)

During the scouting process common themes emerge and the researcher is encouraged to make notes in the form of analytical memos, which represent the write-up of what is emerging from the data as the analysis unfolds (see §3.24.4). Memo writing may happen at any time, and as often as the researcher feels the need. In my case, memos were triggered not only during analysis, but also while reading articles, academic papers or even web pages containing something of relevance; after a discussion or exchange of e-mails when following-up with interviewees, or other entrepreneurs, owner/managers etc. Given that 346 memos were recorded during this study, a much smaller selection of representative entries have been included in Appendix M for the sake of brevity, with others quoted directly in the main body of text, where relevant.

As narrative and memo data accrue, concepts begin to gather around common themes in the text, i.e. they present themselves more frequently to the analyst, persisting around relevant sections (excerpts) of the data as it is read and re-read. This is a natural
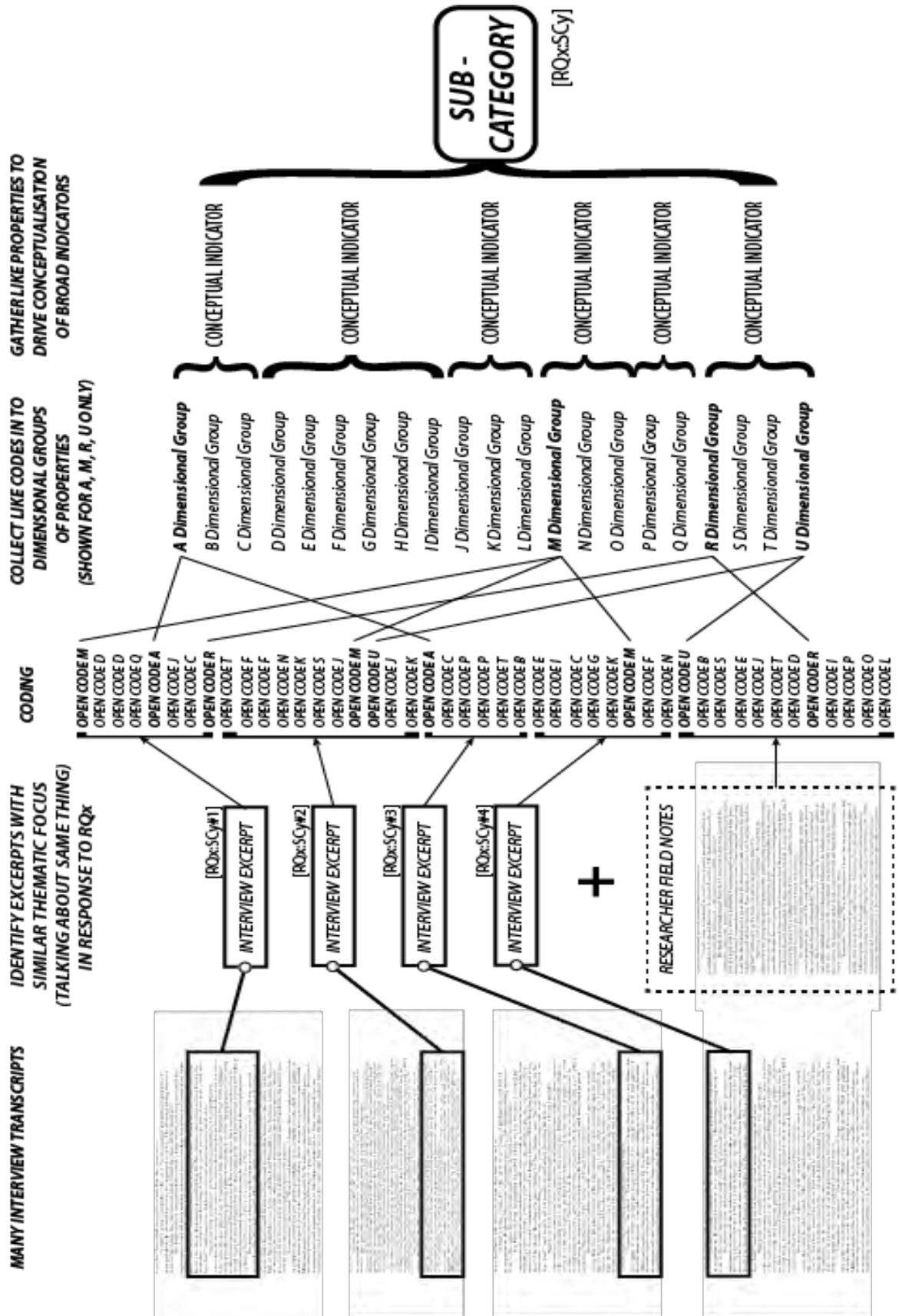
Figure 4.1   *A schematic view of the Grounded Theory approach*
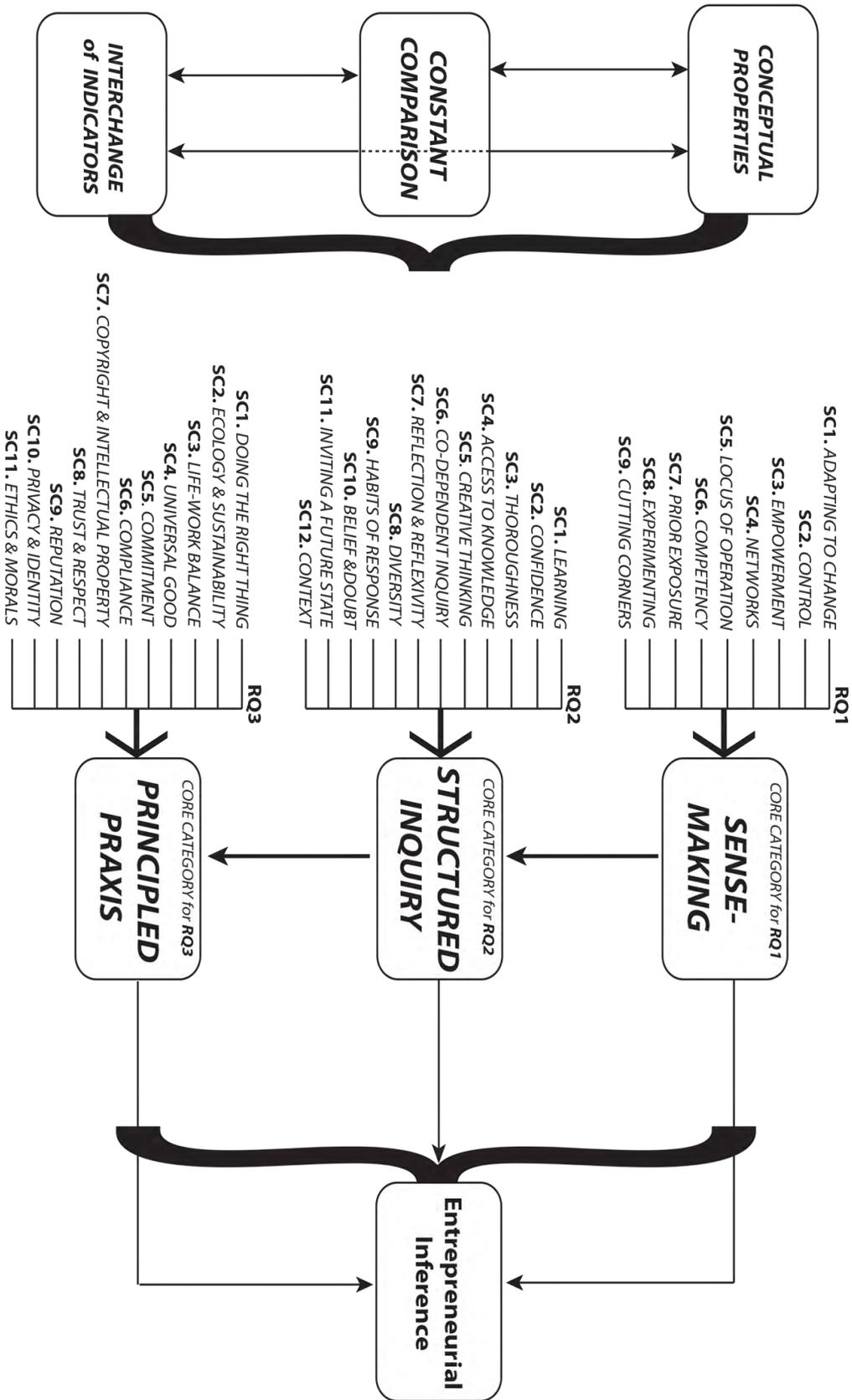
Figure 4.2   *Summary of sub-categories and emergent core categories*

consequence of the researcher's increasing familiarity with the text on a journey of heightened theoretical sensitivity to the data, and with each successive reading of the narratives, concepts begin to 'emerge' by exhibiting a common affinity – or what I referred to as a kind of 'stickiness' in §4.2 - with respect to an embedded theme in an identified segment of narrative. At this point, the researcher bookmarks and groups 'sticky' segments as being relevant to a common concept. It is here that the process of linking concepts with ideas, ideas with ideas, and concepts and ideas with themes and categories begins. This represents the beginning of what is referred to as *conceptual elaboration.*

It is difficult to articulate in writing the practical steps involved in conceptual elaboration, as the process is inherently cognitive in nature. Furthermore, different researchers approach grounded theory in different ways, and so one researcher's approach may be quite distinct from others, despite all claiming to be engaging with Grounded Theory. This arises not only from the differences in GT versions offered by Glaser & Strauss (1967) and Strauss & Corbin (1990) but may also be a response to Glaser's call to encourage researchers to develop their own approach to implementing grounded theory (Strauss & Corbin 1994). For these reasons, it is certain that the hybridised approach developed with respect to this study (see §3.17) will not directly match the experience of other researchers; especially those adopting a strictly Glaserian (classic) approach, or the more prescriptive version advanced by Strauss and Corbin (1990).

4.4   Conceptual elaboration of RQ1:SC1

 'Adapting to change' represented the central theme around which a number of conceptually similar codes began to 'gather' during the initial (first round) of analysis. As a broadly-based dimensional concept, it was expressed at both extremes of the 'adapting' continuum, with 'resistance to change' at one end, 'embracing change' at the other, and 'adapting to change' positioned somewhere in between; each of which when considered together represented a continuum of change. The concept was expressed throughout the coding process according to the positive or negative degree of change exhibited, whether technologically-based or not - thus 'accommodating change', 'recognizing change' and 'giving in to technological change' were all related codes that signified a varying gradation of interplay between actor and environment, which led to the ultimate emergence of RQ1:SC1.

Other dimensional attributes of change were expressed at different points during the analysis, with *challenging change, promoting change, admitting change, enduring change* all representing differing dimensions associated with the broader concept (of change). These aspects of change are evidenced in the three narrative excerpts and field note entry quoted below:

RQ1:SC1 #1 **ST10**	*"When a new product or service arrives on the scene, there is a distinct lag between the time you incorporate it in to your infrastructure, workflow - or whatever – and the point at which the business begins to usefully benefit from its functionality in one way or another. Taking in to account the time it takes for training, shaking off any lingering habits from the 'old' system, there is a definite 'lag' involved in the uptake of new technology. The problem in recent years however, has been that new versions of said technology are now being released faster than the average 'lag' time to useful adoption."*

RQ1:SC8 #5 **ST13**	*"We found that the processes and strategies that we had become accustomed to over the years had to change to accommodate advances in technology – mostly in response to hardware and software upgrades or updates, and often in the name of improving security. Adapting once was fine, but it became somewhat tiresome when it started to happen every couple of months."*

RQ1:SC1 #9. **EX6**	*"Knowing what to choose and/or believe from the sea of available information on tap is just daunting, and it leaves me even more bewildered than ever before."*

The negative end of the change continuum was indicated by *resistance to change*, where respondents bemoaned the negative aspects of change driven by underlying advances in technology. As demonstrated by the narrative excerpts below, change was something that was 'imposed' on user communities from external sources, such as software vendors and hardware manufacturers in enforcing their regular updates and upgrades; both of which represented a frequent and unsettling interruption to business as usual, thus:

```
FIELD NOTE: FN15:18
I dread the regular security updates from Microsoft and
other vendors They probably take up 25% of the time I should
be spending troubleshooting more pressing problems. I'm not
alone here — almost everyone I know personally and on-line
deplores the number of hours wasted babysitting upgrades —
it's just unacceptable.
```

Seventeen narrative excerpts and twelve field note entries drawn from the full range of respondents were found to centre around a concern for change, technology, and the ability to adapt. Five are quoted here to demonstrate how narrative excerpts – those snippets of raw empirical data identified as pertaining to a common theme – are able to contribute to the generation of open codes. How those open codes are then collated, transformed and re-arranged via the process of data fragmentation in to grouped properties which together

drive a conceptual indicator is then explained, making use of real examples drawn from the study.

Table 4.1   *Early indicating codes for RQ1:SC1*

Resisting adaptation // Frequent upgrade of software/hardware // Built-in obsolescence // Cost of licensing/subscription // Job security // Changing too quickly to handle // Forced vendor dependence // Irrelevance of features in emerging tech // Technical over-specification: concept of 'bloatware' // Tendency to over-analyse // Information overload // Knowing what to select/believe // Feeling incompetent // Lack of specialised vocabulary for productive discourse // Protection of identity/privacy // Coercion of minors/safeguarding.

Beginning with the first representative narrative excerpt, sourced from the interview transcript of respondent **ST10:**

Source	Narrative Excerpt
RQ1:SC1 #1 **ST10**	*"When a new product or service arrives on the scene, there is a distinct lag between the time you incorporate it in to your infrastructure, workflow - or whatever – and the point at which the business begins to usefully benefit from its functionality in one way or another. Taking in to account the time it takes for training, shaking off any lingering habits from the 'old' system, there is a definite 'lag' involved in the uptake of new technology. The problem in recent years however, has been that new versions of said technology are now being released faster than the average 'lag' time to useful adoption."*

This excerpt was coded to four distinct properties relating to the early indicators (see Table 4.1) relating to 'Changing too quickly to handle' and 'Frequent upgrade of software/hardware', with the open codes summarised and tabled thus:

RQ1:SC1	Open Codes
#1 (4)	acclimatisation; acceptance; adoption; lag

The second representative narrative excerpt, sourced from the interview transcript of respondent **EX7:**

RQ1:SC1 #2 **EX7**	*"When everything is changing around you, there are no familiar anchor points via which to reference your judgements or actions. Unlike the stale predictability of, say a 9-5 office job, the life of an entrepreneur is characterised by constant change, unpredictability, and uncertainty. Their actions are driven by the need to restore balance and harmony to an otherwise chaotic world, which perhaps explains their propensity for risk taking and seemingly rash decision making."*

RQ1:SC1	Open Codes
#2 (4)	referential anchors; constant change; restoring balance, traits

The third representative excerpt, sourced from the interview transcript of respondent **EX5:**

RQ1:SC1 #3 **EX5**	*"Having banned Windows and all other Microsoft products from site, our whole operation now runs on the 'Linux' open source operating system. It takes a little more getting used to, but has saved us hundreds of thousands by avoiding the yearly licensing and upgrade 'trap'…Since 2010, our total annual spend on operating systems software has been negligible, and the feeling of freedom among our network engineers is palpable."*

RQ1:SC1	Open Codes
#3 (4)	open source; cost savings; liberation; onerous licensing

The fourth representative excerpt, sourced from the interview transcript of respondent **ST9:**

RQ1:SC1 #4 **ST9**	*"Because life in a start-up is so closely allied with non-stop, incessant change, it means that only certain types of individual are likely to thrive in such environments. It's not a case of adapting to change, but more a case of thriving on it. I have colleagues who thrive solely on the 'buzz' of the start-up years – once it has fizzled away, they're off in search of their next challenge."*

RQ1:SC1	Open Codes
#4 (4)	constant change; unique characteristics; thriving on change; transience

The final representative excerpt, sourced from the interview transcript of respondent **ST14:**

RQ1:SC1 #5 **ST14**	*"I am concerned about the frequency of so-called 'security' updates from Microsoft and other software vendors. Installing them takes up so much of my time; time that I should be spending addressing the basic day-to-day needs of my business. Others I know are also beginning to recognise and resent the number of hours they are wasting on this ritualistic farce. As we are now so dependent on the technology, we have no choice but to comply."*

RQ1:SC1	Open Codes
#5 (4)	software updates, insecure; wasted time; forced compliance

The five narrative excerpts referenced above should be sufficient to illustrate the process undertaken, where open codes were produced for the seventeen distinct narratives that had been identified as relating to technological change. Note that, at this point, the codes are still very much tied to their originating excerpt. The task now is to fragment the entire 71 open-code set and rearrange them in to a list of coherent 'grouped-likings', exhibiting synonymous or antonymous dimensional properties. Prior to fragmentation, the list of open codes for RQ1:SC1 appear as shown in Table 4.2

Table 4.2   *Open codes yielded by narrative excerpts pertaining to change*

RQ1:SC1	Open Codes
#1 (4)	acclimatisation; acceptance; adoption; lag
#2 (4)	referential anchors; constant change; restoring balance, traits
#3 (4)	open source; cost savings; liberation; onerous licensing
#4 (4)	constant change; unique characteristics; thriving on change; transience
#5 (4)	software updates, insecure; wasted time; forced compliance
#6 (5)	over-analysis; abundance of information; junk; ill-informed; consider alternatives
#7 (5)	interconnectivity; over-stated; lack of patience; instant gratification; dehumanising
#8 (4)	recursive change; responsivity to change; future indicators; quick to adapt
#9 (3)	resistance to change; acknowledges constant change; resigned to change
#10 (5)	change in environment; responsibility; freedom; thriving; no turning back
#11 (3)	jack-of-all-trades; delegation; acknowledges own competence
#12 (4)	upgrade cycle; inevitability of decay; currency of skills; maintain critical attitude
#13 (4)	survival measures; reinvention; keeping pace; failure
#14 (4)	frequent change; process; workflow; upgrade cycle
#15 (4)	process; strategies; responsive change; upgrade cycle
#16 (5)	fire-fighting; restoring balance; avoiding damage; preventing failure; balancing
#17 (5)	upgrade cycle; recursive change; re-skilling; new terminology; changing rules
Total 71	

Properties were totalled at each stage to act as a simple checksum validation during the process of fragmentation and subsequent reconstitution of data. Assuming that the procedure had been carried out correctly, the totals were expected to tally on conclusion of each stage.

Table 4.3   *Table of codes dimensionalised in to driving properties for RQ1:SC1*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
constant change (x2); frequent change; thriving on change; responsive change; recursive change (x2); responsivity to change; changing rules; resigned to change; change in environment; resistance to change; acknowledges constant change	*Change (13)*
acclimatisation; acceptance; adoption; balancing; quick to adapt; reinvention; restoring balance (x2); fire-fighting; avoiding damage; preventing failure	*Adapting (11)*
currency of skills; re-skilling; acknowledges own competence; jack-of-all-trades; unique characteristics; keeping pace	*Competence (6)*
upgrade cycle (x4); software updates; forced compliance *EXAMPLE*	***Compliance (6)***
freedom; thriving; liberation; dehumanising; open source	*Emancipation (5)*
abundance of information; interconnectivity; over-stated; over-analysis	*Ubiquity (4)*
process (x2); workflow; strategies	*Work (4)*
lag; wasted time; transience; future indicators *EXAMPLE*	***Time (4)***
referential anchors; traits; new terminology	*Narrative (3)*
failure; inevitability of decay; survival measures	*Entropy (3)*
cost savings; onerous licensing	*Constraints (2)*
consider alternatives; maintain critical attitude	*Challenge (2)*
junk; ill-informed	*Worth (2)*
delegation; responsibility	*Ownership (2)*
lack of patience; instant gratification	*Satisfaction (2)*
no turning back	*Own referent (1)*
insecure	*Own referent (1)*
	Total 71

How the narrative-specific open codes shown in Table 4.2 are transformed in to conceptually-based indicators will now be explained. For the sake of brevity, two comparative examples - ***Compliance (6)*** *and* ***Time (4)*** - will be cited with respect to RQ1:SC1, and are highlighted in Table 4.3.

Open codes are so-called because they have yet to be dimensionalised on to a broader conceptual continuum, the totality of which is represented by all members in a set of 'like groupings' (see Table 4.3), which can include the full spectrum of negative-to-positive instances of a particular concept, should they be present. For example, the conceptual indicator ***Time (4)*** is represented by the negative properties of '**lag**' and '**wasted time**', the neutral property '**transience**' and the positive property '**future indicators**'. A review of some of the corresponding tables in Appendix RQ*x* (where *x* = 1, 2 or 3) will confirm that not all conceptual indicators are as dimensionally elaborate, with some being driven entirely by positive properties, some by neutral, and others by negative properties alone. From this it may be concluded that the degree of conceptual diversity exhibited by the driving properties is an indication of the overall polarity of the resulting conceptual indicator. i.e. if the contributing properties are mostly positive, then the resulting conceptual indicator will be positive.

Where codes/properties arise repeatedly, each instance of occurrence is counted as valid. As a second example, the conceptual indicator ***Compliance*** (Table 4.3, row 4) is driven by six open codes, where '**upgrade cycle**' is repeated four times in the contributing narratives. As '*all is data*' (Glaser 2001: 145), each occurrence of a property is taken as equally valid and must be declared, with such instances of repetition contributing to the 'conceptual weighting' of the indicator to which it is eventually assigned. In this case, ***Compliance*** ranked fourth in terms of its conceptual strength with respect to the overall sub-category.

The table of like groupings shown above represents the re-constituted aggregate conceptual expression of all 17 narrative excerpts previously identified as having expressed concern for technological change, and can be said to represent the *dimensionalised* codes, or properties, that ultimately inform sub-category RQ1:SC1 – *Adapting to change.*

4.4.1 Reflecting on the conceptual elaboration of RQ1:SC1

The first code to emerge during analysis came as no surprise; suggesting that it was a dominant theme occupying the concerns of the contemporary entrepreneur in terms of a response to RQ1. The sub-category was strongly indicated by 12 supporting narrative excerpts and was driven by 71 indicating properties.

From this set of properties the two dominating conceptual indicators emerged as *Change* and *Adapting*. As SC1 had not been named at this stage the two leading indicators were combined to eponymously produce the sub-category title *Adapting to change*. On re-reading the narrative excerpts, it soon became apparent that this was indeed representative of the common thread of discussion running throughout the constituent narrative excerpts, and so the name remained.

Other conceptual indicators were clearly present, but in contrast to *Change* and *Adapting* (13 and 11 properties respectively) were notably less dominant, with the joint third-ranking conceptual indicators *Competence* and *Compliance* represented by a mere 6 properties each. The remaining properties trailed-of sharply thereafter, with *Emancipation* (5 properties)*,* and *Ubiquity, Work* and *Time* each supported by 4 indicating properties. The remaining 9 indicators were represented by fewer than 4 properties each.

At this stage it may have been tempting to write-off the less-dominant conceptual indicators as outliers of lesser significance, especially when considered in relation to the dominance of the leading indicators. Indeed, where only one property was associated with a conceptual indicator, they would be bracketed from the substantive analysis as an 'artefactual anomaly' of the research process (in other words, 'junk' data), being labelled '*own referents*' to indicate the absence of any dimensional properties and their comparative solitary weakness.

However, when considered from a systems perspective, the holistic, project-wide significance of some of the less-dominant indicators such as *Narrative* (3 properties) and *Entropy* (3 properties) cannot be underestimated. As the analysis proceeds, and as an acute theoretical sensitivity to the meaning and direction of the research develops, certain 'outliers' - or properties/concepts very closely allied to them - begin to present themselves repeatedly across all stages of analysis, and their stubborn 'permanence' (referred to previously as conceptual 'stickiness') is indicative of a much more subtle, enduring presence that weaves throughout the entire fabric of the project.

While indicators such as *Narrative* may have only been weakly expressed during analysis with respect to one sub-category, one finds that the same – or very similar – concepts are expressed strongly elsewhere and offer a major thematic anchor (as indeed *narrative* does – see §2.8.5) for the study as a whole. Therefore, despite their apparently weak conceptual presence in some categories, the less dominant indicators should be fiercely protected during analysis (for example, by not allowing them to be merged or subsumed in to a more broadly-based concept – see §4.6), as the analysist has no way of knowing which will repeatedly make their presence known during the later stages; any of which could go on to represent a significant contribution to theory.

4.5   Conceptual elaboration of RQ1:SC5

During the early stages of coding, the following excerpt of native data came to the attention of the researcher as being of potential interest:

RQ1:SC5 #2 **ST8**	*"When customers call, they're under the impression that they're connected to a huge corporation. Little do they know that the employee they're speaking to is one of only five in the company, speaking to them from the comfort of his home office, and who is sometimes even in a different country. The quality of broadband and general connectivity is that good that it's almost impossible to tell where anybody is based now."*

In this excerpt, the respondent (**ST8**) – a software development entrepreneur - was recalling how advances in telecommunications and networking technology had dramatically altered the 'locus' of his business operations away from the traditional office environment; not only in terms of the re-location of human resources, but also – as noted by respondent **EX4** - from an infrastructure perspective, where once-internal network and data systems critical to the storage and protection of corporate data were regularly outsourced to third party vendors:

RQ1:SC5 #9 **EX4**	*"Before outsourcing all our hosting, data storage and archiving requirements to the cloud, we had a dedicated server room at the old office, with its own dedicated network manager, and its own dedicated set of problems that regularly disrupted things. If it wasn't some hard drive failing, it was a power supply or a main logic board blowing, any of which would result in us all sitting around twiddling our thumbs until service was resumed. Now, we can blame it all on Amazon if anything goes wrong, which so far - in the three years we've been using them – just hasn't happened."*

Initial coding for the above two excerpts yielded 4 and 11 codes respectively:

RQ1:SC5	Open Codes
#2 (4)	deceptive presence; virtual office; global presence; improving connectivity

and with respect to the narrative excerpt provided by respondent **EX4** (RQ1:SC5#9):

RQ1:SC5	Open Codes
#9 (11)	in-house data network; facilities outsourcing; dedicated operation; attendant issues; hardware failure; systems failure; wasted time; lost productivity; deferred responsibility; reliability; established vendor

A section of narrative from another respondent was subsequently identified discussing topics containing similar themes, but focused on the derivative benefits of working from home, the resulting impact on family life, and the joy of not having to endure the commute to and from the office, thus:

RQ1:SC5 #5 ST12	*"Working from home is the ultimate freedom: I can watch the kids while my partner is out working; do the school rounds at the beginning and end of the day, and so long as I put in the required number of hours every week, everyone stays happy. The best bit of all is not having some boss constantly looking over your shoulder."*

Issues of emancipation are also raised: apart from the freedom of being better able to allocate time between work and family matters in the comfort of the family home, freedom from the constraints and limitations associated with power and control hierarchies was also evident:

RQ1:SC5 #4 EX7	*"The one thing that all staff love about working from home – sorry, correct that – the TWO things that all staff love about it, are not having to commute every day, and being able to spend more time with family. It's a win-win situation, saves employers a fortune in office overheads, and I just don't understand why more companies don't do it. Maybe they don't trust staff to get on with the work."*

In his narrative, respondent **EX7** recognises the benefits to employee and employer (a 'win-win' situation), also making reference to trust and responsibility when pondering the reasons that other companies may have for not adopting a home-working policy. Initial coding of the preceding two excerpts yielded 7 codes each:

RQ1:SC5	Open Codes
#5 (7)	working from home; freedom; liberation; time with children; family duties; working hours; absence of authority

and…

RQ1:SC5	Open Codes
#4 (7)	working from home; travelling to work; family time; cost savings; overheads; low uptake; trust

with the negative aspect being touched upon by respondent **EX6**, thus:

RQ1:SC5 #8 **EX6**	*"I love working from home - the only drawback of the virtual office is not having the human interaction that you would normally get in a traditional office space. Our company makes up for this by regularly arranging work socials, outings and brainstorming 'retreat' sessions, usually over a long weekend at some high-end country manor. The work-life balance is pretty much spot-on."*

A further five excerpts were used as the basis for expressing this (as yet un-named) sub-category:

RQ1:SC5 #1 **ST10**	*"We still maintain a central office, but it's only used by a handful of part-time admin staff, and for hot-desking when remote employees come in for meetings. That said, most meetings are conducted via Skype now anyway."*

RQ1:SC5 #3 **ST11**	*"We made the transition over to a fully-virtualised office about five years ago. All employees operate remotely from home, and they log-in to support customer's computers for troubleshooting and training purposes. They help clients to address issues that they're having with our product by remotely controlling their machine. The staff love it, and could never go back to traditional office-based work, what with that twice-daily commute."*

RQ1:SC5 #6 **EX5**	*"I've noticed that everything seems to be reverting back again to the old client:server model, where all processing and storage takes place on centrally-located servers, and clients access services via remotely connected terminals. The modern equivalent of client:server is facilitated now of course by web-based virtualisation and cloud technologies using products like Citrix and Azure… leaving all the hard work, headaches and expense usually associated with operating and maintaining your own network up to the big boys like Microsoft and Amazon."*

RQ1:SC5 #7 **ST9**	*"We use Amazon cloud services as our preferred medium for file storage and hosting applications; it's been this way for a few years now. The next big things to come along and have a transformational effect on working life will be so-called 'BigData' and the 'Internet of Things'."*

RQ1:SC5 #10 **EX3**	*"The old boundaries that once hindered many aspects of business have mostly disappeared. The only thing that we don't have any power over is the time difference when dealing with international customer. Even then though, I don't mind staying up late or getting up a few hours early if it's to attend an important meeting. I can just go back to bed once it's over."*

The selected excerpts centred mostly around themes of emancipation and liberation that ultimately contributed towards a sense of empowerment among the beneficiaries: liberation from traditional work spaces (SC5#3); liberation from old power, control and authority strictures (SC5#5); liberation from the twice-daily commute (SC5#4); the freedom to spend more time with family (SC5#4; SC5#5); the freedom to determine

schedules (SC5#5); the freedom to communicate unhindered with colleagues, customers and suppliers regardless of physical location (SC5#10; SC5#1); the freedom to securely access corporate information systems regardless of their physical location (SC5#6), and the freedom to occasionally engage with an office environment, should the need/desire arise (SC5#1).

The researcher-generated codes arising from analysis of the data at this stage are merely unsorted artefacts put forward in an attempt to marshal meaning by condensing any detected nuance, intention or expression contained within the narrative in to a representative shortcut. It is important for the researcher to embrace a non-critical, yet purposeful attitude during this stage of analysis in order to allow the free emergence of new codes. Overly-critical analysis at this stage may prevent the expression of dimensionally related codes during later stages of analysis.

It is at this stage of the analysis where codes are re-arranged from their narrative-level groupings to a set of 'like-groupings' based on their synonymous/antonymous and dimensional properties. The full set of 66 open codes for the group of ten narrative excerpts grouping around the same theme was compiled in to a table, thus:

Table 4.4   *Open codes yielded by narrative excerpts pertaining to location*

RQ1:SC5	Open Codes
#1 (4)	maintaining traditional presence; functionality; meeting space; video-conferencing
#2 (4)	deceptive presence; virtual office; global presence; improving connectivity
#3 (8)	transition; virtual office; remote working; remote support; remote training; remote control; retrospection; travelling to work
#4 (7)	working from home; travelling to work; family time; cost savings; overheads; low uptake; trust
#5 (7)	working from home; freedom; liberation; time with children; family duties; working hours; absence of authority
#6 (7)	centralised processing; centralised storage; remote connectivity; virtualisation of services; cloud technology; network support; devolved responsibility
#7 (4)	cloud services; data storage; data hosting; transforming technologies
#8 (8)	working from home; virtual office; inter-personal socialisation; remedial action; social gatherings; brainstorming; remote location; work-life balance
#9 (11)	in-house data network; facilities outsourcing; dedicated operation; attendant issues; hardware failure; systems failure; wasted time; lost productivity; deferred responsibility; reliability; established vendor
#10 (6)	boundaries; barriers to business; working hours; accommodating differences; international trade; home working
Total 66	

This is what grounded theory texts refer to as the recursive 'fragmenting' of data. Using the '*Table → Convert → Convert Table to Text*' tool in Microsoft Word, a 'master' list of expressed codes was extracted from Table 4.4 and re-ordered alphabetically to help

spot duplicates or leading word matches; thereby facilitating more efficient grouping of like terms.

Confronted with a list of sorted codes (Table 4.5) containing a number of readily-identifiable duplicates, it is now the job of the analyst to begin grouping the terms in to sets that exhibit some form of congruence and/or conceptual affinity; gathering them as 'dimensionalised' properties that may be represented on a scale containing '*like groupings*' and '*synonymous/antonymous dimensional properties*', as indicated at the head of Table 4.6. Confronted with a table of seemingly unrelated terms, the process begins by demanding that all properties are scanned over and over until some semblance of 'learned' familiarity began to indicate commonality and/or congruence between one or more terms.

Table 4.5   *Alphabetically sorted open codes for RQ1:SC5*

absence of authority	global presence	social gatherings
accommodating differences	hardware failure	systems failure
attendant issues	**home working – same as ***	time with children
barriers to business	improving connectivity	transforming technologies
boundaries	**in-house data network**	transition
brainstorming	inter-personal socialisation	travelling to work
centralised processing	international trade	travelling to work
centralised storage	liberation	trust
cloud services	lost productivity	video-conferencing
cloud technology	low uptake	**virtual office**
cost savings	**maintaining traditional presence**	**virtual office**
data hosting	**meeting space**	**virtual office**
data storage	network support	**virtualisation of services**
deceptive presence	overheads	wasted time
dedicated operation	reliability	work-life balance
deferred responsibility	remedial action	**working from home ***
devolved responsibility	remote connectivity	**working from home**
established vendor	remote control	**working from home**
facilities outsourcing	remote location	working hours
family duties	remote support	working hours
family time	remote training	
freedom	remote working	**TOTAL: 66**
functionality	retrospection	

Emergence of the first grouping of terms will now be explained (later to be called *Locus of Operation*, but at this stage that label has yet to be assigned and remains undetermined). Referring to Table 4.5, the 19 properties highlighted in **bold text** relating to location, resource and agency began to stand out almost spontaneously, and for no reason other than the researcher began to notice an affinity between certain terms that somehow seemed attractive. But what kind of affinity? To begin with, terms on a sliding dimensional scale pertaining to a combination of location and agency, such as 'fixed [location]' (as in **working from home**), 'moving [location]' (as in **facilities outsourcing**),

'central [location]' (as in **centralised storage**), and 'virtual [location]' (as in **cloud technology** and **cloud services**) began to impress themselves on the analyst's attention. Once a conceptual 'feel' for the grouping had been established, it was then an easy matter to identify the remaining terms.

During this process, the various properties had not only been dimensionalised on to a sliding conceptual scale, but had also grouped together to provide an impression, or overall feeling for what the researcher subjectively elected to label '*Locus of operation*'. In the case of most sub-categories, the sub-category would take on the name of the leading conceptual indicator, as this represented the thematic culmination of all other indicators driving the sub-category. Hence, RQ1:SC5, with its 10 contributing narrative excerpts, 66 indicating properties (referred to as 'codes' once they have been dimensionalised) and 10 distinct conceptual indicators (*Locus of operation*, *Productivity, Remote working* etc.) was named after its most prominent conceptual indicator, '*Locus of operation*'.

Table 4.6 *Table of codes dimensionalised in to driving properties for RQ1:SC5*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
centralised processing; centralised storage; data storage; data hosting; in-house data network; dedicated operation; facilities outsourcing; cloud technology; cloud services; virtual office (x3); meeting space; working from home (x4); maintaining traditional presence; virtualisation of services	*Locus of operation (19)*
working hours (x2); wasted time; work-life balance; lost productivity; travelling to work (x2); brainstorming; transforming technologies; transition; improving connectivity; hardware failure; systems failure; network support	*Productivity (14)*
remote connectivity; remote control; remote location; remote support; remote training; remote working; deceptive presence	*Remote working (7)*
social gatherings; time with children; family duties; family time; inter-personal socialisation; video-conferencing	*Social interaction (6)*
freedom; liberation; boundaries; barriers to business	*Emancipation (4)*
cost savings; overheads; low uptake	*Financial (3)*
established vendor; trust; reliability	*Vendor relations (3)*
devolved responsibility; deferred responsibility; absence of authority	*Responsibility (3)*
international trade; global presence	*Global reach (2)*
remedial action; accommodating differences	*Adapting (2)*
retrospection	*Own referent (1)*
attendant issues	*Own referent (1)*
functionality	*Own referent (1)*
	Total 66

For many, it may be concerning that the above process appears to rely on the subjective opinions of the researcher, who apparently flouts all rules pertaining to researcher impartiality, bias and objectivity etc. But, as part of a concerted grounded theory effort, this is an intended – even crucial - ingredient of the 'constant comparison and interchange of indicators' approach to analysis. Being able to usefully apply any prior relevant

experience in the field is contingent on the researcher having that prior exposure to begin with, and for that reason, the approach would not be suitable to all studies where the researcher may have no knowledge in the area; therefore, having no option but to remain impartial. However, the benefits of having a researcher *as expert analyst* (see §3.14.1 for detailed discussion) confers the privileged advantage of permitting the researcher to 'break the veil of impartiality' and carefully bring his or her own experience to the process, while at the same time, knowing when to 'bracket' one's own relevant expertise and when to remain 'open'.

4.6   Reflecting on the coding process

4.6.1 Conceptual Overlap

As analysis of the data progressed I would periodically revisit each conceptual code with a view to reassessing the classification and assignment of properties to their related concepts. I considered this to be an integral and necessary element of the 'constant comparison' process, which acted as a form of 'relationship safeguarding', where the continued conceptual relevance of properties to their assigned concepts could be verified, validated and clarified as the underlying data driving their relationship evolved over time.

The process confirmed whether, in light of new realisations, understanding, and clarity, the property, or properties were still congruent with an overall understanding of the concept, as it stood at that point in time. On a number of occasions I was confronted by properties that appeared to have been misclassified in terms of their conceptual relevance, but I would always need to remind myself that (in the absence of a bona fide error) there would always have been a prior valid reason for the allocation, which would inevitably force me to refer back to the raw empirical data, field notes, and conceptual memos for reassurance. For many, I would be satisfied, and the original classification would stand, as outlined in the following examples of confusion that arose between sub-categories.

4.6.2 Assigning ambiguous properties to concepts

During analysis, properties exhibiting potential relevance to more than one conceptual indicator would frequently arise. The conceptual code *Control* (RQ1:SC2) offers a good example when comparing the conceptual indicators *Competition* and *Employment*, thus:

outsourcing; global competition (x2); global connectivity; open to all; global marketplace; overseas talent; competitive advantage; competitive edge; mission-critical; differentiation from competitors	*Competition (11)*

remote working; gig economy (x2); local unemployment; **outsourcing**	*Employment (5)*

Both were similarly ranked in terms of their conceptual relevance, but quite distinct with respect to their underlying meaning. When faced with the property of *outsourcing*, which occurred twice in the relevant empirical excerpt, it was initially deemed to be an expressed property of *Employment*. During a later stage of analysis however, it was determined to have *equal* relevance to both *Competition* and *Employment*. In order to resolve such ambiguity, a step needed to be taken back in order to consider the intended nuance and usage behind the properties, as originally portrayed in context at the interview stage. Referring back to the original interview excerpts giving rise to both properties:

RQ1:SC2 #3 **ST13**	*"Our direct competitors now outsource most-all of their non-specialist functions to overseas companies willing to do the work for less. They save a small fortune on admin staff in the process, and in some way, gain a competitive advantage over us because they can spend more time and money on the things that matter, like improving their products, and gaining more market share. We are losing out big-time."*

and

RQ1:SC2 #4 **ST14**	*"With the E-lance and UpWork web sites, we can now outsource any specialist requirements we have to the so-called 'gig' economy, where hundreds or thousands of willing freelancers located in all corners of the world are willing to bid on the work. Much of our work gets subcontracted to Indians, who always do a fantastic job, are so willing to accommodate, and provide the best hourly rates. This kind of practice is becoming more prevalent in our industry, and I hate to say it, but is at the expense of us employing the locally available talent, which is too tardy, too expensive, and usually comes with attitude."*

The first respondent speaks about competitors outsourcing specialised functions to overseas companies, the associated financial benefits, and the competitive advantage gained by being able to concentrate more on '*things that matter*' as a result of the time liberated by outsourcing.

The second narrative lauds the on-line skills and talent-matching applications that are driving engagement with the so-called 'gig-economy', where significant cost savings are made by casually employing remote workers at a much lower hourly wage than available locally.

While both respondents are talking about the phenomenon of outsourcing, the first is focussed more on issues relating to time and cost; and while the second is also concerned about the time/cost benefits, he also makes reference to employment, employability and how the very nature of it being transformed by on-line technologies, global telecommunications, and the advent of remote, 'always available' gig contractors.

Returning to the original question: should the property *outsourcing (x2)* be allocated to the conceptual indicator *Competition*, or the conceptual indicator *Employment*? Initial analysis suggested that they were equally relevant to both, and after careful consideration of the underlying empirical data, it became clear that perhaps both properties should remain equally assigned to both concepts, thereby preserving the balance in original meaning as portrayed by the source narrative. To some, seeing the same property contributing to multiple conceptual indicators may appear to be a mistake: it is not.

Indeed, where the properties belonging to two distinct concepts expressed significant overlap of meaning or multiple ambiguities, it prompted the researcher to question the uniqueness of the concept itself, and often resulted in the blending of two concepts in to one, taking on the constituent properties of each founding concept. Consequently, identical properties are seen to exist independently across multiple concepts, or become grouped together under one common conceptual banner. This is not a case of carelessness or lack of attention on the part of the analyst, as one may suspect, but reflects a careful consideration of the nuanced meaning of the property, as it relates not only to the original narrative, but also the situational context, field notes and conceptual memos; all of which add to the original expression of the concept.

While the above argument may have had little impact on the final significance of either conceptual indicators in this case, the thought processes applied when distinguishing between potentially ambiguous properties is highlighted to demonstrate similar occurrences between artefacts that may have an impact on the intended contextual meaning of a code. Where multiple properties exhibit conceptual ambiguity, their impulsive reallocation or redistribution could result in major changes to a concept's overall significance and the theory it later informs, and so care must be taken. Three examples of how conceptual ambiguity was recognised and subsequently dealt with are outlined in the following sections.

4.6.3 The case of RQ3:SC1, RQ3:SC4 and RQ3:SC6

Doing the right thing (RQ3:SC1) was an unusual sub-category in that the only conceptual indicator that adequately described its dominant properties sounded uncomfortably colloquial and overly vague; in other words, it was not a *good fit* (Glaser 2002). Furthermore, it was worryingly close in terms of meaning to the sub-categories *Universal good* (cf. RQ3:SC4) and *Compliance* (cf. RQ3:SC6), leading me to suspect that the coding process had failed at some point, or something else had been overlooked.

The overall vagueness and lack of comfortable 'fit' with respect to the other sub-categories indicated that the properties driving the category may be a sub-set of one or more of the existing categories, and therefore prompted a re-evaluation of SC1, SC4 and SC6 in the later stages of analysis.

An initial remedy was to merge the constituent properties for all three sub-categories to form one larger sub-category, driven by a more broadly-based set of conceptual indicators; but if that was to be the case, then why not collapse *all* sub-categories driving RQ3 in to just one labelled *Principled praxis*? Clearly, they all, in some way or another, were conceptually driving the core category. The line had to be drawn somewhere, and as constant comparison and the interchange of indictors progressed, this dilemma highlighted the challenges faced by the analyst during the approach to theoretical saturation: as saturation of the data was approached, the nuances, meanings and dimensional properties driving the sub-categories would begin to exhibit increasing signs of conceptual overlap, causing the final allocation of properties to their respective sub-category to be further doubted. This doubt often resulted in them being switched from one category to another, only to be doubted again, and then swapped back to their original allocation. Rather than the 'abrupt-stop-to-analysis' so often referred to in the grounded theory texts, perhaps *this* was a better indicator of an approaching theoretical saturation?

There must have been an original basis for distinguishing between the three synonymous sub-categories RQ3:SC1, SC4 and SC6. To address this doubt, a thorough re-analysis of the underlying nuances embedded within the original interview narrative was required. Subsequent re-evaluation, however, vindicated the original choice for distinction: nuanced meanings contained within the narrative excerpts driving *Doing the right thing* (SC1) revealed that respondents were referring to the need to serve the immediate needs of themselves and those around them, such as work colleagues, family and other close associates. Contrastingly, *Universal good* (SC4), extended the scope of the action-out-of-

duty described by SC1 to address a set of beneficiaries based externally to the respondent's immediate sphere of influence. While both SC1 and SC4 were nuanced with the common need to do only what others would generally perceive to be good, principled action, the *scope* of the intent was quite distinct. The concepts involved were broadly similar, but the extent of the action was not, and this possibly gave rise to the original confusion: competing conceptual indicators were at play here. Finally, *Compliance* (SC6) referred uniquely to the observation of statutory demands and the legality of complying with authoritarian demands, and while it may have initially appeared to be strongly synonymous with SC1 and SC4, it was found to be quite independent in the final analysis.

4.6.4 Concerning the conceptual elaboration of RQ2:SC4

Choosing a suitable name for this sub-category was the subject of much consternation and should be highlighted as a good example of how a sub-category evolves during the various stages of analysis. Based on the concepts initially driving it, the sub-category was labelled *Access to knowledge*, but 'knowledge' would have immediately restricted the conceptual scope to data with meaningful structure, thereby excluding the less structured forms of *data* and *information* (refer to DIKW discussion: §2.8). The category was then changed to *Accessibility*, but on reflection, such a vague descriptor could also refer to accessibility with respect not just to information or knowledge, but to people, resources and other artefacts. As access to people and access to resources had already been addressed by *Networks* (RQ1:SC4) and *Locus of operation* (RQ1:SC5) respectively, the label *Accessibility* was therefore not a viable option, either. Following a careful review of the constituting properties, it was decided to name the sub-category '*Access to information*'; a label that reflected the structured, meaningful nature of the knowledge being sought (contrasted with a structure-less corpus of meaningless data), and which was consonant with, for example, Casson's (2003: 233) conclusions relating to the role of information in stimulating entrepreneurial activity.

4.6.5 The conceptual elaboration of RQ3:SC3 and RQ3:SC5

A significant amount of conceptual overlap between RQ3:SC3 *Life-work balance* and RQ3:SC5 *Commitment* began to appear during the later stages of analysis, mostly on account of the overlapping concepts relating to the strong inter-dependencies that exist between family, colleagues, and the working environment that ultimately satisfies their various needs. The fact that the sub-category had to be changed from *Family values* to *Commitment* signalled early signs of potential ambiguity.

The change of name was shortly followed by the temptation to merge both sub-categories, as the narratives supporting each seemed to focus on similar conceptual themes. However, a subsequent detailed analysis of the excerpts *in context* with the relevant native interview scripts revealed specific nuances and sufficient variety to warrant a sustained differentiation between the two. Accordingly, the two distinct sub-categories relating to *Commitment* and *Life-work balance* remained. Indeed, had the two categories been merged, much of the preceding discussion could possibly have been lost, having been absorbed in to a wider conceptual discussion, thereby resulting in the complete omission of a number of embedded concepts vital to the construction of theory in Chapter 6.

Chapter 5 – Data Analysis

5.0   Introduction

Chapter 4 offered worked examples of the analytical procedures involved in the conceptual elaboration of two sub-categories: *Adapting to change* and *Locus of operation*, referred to throughout this work as 'RQ1:SC1' and 'RQ1:SC5' respectively. Conceptual elaboration was facilitated by the rigorous application of analytical coding, as described in Part III of Chapter 3.

RQ1:SC1 and RQ1:SC5 emerged as two of the nine conceptual indicators prompted by the first research question (RQ1), which ultimately contributed towards the conceptual definition for the first of three core categories, which for RQ1 was '*sensemaking*'. Each of the three research questions gave rise to their own distinctive line of grounded inquiry, eventually progressing to indicate a unique core category. When considered together as parts of a whole, they pointed towards a single master (core) category answering to all three, and hence each of the research questions (RQ1, RQ1, RQ3). The master category indicated by all three core-categories was *Entrepreneurial inference* and could be said to represent the core essence underpinning the entire study (see Figure 4.2 for schematic depiction).

Just as RQ1 gave rise to nine conceptual indicators informing the core category of *sensemaking*, RQ2 and RQ3 similarly generated their own sets of unique conceptual indicators, yielding 12 and 11 distinct sub-categories, as well as the core categories *Structured inquiry* and *Principled praxis* respectively. In line with the three core-categories this chapter is presented in three sections, with each building on the foundational support provided by the preceding research question(s).

The first section develops a grounded theory of *sensemaking* in uniquely addressing RQ1 as the foundational pilot for the study (see §3.8.1: *The pilot study*). As the study progresses, the synergistic relevance between each of the three RQs becomes evident, where the conceptual essence of each is contained within and exhibited by the other two, thus representing a truly synergistic relationship between the three.

Underscoring a true systems approach to the inquiry, the synergistic nature of each element of the process should not be underestimated. Not only are each of the RQs inter-related and supportive of each another, but the core categories to which each of them points also possess – as this chapter will demonstrate – synergistic relevance between each other; all of which ultimately feed-in to the 'master' core category of *Entrepreneurial inference.*

Referring back to the previous chapter, Figure 4.1 depicts a full schematic illustration of the inter-relatedness between themes and concepts across each of the three grounded studies undertaken. Moving to the left of the core categories in Figure 4.2, it is also clear that a high degree of synergy also exists between the sub-categories that inform them, expressed at the open code level. Such interconnectedness should not be surprising, as the grounded theory approach - via the constant comparison of properties with codes, combined with an interchange of indicators – naturally enforces a high degree of conceptual synergy to develop during analysis; thereby ensuring a high degree of relevance and fit (validity) to the later stages of theoretical analysis, as outlined by Glaser (2004).

Data Analysis (RQ1)

5.1   Introduction

This section analyses the narrative excerpts contributing to each of the nine sub-categories responding to RQ1: SC1-SC9. In conjunction with any post-sessional field notes (Appendix F), and drawing on my [temporarily unbracketed] experience in the field, a thick *description* of the narrative is provided. Note that this stage of analysis does not rely upon academic literature as a source of theoretical inspiration, and so maintains the independence of the emergent concepts until the theory building of Chapter 6, where the analysis here will be considered together with relevant researcher memos, and compared with the extant literature for signs of correspondence or refutation.
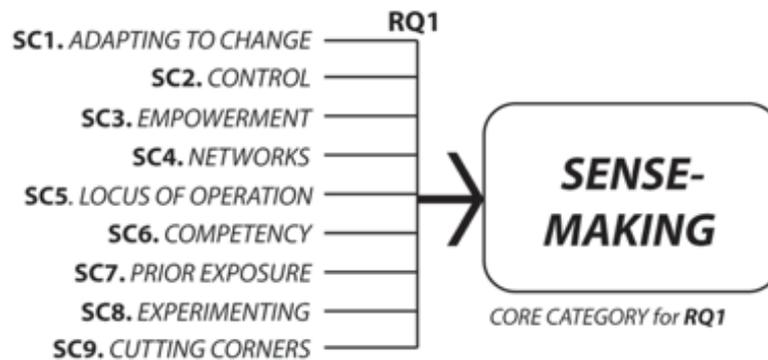
Figure 5.1   *The 9 sub-categories driving the core-category 'Sense-Making'*

5.1.1   RQ1:SC1 - Adapting to change

Adapting to change featured heavily as an emergent theme in the conceptual analysis of RQ1 (see Appendix S1); not just with respect to this sub-category (RQ1:SC1), but as a common thread that ran throughout many other categories, expressed variously as conceptual indicators relating to *Transforming*, and *Transformation* (see RQ1:SC3, SC4, SC7; RQ2:SC12).

Furthermore, change was not only expressed at the binary extremes of resisting and adapting, but as a multitude of interim properties that demonstrated varying gradations of positive and negative change; demonstrating that the phenomenon existed as a broad-spectrum continuum, as illustrated by the supporting narrative excerpts quoted in this section.

The types of 'change' being adapted to focussed on the continual need for entrepreneurs to respond to the evolving workflows, techniques and processes prompted by the progressive emergence of various technologies (e.g. 'smart' devices [1] , remote connectivity, social media etc.); often 'mission critical' technologies used to support and enhance venture viability amidst the unpredictability and chaotic turbulence of an emerging 'information' economy, as elicited by respondent **EX2**:

RQ1:SC1 #14 **EX2**	*"In my previous employment, I found that the processes and workflows we had become accustomed to over years were starting to change more frequently to accommodate the latest advances in MIS technology, mostly driven by upgrades to hardware and software. Upgrading once is fine, but soon becomes tiresome when minor and major updates start to appear every few months. The updates can't be ignored, otherwise everything stops working. It's no different now, working for myself: I just don't have the time or the spare brain cells to keep resetting the goalposts and reinstalling things over and over – it really slows down my business."*

Respondent **ST9** singles-out the general disposition of entrepreneurs as being particularly adept at adapting to change, owing to their instinctive, 'chameleon-like' ability to respond to unexpected events in dynamically changing environments, thus:

RQ1:SC1 #8 **ST9**	*"Those in the business of creating and managing enterprise are constantly needing to adapt to the very change that they are responsible for creating in the first place. Some complain and others just get on with it, but in the domain of high-risk, fast moving business, constant change keeps us all on our toes…it's a completely different dynamic to the standard 9-5 employee, whose life from one working day to the next is mapped out from start-to-finish. For entrepreneurs – especially those in the hi-tech industry - they usually have no idea what one day to the next will bring, and so need a chameleon-like response at the ready, able to deal with and react to anything that may be thrown at them."*

Here, **ST9** makes indirect reference to a causally 'recursive' loop, where the technologies designed and produced by a sector often return to exert influence and *Control* (RQ1:SC2) over the very sector responsible for its original creation. Other narratives (e.g. RQ1:SC1#3, #14, #15) readily demonstrate the power of such technologically-imposed control via the *update-upgrade-subscribe* trap associated mostly with software and 'apps' for smart devices – where the service will simply stop functioning should the appropriate remedial action (one-off or periodic subscription license payment, software/hardware update/upgrade, mandatory staff training etc.) not be taken.

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[1] *'Smart' devices: 'Smart' phones, tablets and other Web 2.0-capable wirelessly connected devices that are 'always-on' in terms of their internet presence (battery-life permitting).*

Like **EX2,** respondent **ST14** elaborates further on the various control mechanisms exerted *by* technology *on* users, expressing exasperation at the frequent demands to adapt information systems to comply with the many upgrades, updates and security patches imposed on him by vendors; resigning himself to a future 'trapped' in a never-ending cycle of maintenance and contractual obligations:

RQ1:SC1 #5 **ST14**	*"I am concerned about the frequency of so-called 'security' updates from Microsoft and other software vendors. Installing them takes up so much of my time; time that I should be spending addressing the basic day-to-day needs of my business. Others I know are also beginning to recognise and resent the number of hours they are wasting on this ritualistic farce. As we are now so dependent on the technology, we have no choice but to comply."*

Regarding the need to personally adapt, respondents frequently bemoaned a working environment characterised by rapid and discontinuous change (RQ1:SC1; RQ1:SC4), where incumbent skillsets were in a constant flux of replacement and revision, and increased training or self-learning (see **ST9** and **ST15** below) was seen as the only way of ensuring that skills could competently accommodate the frequent updates forced on mission-critical information systems; systems on which the operation invariably depended. Highlighted by respondents **ST9** and **ST15**, such change was perceived as essential to one's future survival and relevance in the setting of a technologically dynamic workplace:

RQ1:SC1 #12 **ST9**	*"Just as WordStar was replaced by Microsoft Word, Facebook will surely go the same way as MySpace one day...and all the old habits and practices that you once spent hours learning with respect to these latest fads will get replaced over, and over again with new ways of doing things; ways of doing things that become mainstream as more and more users fall for their charms. The main point is to ensure that you remain ever-vigilent, and ensure that you as an individual do not get caught unawares by the creeping and inevitable progress that we call technology. Never stand still, and always ask questions that directly challenge the status quo."*

Respondent **ST9** also hinted here at the looming spectre of traditional jobs being eroded by progressive automation, suggesting that a life dedicated to continuous training (cf. *Learning* – see RQ2:SC1), driven by a critical outlook may be one of the few remaining ways forward if the traditional work imperative is to persist. The need to 'keep up' was a frequently occurring concern connected to the changing work environment and was attributed to a gradual 'loss of control' (see RQ1:SC2) of skills that were being progressively rendered useless by advancing autonomous technology, coupled with a general concern for long-term job security. Respondents **ST15** and **ST10** expand further on these points:

RQ1:SC1 #13 ST15	*"In a bid to survive we have had to reinvent ourselves time and time again in line with changes to the underlying technology. Fortunately, we've been able to keep pace so far, but each time there's a significant upheaval to the way things are done, the consequences become more expensive, more complicated and riskier to integrate with existing systems. How much longer we can continue like this is anybody's guess."*

Survival is referenced here as the basic *need* that drives the response to technological change, whereas respondent **ST10** highlights the decrease in time allowed to adapt to change:

RQ1:SC1 #1 ST10	*"When a new product or service arrives on the scene, there is a distinct lag between the time you incorporate it in to your infrastructure, workflow - or whatever – and the point at which the business begins to usefully benefit from its functionality in one way or another. Taking into account the time it takes for training, shaking off any lingering habits from the 'old' system, there is a definite 'lag' involved in the uptake of new technology. The problem in recent years however, has been that new versions of said technology are now being released faster than the average 'lag' time to useful adoption."*

While the time it takes users to adapt, adjust and accommodate to change in their working environmental remains unchanged, the time between upgrades and updates to critical systems is perceived as becoming ever shorter. This has resulted in not only a sense of inadequacy and lack of confidence (RQ2:SC2) regarding the ongoing currency of skillsets (RQ1:SC6 - *Competency*), but also prompts users to question their ability (RQ2:SC7 – *Reflection & Reflexivity*) when they are expected to operate such advanced systems productively and effectively in the fulfilment of their work duties, thus:

RQ1:SC1 #17 ST15	*"No sooner do you get accustomed to the way model 'x' works, model 'y' is released, accompanied by a whole new set of terms, rules, features and add-ons; and the whole process starts over again."*

and…

RQ1:SC1 #2 EX7	*"When everything is changing around you, there are no familiar anchor points via which to reference your judgements or actions. Unlike the stale predictability of, say a 9-5 office job, the life of an entrepreneur is characterised by constant change, unpredictability, and uncertainty. Their actions are driven by the need to restore balance and harmony to an otherwise chaotic world, which perhaps explains their propensity for risk taking and seemingly rash decision making."*

The negatively emergent properties defining this sub-category focus on respondents' own perceived inability to integrate technology due to mismatched or out-dated skillsets, and their lack of conceptual *anchors* (see **EX7** narrative above) via the presence of *specialist* [technical] vocabulary (i.e. a specialised lexicon – see **ST15** narrative above) needed to engage in productive discourse regarding the gainful integration of the technology with

existing workflows and processes[2]. In other words, they are referring to a lack, or absence of guiding *narrative*, which is seen as an essential prerequisite to satisfactory job performance.

Respondent **EX5** responded to the forced imposition of systems updates in the name of security or enhanced feature sets by targeting the elimination of products sold by for-profit corporations, in the name of alternative, open-source solutions; thereby escaping the perpetual subscription-upgrade trap:

RQ1:SC1 #3 **EX5**	*"Having banned Windows and all other Microsoft products from site, our whole operation now runs on the 'Linux' open source operating system. It takes a little more getting used to, but has saved us hundreds of thousands by avoiding the yearly licensing and upgrade 'trap'…Since 2010, our total annual spend on operating systems software has been negligible, and the feeling of freedom among our network engineers is palpable."*

Other respondents celebrated the efficiencies that came with the seemingly incessant changes to the technological landscape, pointing out that the negatives (cost, updates, upgrade etc.) were far-outweighed by the gains, advantages and operating efficiencies brought about by increasing connectivity speeds information accessibility facilitated by an 'always-on' broadband culture[3].

But, knowing how to distinguish valid information from the 'noise' amidst the sheer abundance of data was also a point of frustration, often resulting in needless over-analysis and much wasted time and effort. This culminated in a sense of resigned helplessness, where the technology itself (rather than any occupational factor(s)) was perceived as the ever-present and dominating force:

RQ1:SC1 #6 **ST8**	*"I find that there's a tendency to needlessly over-analyse problems now. Just because of the sheer amount of information available at the press of a button, people feel the need to include it all, even though much of it is ill-informed dross. A good example of this is when people get a pain or ache and make the fatal mistake of consulting Google: before you know it, you've got just weeks left to live. The same applies to the search for business and technical information: consulting Google is the last thing one should do if you're looking for even the slightest degree of clarity."*

Although perhaps more relevant to RQ1:SC5 *Locus of operation*, RQ1:SC1 - *Adapting to change* also captured the concerns of respondents that related to aspects of change and fluidity in working location, where they had progressively witnessed the transition from

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[2] *Field Note FN14:14 on Guiding Narratives*
[3] *Field Note FN15:01*

a static, stable physical working environment and infrastructure to a virtual 'pop-up' equivalent; where employees could be 're-tasked' to work from home for a designated number of days each week/month; and where computing and office resources could be hosted remotely, in 'the cloud' (see RQ1:SC5 #6, #7, #9) at the flick of a switch. What was once 'the office' had now become a transient meeting place (see RQ1:SC5#1) for occasional 'hot-desking', and for many, represented the only opportunity for direct social interaction with work colleagues.

Technological change was generally seen as an impediment to progress, as well as an additional overhead to 'business as usual', with the need to frequently upgrade to newer versions of software and hardware being cited as a drain on time and resource; specifically with regard to the start-up environment, thus:

RQ1:SC1 #16 EX1	*"In my experience the typical life of an entrepreneur is punctuated by one fire-fight after another. Because of the dynamism of the environment in which we generally operate – which is even more demanding in the technology sector owing to its ever-changing nature – our life consists of restoring balance to situations that have the potential to damage, or even destroy a venture if left unattended. It's all a big balancing act in the name of survival."*

Here, the response to change is described via a powerful fire-fighting analogy, singling-out technology as a particular aggressor because of its constantly changing nature. However, other types of change that contribute to the challenge and dynamism of any start-up environment are also at play: cultural change (overseas-based contractors, call-centres etc.) political change (compliance with bureaucracy, red-tape, statutory requirements etc.); environmental change (e.g. staff turnover, remote tele-working, shifting resource and infrastructure location) and other changes imposed by financial and market forces such as cyclical boom-and-bust periods in the economy; regional, national and global market fluctuations, and prolonged periods of depression; all of which are evidenced by the permanent historical record.

In contrast to this however, just as many respondents tended to frame their engagement with technology in a positive light, citing it as less of a fight, but more as an *empowering* force (cf. RQ1:SC3 - *Empowerment*); a chance to embrace diversity (RQ2:SC8 - *Diversity*); redefine outmoded workflows/processes and increase efficiency (RQ1:SC8 – *Experimenting*); promote innovation and creativity (RQ2:SC5 – *Creative thinking*); and as a tool for the generation and discovery of new knowledge and opportunities (RQ2:SC4 – *Access to knowledge*).

5.1.2   RQ1:SC2 - Control

The sub-category *Control* exhibits a close affinity with the preceding sub-category *Adapting to change* (RQ1:SC1), in that the degree to which attempts are made to re-balance a system that is subject to turbulent forces of change are contingent on the controlling agent('s) ability to respond and adapt. Accordingly, the lead conceptual indicator here refers to dimensions of power, subservience, dominance, capitulation, and other properties that prompt some form of intervention or remedial action when attempting to mitigate contra-forces that may lead to the needs of a venture not being met.

Table 5.1.2   *Conceptual indicators for sub-category RQ1:SC2*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
controlling; controlling ability; loss of control; submission; obedience; ceded control; obedience; surrendering control; inclusivity; reliance; subservience (x2); dependence (x2); capitulation; focus on essentials; cost savings	*Control (17)*
global competition (x2); global connectivity; global marketplace; overseas talent; open to all; competitive advantage; competitive edge; mission-critical; differentiation from competitors	*Competition (10)*
forced compliance; power; dominance; ignoring change; rejecting change; empowerment; commandeering	*Empowerment (7)*
remote working; 'gig' economy (x2); local unemployment; outsourcing (x2)	*Employment (6)*
staying one-step ahead; increased effort; changing habits; adapting to survive	*Surviving (4)*
reliable vendors; confidence in supplier; pessimistic outlook	*Satisfaction (3)*

N.B. Shows lead indicators only: see Appendix RQ1:SC2 for full table

Adapting to change (RQ1:SC1) describes the reaction to controlling forces, but the *source* of control itself is an entirely separate conceptual entity, and deals with the various forms of agency at play in the execution of human and non-human response. Therefore, *Control* as a conceptual indicator plays a key role in defining the response to endogenous and exogenous environmental change, where both human and technological agency were seen to be the originators and recipients of varying degrees of control.

At its simplest level, technological control manifested as an increasing level of human dependence on smart devices, as indicated by respondents **EX6** and **ST8**, thus:

RQ1:SC2 #1 **EX6**	*"I would never dream of going anywhere without my mobile phone and/or iPad. I depend on both to schedule my day, tell me where to go, and how to get from A to B. I can't imagine it any other way."*

and

RQ1:SC2 #2 ST8	*"It's fair to assume that my actions are for the large part driven by my smart phone. If it rings, I have to answer it. If I hear that a new text, Facebook or Twitter message has arrived, I simply must read it immediately – even to the point of pulling over in the car, or suspending a conversation mid-flow. These things really do have power over the people they are interacting with."*

Other dimensions of control were expressed in terms of financial loss, where control over market share, sales and profitability was being ceded to 'gig-contractors' participating in the boundary-free knowledge-economy. This was especially prevalent in the technology sector, where enhanced efficiencies in the realm of telecommunications and connectivity were seen to be enabling knowledge workers to bid for work, regardless of their global location:

RQ1:SC2 #6 EX7	*"We have to work harder than ever now to win a contract. We're not only competing against local talent, but it seems that the whole world is also pitching for the same work, thanks to advances in global telecommunications. The whole world is now a market place, and anybody with a good internet connection can take trade in this market."*

But the antipodal conceptual dimension to this also pointed towards an increased level of control in terms of firms being able to outsource specialist requirements to those very same 'gig' contractors, thereby saving considerably on employee overheads (e.g. contracts, holiday pay, working time directives etc.) and releasing much valued time to concentrate on product R&D in the process:

RQ1:SC2 #4 ST14	*"With the E-lance and UpWork web sites, we can now outsource any specialist requirements we have to the so-called 'gig' economy, where hundreds or thousands of willing freelancers located in all corners of the world are willing to bid on the work. Much of our work gets subcontracted to Indians, who always do a fantastic job, are so willing to accommodate, and provide the best hourly rates. This kind of practice is becoming more prevalent in our industry, and I hate to say it, but is at the expense of us employing the locally available talent, which is too tardy, too expensive, and usually comes with attitude."*

Respondent **ST15** explains the need for businesses to constantly differentiate themselves in terms of price and product from the offerings of their (often cheaper) overseas competitors:

RQ1:SC2 #8 ST15	*"To differentiate ourselves from the overseas freelancers now bidding for jobs we once had exclusive access to, we have had to lower our prices and ensure that we're up to date with the latest techniques when it comes to software design. These overseas guys really are giving us a run for our money, and one day they're going to put us out of business for good. Seems like a race to the bottom to me."*

In attempting to make sense of the concept, respondents variously resorted to concerns relating to the long-term survival of not only themselves – on account of their perceived

out-moded skill-sets and competencies (see RQ1:SC6) – but also for the future of many of the common industries in which vast numbers of people are presently employed, thus:

RQ1:SC2 #10 EX4	*"While it does bring many benefits, technology has also empowered others who previously wouldn't have been able to compete to bid for the work we have comfortably enjoyed for years. Look at what Uber has done to taxi drivers; look at what self-employed drivers have done to traditional couriers…the list is growing, and to stay one step ahead, traditional industries will need to act fast to survive, otherwise it won't be long before the rug is pulled from under them, too."*

The conceptual indicator *Competition* closely follows *Control* as a defining attribute of this sub-category, and this is for good reason: respondents both celebrate and bemoan a loss of control via the emergence of casual contract workers operating within the global 'gig' economy; a phenomenon that has arisen in direct consequence to recent advances in telecommunications capacity, speed, and its ability to seamlessly enable remote working via the internet for anybody with a fast, reliable connection. As respondent **ST14** explains:

RQ1:SC2 #4 ST14	*"With the E-lance and UpWork web sites[4], we can now outsource any specialist requirements we have to the so-called 'gig' economy, where hundreds or thousands of willing freelancers located in all corners of the world are willing to bid on the work. Much of our work gets subcontracted to Indians, who always do a fantastic job, are so willing to accommodate, and provide the best hourly rates. This kind of practice is becoming more prevalent in our industry, and I hate to say it, but is at the expense of us employing the locally available talent, which is too tardy, too expensive, and usually comes with attitude."*

Respondent **EX3** offers a health warning for those firms operating in industries and sectors that stand to be massively transformed by a competing, globally-based workforce:

RQ1:SC2 #9 EX3	*"I have seen so much arrogance and complacency in firms that think that the new way of doing things won't affect them. They stick their heads in the sand and expect business to continue as usual, while all the time their bottom line is being eroded by some far-flung guy with a computer and internet connection, who can do the work they do for less time and in a fraction of the time – all from the comfort of his bedroom in Timbuctoo. Big firms need to wake up and smell the coffee before it gets too late."*

Respondent **ST10** expresses concern regarding the over-dependence of users on the contemporary 'smart' technologies they were increasingly becoming attached to, thus:

RQ1:SC2 #11 ST10	*"With technology comes many advantages, but you also need to remember that it forces its own way of doing things on you, and in so doing challenges your established way of doing things. If the way it wants you to work doesn't fit with the way you've always done something, then you – not the technology – has to give way."*

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[4] *eLance merged with Upwork in December 2013, and is now known as Upwork: www.upwork.com*

The increasing levels of *Control* that information systems, gaming platforms and so-called smart devices are beginning to exert on their user base did not go unmissed, with some respondents almost evangelically describing their complete allegiance to and utter dependence on the devices that have emerged over recent years to run their lives, as evidenced by **EX1**:

RQ1:SC2 #7 **EX1**	*"I utterly depend on the information systems I access every day; to the point that I would have no idea how I might do my job if they were not there. This was regularly made all too clear to us when our in-house network would fail. Even if only for a day, it would cause mayhem and result in a total loss of productivity. For this reason we have now ceded all control of our systems to the guys at Microsoft, running all our apps and hosting all data and e-mail – everything - on their cloud network via the Azure platform. It means that if anything goes wrong, we know that they will get things up and running again. Thus far, not one outage in 3 years."*

While the outsourcing of personnel was featured by some respondents, the outsourcing of vital systems infrastructure to third-party hosting and so-called 'co-location' providers was also emerging as a clear example of the transfer of [systems] control. Respondents described how vital infrastructure was relocated from in-house locations to often remotely-located third party companies capable of hosting massively scalable IS (Information Systems) infrastructure, thus immediately dispensing with all the ancillary issues that once accompanied having to maintain and support one's own in-house network. Such off-site providers are attracting much attention, with services being referred to collectively as 'the cloud', fully scalable to host 'big data' for the coming 'Internet of Things' (IoT)[5].

Respondent **ST9** makes specific reference to the level of control that smart devices indirectly impose on their user-base, abruptly pointing out their single, abiding, point of failure:

RQ1:SC2 #5 **ST9**	*"My smartphone is my everything. It reminds me of all birthdays and anniversaries, it tells me when to get up, when to go to bed, and how many steps I've taken during the day. If it thinks I haven't been exerting myself enough, then it reminds me to breathe, and if I'm slouching in the chair it commands me to sit up straight. The funniest thing is that I actually do what it tells me, every time. The only problem arises when the battery runs out – then I really am stuffed."*

The various degrees to which technology has exerted control, not only over the people for whom it is supposed to serve, but also via the degree to which businesses are now utterly reliant upon it, must be noted. One only has to recall the mayhem caused by an

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[5] *Field Note FN16:04*

outage in systems used by airlines (cf. above excerpt RQ1:SC2#7 from **EX1**), or when home and business broadband connections to the internet fail - or become slow - to understand the degree of dependence now being entrusted to these systems.

5.1.3   RQ1:SC3 - Empowerment

Although *Empowerment* (RQ1:SC3) was tabled in Appendix S4 as the least expressed, lowest ranking sub-category (32 of 32) across the whole study (i.e. across all three research questions) with the fewest indicating properties, its relevance should by no means be underestimated.

Not to be confused with the core conceptual category of *Sense-making*, *Empowerment* was the strongest thematic label to which all the conceptual sub-categories of RQ1 intuitively belonged. In other words, *Adapting to change* (RQ1:SC1)*, Control* (RQ1:SC2), and the remaining seven sub-categories for RQ1 could all be said to represent the various ways in which the responding entrepreneurs became *empowered* while attempting to survive (master category) by *making sense* (core category) of their [high-velocity; turbulent; start-up] environments. The fact that empowerment itself was also an indicating sub-category (RQ1:SC3) – although weakly expressed as a concept - merely served to enforce the relevance of its thematic presence.

Table 5.1.3   *Conceptual indicators for sub-category RQ1:SC3*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
manual processes (x2); automation (x2); instant processing; digitisation (x3); promotes accuracy; enforces uniformity; inefficiencies; personal efficiency; barriers to business; on-line compliance; improved cash flow	*Empowerment (15)*
transformation; transforming; liberating	*Transforming (3)*
saved time (x2); wasted time	*Time (3)*
threat to survival; health concerns; survival measures	*Survival measures (3)*
remote connectivity; global connectivity; virtual office	*Presence (3)*

N.B. Shows lead indicators only: see Appendix RQ1:SC3 for full table

As a concept, *Empowerment* was expressed positively by respondents mostly via a *Transforming* sense of freedom that accompanied the various aspects of life relating to self-employment and owner-management. It was emancipation from the self as a duty-bound member of the traditionally employed working classes; emancipation from a designated, non-negotiable working space; and emancipation from the power, authority and coercion associated with hierarchical management.

Respondent **EX1** describes how empowerment came in the form of a release from routines normally associated with traditional modes of work, accelerated by recent improvements in broadband and internet connectivity, which permitted people to work remotely and transparently from any location possessing adequate connectivity. The narrative exhibits clear links with *Locus of operation* (RQ1:SC5), thus:

RQ1:SC3 #7 EX1	*"I used to commute to work every day – three or four useless hours wasted travelling to and from the office. What amounted to half of every working day was idly spent listening to music and polluting my lungs with filthy air. Now, work comes to me no matter where I may be on the planet. So long as I have a fast internet connection, I can make and receive calls through the company switchboard, work on spreadsheets, make decisions and work just as effectively as I did when I was based in a physical office, sat at a physical desk."*

Removal of many of the old barriers to business was also perceived as a form of liberating empowerment, as outlined by respondent **EX2**:

RQ1:SC3 #3 EX2	*"Many of the old barriers to conducting business have disappeared. The yearly paper chase and inconvenience of statutory compliance with various government departments is now processed entirely on line. I get reminders to file via text message or e-mail, and it has saved tremendous amounts of time and worry traditionally reserved for dealing with red-tape matters."*

This narrative excerpt discusses the way in which users are now empowered to deal directly with issues of (statutory) compliance via specialist accounting applications, web-sites and government-sponsored on-line portals; an element of business once deemed to be the exclusive preserve of professional accountants and lawyers, as explained by respondent **ST12**:

RQ1:SC3 #1 ST12	*"Until very recently, we paid thousands to accountants and other professionals for their 'expert' opinions. With the transfer of many professional services to on-line portals however, payroll is now processed for about £6 per month; accounts are all processed and filed on-line for £20 per month, and sales tax returns are filed automatically on line, for free. Bad news for the accountants and their industry in general I suppose, but good news for innovative small firms like ours trying to get along and keep our heads above water."*

Here, technology has empowered entrepreneurs and owner-mangers to remove the veil of mystery that once accompanied payroll, income, and sales tax filing – something that only professionally qualified agents ever dealt with – replacing them with specialised web applications that fulfil the same function, and thereby removing the need to outsource that functionality. Follow-up conversations with **ST12** [6] revealed that professional

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[6] *Field Notes FN16:10 and FN16:11*

accountants and lawyers were still needed by companies, however, especially when faced with the need to deal with an official audit, investigation, or anything requiring an expert opinion or interpretation of the law. Such technological automation was therefore only useful for meeting the regular, day-to-day demands of accounting: anything out of the ordinary would still require some degree of professional intervention.

Lower-ranking conceptual tropes allude to *Transforming*, *Time, Survival measures* and *Presence* (see Table 5.1.3), suggest that empowerment is not only enabled by the transformative impact of automation and the efficiencies of digitisation, but are underscored and complemented by the entrepreneur's ability to manipulate the technological milieu at his or her disposal to effectively manage time, by optimising processes and procedures in order to maximise effectiveness, thus:

RQ1:SC3 #5 EX3	*"Gone are the days when we would spend hours completing paper forms, then sending them off for processing. Assuming they didn't get 'lost in the mail' you'd then spend ages waiting for a response, having no idea if it had been received and/or whether it was being processed. Whether it's tax, customer invoices, supplier invoices…whatever, the lag associated with the paper chase has almost completely been replaced by the immediacy of on-line systems. Now, most things are processed the moment they are received."*

The same respondent proceeded to comment further with specific reference to recent improvements in financially-based transactions, thus:

RQ1:SC3 #4 EX3	*"Improved transaction settlements between bank accounts has made a big difference to our cash flow situation…gone are the days of waiting up to nine days for a cheque to clear, especially if coast-to-coast. I've lost count of the number of times we nearly went bust because a large cheque was 'in the mail' or waiting to 'clear' in to the account. Those excuses just don't wash anymore."*

Technology itself was seen as having a positive and beneficial impact on human accuracy, reducing the temptation to cut corners - as covered by RQ1:SC9 *Cutting corners* – and thereby encouraging workers to cultivate a best-practice attitude characterised by confidence, accuracy and attention to detail, thus:

RQ1:SC3 #6 EX5	*"Technology acts as guardian against human error, as it forces a consistent and uniform workflow to processes that were once manual and open to a whole host of different interpretations and possible abuse."*

Here, respondent **EX5** suggests that contemporary information systems – unlike the manual systems that preceded them - simply do not allow shortcuts or non-semantic errors to be made. While the assurances from **EX5** indicate a move in the right direction, we

should remain aware that systems may never be fully immune from human error or duplicitous intent.

5.1.4   RQ1:SC4 - Networks

Following the lead conceptual indicator *Networks,* Table 5.1.4 shows that less dominant indicators related to issues of *Inter-personal communication*, *Reputation, Expertise, Transformation, Responsivity* and *Learning* were seen to complete the substantive definition of this sub-category, thus:

Table 5.1.4   *Conceptual indicators for sub-category RQ1:SC4*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
pervasive reach; pervasive technology; global reach (x4); ubiquity (x2); altruistic referral; seamless access (x2); disparate partners; pervasive; maintaining contact; making contacts; participation; no barriers; transcends barriers; transparency	*Networks (19)*
social media (x2); social networking; social networks; virtual presence; virtual venues; viral broadcast; instant communication; on-line presence	*Inter-personal communication (9)*
public perception; perception; customer service; validation; consumer confidence; consequences for reputation; reliability	*Reputation (7)*
specialised knowledge; specialist fields; expert opinions; dedicated resource; concentrated expertise	*Expertise (5)*
transformation; transformational; transformative; power; cost savings	*Transformation (5)*
fast response; negative feedback; efficiency of response	*Responsivity (3)*
information exchange; knowledge transfer; business intelligence	*Learning (3)*

N.B. Shows lead indicators only: see Appendix RQ1:SC4 for full table

Networks consisting of friends, family members and business associates represent an essential source of intersubjective discourse, ensuring that business, personal and professional relationships develop and thrive over time.

The role that contemporary technology plays in enabling such networks forms the focus of this sub-category, where respondents highlight the positive and negative consequences of their ability to seamlessly and transparently transcend traditional barriers to communication; enabling access between disparately located individuals who perhaps would never before have had the chance to meet.

This sub-category was originally labelled *Social networks*, after which it changed to *Making connections* (see Appendix RQ1:SC4 for log of changes); but because of the potential for confusion with on-line digital platforms such as Twitter, Facebook etc., it was considered preferable to simply use the more generic label *Networks*. In so doing, both conventional and contemporary forms of networking could be accommodated by the

analysis, therefore differentiating digitally connected social networks from other non-digital, human-social and non-human (data) networks.

Those respondents able to draw on past recollections relating to working life before the advent of Enterprise2.0/Web 2.0 technologies (before the year 2000) pointed out the limited ways and means of collaboration available to them; restricted mostly to introduction via word of mouth or personal recommendation; mingling at conferences and trade exhibitions, or by directly corresponding with published authors in journals and other specialist publications etc. As described by **EX2**:

RQ1:SC4 #5 EX2	*"I used to attend yearly technical conventions to gather intelligence on the latest updates in my field. Now, I don't bother – it's much easier to keep updated via postings on the LinkedIn or Facebook profiles of my counterparts in different parts of the world. Yes, technically we're competitors, but that never gets in the way of us helping each other out...many of the barriers and prejudices of old have now completely dissolved, it seems."*

The role of technology in not only removing old attitudes towards competition, but accelerating the pace at which networks (both traditional social and digital) are initiated and grown was seen as a distinct advantage in terms of its impact on shared expertise via an accelerated *Access to knowledge* (RQ2:SC4), and the subsequent benefits gained by enhanced modes of *Learning* (RQ2:SC1):

RQ1:SC4 #3 ST13	*"All the experts in a particular field tend to gather in the same 'electronic meeting places', whether it be a Facebook or LinkedIn group, or a web-site forum dedicated entirely to the topic. For example, if I need advice on some obscure aspect of telecoms policy, there are forums out there dedicated entirely to its discussion. In the unlikely event that the people participating in that forum don't know the answer, they will for sure be able to tell you who can. And the best thing of all about it is that it's globally based, completely free, and open 24/7. Ten years ago I would have needed to pay specialist consultants hundreds, if not thousands, for access to the same kind of information."*

Vindicating further the aforementioned decision to change the name of this sub-category from *Social networks* to *Networks*, some respondents point out that *Networks* pertain not only to socially-based phenomena, but also refer to the technological infrastructure, or *Data Networks,* that are responsible for recent advances in global telecommunications, thus:

RQ1:SC4 #7 ST8	*"One of the less-considered side effects of being constantly connected via 'always-on' broadband or mobile technology is that even when you're out and about in the field, visiting customers, or attending an international convention, you still have access to office files, e-mails, and the ability to communicate with anybody, at any time. If I need an expert opinion on anything, it takes but minutes to get a response or find the answer on an online forum."*

Here, respondent **ST8** sees 'the network' – more colloquially referred to as 'the net', or 'the Internet' - as enabling instant and transparent access to office resources wherever he may be located. Such data networks facilitate access to colleagues via e-mail and video-conferencing platforms, as well as to the vast array of interconnected information systems and databases accessible over the 'net'. The use of on-line social groups as a networked source of 'instant expertise', perceived as driving the accelerated acquisition of knowledge is also mentioned by various respondents throughout the study (see for example: RQ1:SC4#3, SC4#7; RQ2:SC4#17, SC8#3, SC10#3).

Respondent **EX1** extols the simple virtues of e-mail, citing it as one of the best aspects to emerge out of recent advances in technology-facilitated communications:

RQ1:SC4 #4 **EX1**	*"e-mail has to be the best thing to have come out of the technology revolution in terms of keeping in touch: Instant one-to-one – or even one-to-many communication; more or less guaranteed delivery, and the reassurance of knowing when it was read. What a far cry from letters and so-called 'snail-mail'."*

Exchanging information with such diversely talented, globally disparate contacts would never have been possible via traditional modes of communication. Face-to-face meetings would previously be facilitated by international academic conferences, trade fairs, and personal introduction/recommendation, as previously outlined in the commentary relating to **EX2**. As respondent **EX3** points out, the emergence of 'always-on' smart devices has now enhanced and mobilised many of the traditional means of communications, thus:

RQ1:SC4 #6 **EX3**	*"Smartphones, tablets and other mobile devices have had the effect of taking all this technology, and making it universally available, meaning that even when you're out and about, you can still be connected to the office, your colleagues and you family. If things have changed this much in the past twenty years or so, what the heck is it going to be like another twenty years from now?"*

Networks of all kinds are progressively enabling enhanced forms of inquiry, helping not only to *Invite future states* (RQ2:SC11) based on the differing cultural and worldview positions held by disparately located experts, but also offer a degree of *Diversity* (RQ2:SC8) that is associated with creative thinking (RQ2:SC5). In fact, this sub-category is foundational in driving the majority of sub-categories relates to RQ2 and is therefore core to informing *Structured Inquiry* (core-category).

Negative aspects relating to *Networks* were expressed solely in terms of their social dimension, where platforms such as *Facebook* and *TripAdvisor* could be complicit in damaging the short- and long-term *Reputation* (RQ3:SC9) and levels of *Trust & respect*

(RQ3:SC8) associated with a business and/or the individuals running it. A number of respondents lived in fear of the potentially catastrophic consequences of the 'negative review', where a single negative comment or low rating lodged by a dissatisfied customer (or disgruntled ex-employee) had the power to damage a business irreparably. Such negative dimensions were further expressed in RQ3 categories related to *Trust & respect* (RQ3:SC8); *Reputation* (RQ3:SC9); *Privacy & Identity* (RQ3:SC10) and *Ethics & morals* (RQ3:SC11).

RQ1:SC4 #2 **ST12**	*"Social Media is like a double-edged sword: on one side, it's great for business networking and the cultivation of new industry contacts anywhere in the world; but on the other, it's a force to be reckoned with when somebody posts a complaint or review about your product's performance, or lack thereof. We now have dedicated employees to handle our entire on-line presence. They effectively handle our public profile, and are probably the most powerful employees in the company."*

That companies now employ dedicated staff to deal with on-line customer reviews and ratings indicates how seriously the phenomenon is being taken. As respondent **ST12** points out, the responsibility that staff in the social media department have is palpable; possessing the power to make or break the reputation of their employer at the stroke of a few keys. Respondent **EX4** adds some words of caution relating to this topic, thus:

RQ1:SC4 #1 **EX4**	*"Our customer service is driven entirely by Twitter, Instagram and Facebook now. Five years ago we just had an 0800 number and an e-mail address. Now, customers prefer to broadcast their opinions on our performance – positive or negative, but mostly negative - for all to see on various review websites. We must be seen to respond quickly and positively to every posting, or be prepared to take the corresponding hit in user confidence/market share when users decide to revolt. It really is that brutal."*

The impact of negative reviews and/or low-ratings is so acute that attention is being directed towards platform providers concerning the moral and ethical duties inherent in not only policing and pre-authenticating content contributors, but also in determining how the content they leave may be assessed for potential impact *before* publication. Unless some form of quarantine system is in place to verify postings for compliance, un-checked content stands to be communicated instantly to a global audience of potential customers and/or suppliers.

While positive reviews represent a goldmine for increased brand awareness and heightened sales, reputations (cf. RQ3:SC9) that may have been years in the making stand to be comprehensively annihilated in the space of just a few hours in response to a single negative review - such is the power of the social media network.

5.1.5   RQ1:SC5 - Locus of operation

Locus of operation (RQ1:SC5) refers to the relationship between entrepreneurial action and the environment in which *Control* (RQ1:SC2) is exerted, and relates not only to the inter-subjective relationships lived by and between entrepreneurs and their colleagues in the contemporary information era, but also highlights how technology is implicitly involved in a redefinition and relocation of the environments that host action, and how they are perceived.

Most-all of the 12 defining properties driving the emergence of this sub-category refer to contemporary ICTs, implying that physical location does not define entrepreneurial action, but rather, the ability to access human or technological resources remotely, securely, and independent of location. Assured of resource location and accessibility, the entrepreneur continues to be able to *make sense* of the operating environment, despite rampant exogenous change:

Table 5.1.5   *Conceptual indicators for sub-category RQ1:SC5*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
network support; centralised processing; centralised storage; data storage; hardware failure; systems failure; in-house data network; data hosting; dedicated operation; facilities outsourcing; cloud services; cloud technology	*Locus of operation (12)*
virtual office (x3); working from home (x4); virtualisation of services; maintaining traditional presence; deceptive presence; meeting space	*Work space (11)*
working hours (x2); wasted time; work-life balance; lost productivity; travelling to work (x2); brainstorming; transforming technologies; transition; improving connectivity	*Productivity (11)*
social gatherings; time with children; family duties; family time; inter-personal socialisation; video-conferencing	*Social interaction (6)*
remote connectivity; remote control; remote location; remote support; remote training; remote working	*Remote working (6)*
freedom; liberation; boundaries; barriers to business	*Emancipation (4)*

N.B. Shows lead indicators only: see Appendix RQ1:SC5 for full table

Locus of operation featured prominently amongst the major concerns expressed in response to RQ1, ranking third in terms of its significance with respect to the core category of *sense making* (see Appendix S1). As the centralised office environment evolves in line with advances in communications technologies, knowing where resources are, and how to access them in relation to one's own [physical] location has now become an important issue for those involved in the creation and management of ventures. As respondent **ST8** demonstrates:

RQ1:SC5 #2 **ST8**	*"When customers call, they're under the impression that they're connected to a huge corporation. Little do they know that the employee they're speaking to is one of only five in the company, speaking to them from the comfort of his home office, and who is sometimes even in a different country. The quality of broadband and general connectivity is that good that it's almost impossible to tell where anybody is based now."*

Locus of operation now refers to a drastically altered and dynamically fluid concept, enabled by advances in remote connectivity and broadband capacity, constantly shifting in response to the changing demands and challenges associated with the challenges of global, borderless business. As respondent **ST11** explains:

RQ1:SC5 #3 **ST11**	*"We made the transition over to a fully-virtualised office about five years ago. All employees operate remotely from home, and log-in to support customer's computers for troubleshooting and training purposes. They help clients to address issues that they're having with our product by remotely controlling their machine. The staff love it, and could never go back to traditional office-based work, what with that twice-daily commute."*

Not only have many knowledge workers been released from the traditional ties associated with work space and the daily commute, but they are able to spend more time with family when working from home:

RQ1:SC5 #5 **ST12**	*"Working from home is the ultimate freedom: I can watch the kids while my partner is out working; do the school rounds at the beginning and end of the day, and so long as I put in the required number of hours every week, everyone stays happy. The best bit of all is not having some boss constantly looking over your shoulder."*

However, while contact hours with loved ones may be improving, the progressive erosion of strong social ties and relationships that once existed between colleagues in the traditional office environment was noticed by respondent **EX6**, thus:

RQ1:SC5 #8 **EX6**	*"I love working from home - the only drawback of the virtual office is not having the human interaction that you would normally get in a traditional office space. Our company makes up for this by regularly arranging work socials, outings and brainstorming 'retreat' sessions, usually over a long weekend at some high-end country manor. The work:life balance is pretty much spot-on."*

In this case, concerns were addressed by arranging regular social events for colleagues and families; sometimes to facilitate group brainstorming sessions (see RQ2:SC6 *Co-dependent inquiry*) at a remote 'off-campus' location for nominated teams, and at others for colleagues and families to have a work-sponsored social day together at a local attraction. Here, colleagues that may only interact 'digitally' during the course of the

working day are provided with the opportunity to engage on a face-to-face basis and 'reconnect' socially.

The degree of emancipation experienced by a fluid locus of operation features in this, and other concepts, and was described by respondent **EX7**, thus:

RQ1:SC5 #4 **EX7**	*"The one thing that all staff love about working from home – sorry, correct that – the TWO things that all staff love about it, are not having to commute every day, and being able to spend more time with family. It's a win-win situation, saves employers a fortune in office overheads, and I just don't understand why more companies don't do it. Maybe they don't trust staff to get on with the work, I don't know?"*

Respondent **ST10** mentioned that his firm continues to maintain a physical office presence where employees that are predominantly home-based can elect to work from the office 'hot-desks' for a number of days each month; thereby restoring some of the social contact missed when working virtually; and at the same time providing workers with full autonomy over the division of time spent between home and 'the office':

RQ1:SC5 #1 **ST10**	*"We still maintain a central office, but it's only used by a handful of part-time admin staff, and for hot-desking when remote employees come in for meetings. That said, most meetings are conducted via Skype now anyway."*

Locus of operation referred not only to the location of human and office productivity resources, but also the location of critical business systems and infrastructure; something that had also endured significant change in line with advancing telecommunications technologies. Where firms would have previously hosted critical systems locally, they were increasingly outsourcing responsibility for the upkeep and maintenance of essential infrastructure, as well as the co-location of other mission-critical systems, to designated third-party providers, thus:

RQ1:SC5 #7 **ST9**	*"We use Amazon cloud services as our preferred medium for file storage and hosting applications; it's been this way for a few years now. The next big things to come along and have a transformational effect on working life will be so-called 'BigData' and the 'Internet of Things'.*

In contrast to how it was prior to the advent of remote 'cloud' services, respondent **EX4** recalls the stress once associated with running an in-house data network:

RQ1:SC5 #9 **EX4**	*"Before outsourcing all our hosting, data storage and archiving requirements to the cloud, we had a dedicated server room at the old office, with its own dedicated network manager, and its own dedicated set of problems that regularly disrupted things. If it wasn't some hard drive failing, it was a power supply or a main logic board blowing, any of which would result in us all sitting around twiddling our thumbs until service was resumed. Now, we can blame it all on Amazon if anything goes wrong, which so far - in the three years we've been using them – just hasn't happened."*

5.1.6   RQ1:SC6 - Competence

The sub-category *Competence* (RQ1:SC6) was indicated by 64 dimensional properties, ranking fourth in terms its strength of contribution to the core category of sense-making.

The dimensional breadth of indicators relating to *Competence* expressed by respondents focussed exclusively on individual competencies, skill-sets, confidence and the need to 'keep-pace' when faced with a rapidly changing and turbulent environment. Respondents were concerned with the need to stay 'one step' ahead [of change], which was invariably expressed as doubt via a critical assessment of their own abilities, and hence overall competence.

The lead conceptual indicator for the category, *Competence*, is driven by properties related to confidence, doubt and self-worth when respondents were faced with the need to maintain and develop skills in an ever-changing world. As table 5.1.6 shows, the need to remain competent was supported by indicators associated with self-development and *Learning*; all of which were underscored by a *Pragmatic* approach to *Entrepreneurial Inquiry*, thus:

Table 5.1.6   *Conceptual indicators for sub-category RQ1:SC6*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
question own competence; doubting confidence; despondency; belief in self; cognitive stress; current skills; mismatched skills; loss of worth; own skillset; self-esteem; self-confidence; self-reliance; doubt own skills; staying ahead; keeping pace (x3); expertise; unaware of own competence; staying current; field of specialisation; technical ability; accumulated experience	*Competence (23)*
learning; learning confidence; builds knowledge; passive learning; point of education; updated knowledge; pervasive knowledge; exchange information; search for knowledge	*Learning (9)*
pragmatic approach (x2); productive method; practical approach; speculation (x2); unintended consequences; direct experience	*Pragmatism (8)*
Initial starting point; inspiration; starting-point; Meno's paradox; narrative; keyword choice; lack of comprehension	*Inquiry (7)*
precocious exposure; self-determination; early venture creation; self-employment; theory of entrepreneurship; necessity	*Entrepreneurial (6)*

N.B. Shows lead indicators only: see Appendix RQ1:SC6 for full table

Concern regarding the compatibility and adequacy of existing skills in the service of newly-arrived technologies was expressed by respondent **ST13** thus:

RQ1:SC6 #3 **ST13**	*"My base skillset is still stuck in the late 1990s, having changed little since I completed my initial training. It served me well for my first ten years at work, when things didn't seem to change that much. These days however, I am beginning to feel less in control of the machines we use than ever before, because service updates and software fixes are issued almost daily, and I just don't keep up as much as I should."*

Doubt with respect to one's own individual competence coupled with exasperation at the need to always be learning was expressed by experienced and inexperienced entrepreneurs alike, with one experienced respondent recalling a disturbing loss of self-confidence on not being able to comprehend the details of an overheard technical discussion that took place between two colleagues:

RQ1:SC6 #9 **EX6**	*"I have always considered myself to be quite technically informed and up to date, but after overhearing a couple of our developers the other day discussing an issue they were having with some esoteric aspect of programming, I was forced to reconsider my perceived technical prowess. I have to admit that I didn't understand a single word of what they were saying. Yes, it was in English, but it may as well not have been. I felt so deflated and out of touch after the experience that I began to reconsider what I actually knew myself."*

Respondent **EX1** described feelings of 'being like an imposter' when needing to give the outward impression of expertise in professional settings. He subsequently began to realise that this was a sign that he did in fact know his subject, and that such doubts were driven more by a lack of self-confidence, rather than a lack of knowledge or expertise:

RQ1:SC6 #6 **EX1**	*"Have you ever had that feeling of being an 'imposter' when it comes to answering questions in an area that you may not be completely familiar with? It's something that we have all experienced, and I have come to understand that it's a sign that you actually do know what you're talking about…you get that feeling because those around you believe in you, but you yourself don't have the confidence to believe in your own competence. I see so many highly-intelligent and knowledgeable managers that fall in to this group."*

Such doubts were also typical of respondents who linked their perceived lack of competence to the absence of a guiding narrative with respect to the topic under discussion or investigation. Not being in possession of the 'words' or specialised terms associated with a particular technology resulting in the absence of familiar lexical 'anchors' on which to secure the foundations of a speculative inquiry, thus:

RQ1:SC6 #2 **EX3**	*"Knowing where to start is by far the biggest mental block I have, every time I need to figure out how something works. How can you possibly know what to ask for if you don't understand the problem to begin with? It's all very speculative to begin with – you just need that initial impetus to get the ideas flowing."*

Despite the absence of a guiding narrative, respondent **ST11** explains how search engine technologies often comes to the rescue when supplied with a few tenuously ventured keywords to initiate a search:

RQ1:SC6 #5 **ST11**	*"Even though you may not know what you are looking for to begin with, you soon find that by venturing a few tenuously-related keywords, you follow the rabbit down a particular hole, jumping around search engine pages, following one link after another like some kind of demented 'cyber-spider'. Following this random, almost chaotic 'knowledge trail' is so utterly productive in my opinion, that it should be taught to the kids at schools as a method. It's like an extremely powerful form of 'passive learning', where you don't set-out to learn anything specific, but end up gleaning so much incidental information – often peripheral to your specialist area - that it definitely bolsters your all-round knowledge in the area, and ensures that you're up to date with the latest trends."*

Similar doubts relating to the lack of an appropriate narrative were also widely expressed by respondents in *Adapting to change* (RQ1:SC1), when newly emergent technologies could not be readily assimilated because users lacked familiarity with the specialist lexicon associated with their use.

Respondent **EX7** linked *Competence* to various concepts expressed by RQ1:SC7 *Prior exposure*, claiming that those entrepreneurs who engaged with venture creation earlier stood to gain more practical experience than their contemporaries, who may have elected to pursue paths leading to traditional employment or a college/university education:

RQ1:SC6 #8 **EX7**	*"I have noticed that the earlier you start working for yourself, the more likely you are to continue on the self-employed path. This might explain why the most successful entrepreneurs either didn't finish high school, or dropped out of university/college. Those who engage earlier with venture creation and self-sufficiency will have a practical, real-world head-start over their contemporaries who decided to stay-on at school or university etc…I don't think it has anything to do with competence, but is more related to direct experience."*

5.1.7   RQ1:SC7 - Prior exposure

Prior exposure (RQ1:SC7) emerged as a sub-category referencing previous exposure to or experience with technology; not only the kind of massively interconnected ICTs characterised by the contemporary era (Web 2.0; Enterprise 2.0 etc.), but also the various forms that technology took prior to the 1990s. Interest was therefore expressed across a wide timeframe, and highlighted the fact that many respondents were able to draw on a broadly longitudinal set of experiences that pivoted around the mid-1990s.

The coding table for this sub-category (See Appendix RQ1:SC1 for full table) indicates the key properties driving the emergence of relevant concepts, showing that education, hobbies, mentoring and play were key constituents, and played an essential role in the entrepreneur's ability to make sense (core category) of the dynamic environment(s) in which they operated.

Table 5.1.7   *Conceptual indicators for sub-category RQ1:SC7*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
formative interest (x2); lifelong interest (x2); formative influence; determined future path; early influence	*Prior Exposure (7)*
further education (x3); point of education; extra-curricular activities early hobbyist; hobbyist (x2); experimentation (x2)	*Role of education (5)* *Hobbies (5)*
corporate sponsorship; mentor encouragement; parental influence (x2) play (x3); gaming	*Mentoring (4)* *Play (4)*
venture creation (x2); venture catalyst	*Venture formation (3)*
family life; technical household previous employment; relevant experience transformative effect; transformation technical services; non-technical coding; games programming	*Home factors (2)* *Work experience (2)* *Transformation (2)* *Vocation (2)* *Programming (2)*

N.B. Shows lead indicators only: see Appendix RQ1:SC7 for full table

Early interest in technology was often encouraged by parents, relatives, or family friends, who would have some involvement themselves with technology through employment, the pursuit of technical hobbies or interests, or via a technical/engineering educational background, thus:

RQ1:SC7 #1 **EX2**	*"Both my parents worked for Hewlett-Packard for many years, and all this tech stuff was just a normal, integrated part of family life in the valley[7]...Most week nights they would bring home the latest gadgets for us all to play with. First off it was a Commodore PET, then a Tandy TRS-80. At one point, we even had a PDP-11[8] sitting on the kitchen table for about a month."*

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[7] *Reference to 'Silicon Valley' – an area in Northern California between San Francisco and San Jose.*
[8] *Digital Equipment Corp. (DEC) PDP-11: Early 16-bit minicomputer, popular during the 1970s - 1990s.*

Although the father of **EX6** was a mining engineer by trade, he also maintained an active technical interest in radio and electronics outside (a mostly non-technical) work, thus:

RQ1:SC7 #2 EX6	*"As well as being a miner, my father was in to radio and electronics; both of which I took an interest in from about age ten. Out of these hobbies grew my interest in computing and electronics, which eventually got me in to university to study electronics. By the end of the first year I thought that what they were teaching was irrelevant, and so dropped out and started out on my own. The rest is history…"*

For many respondents, early influence from parents, teachers and family friends was crucial in the nurturing and ultimate formation of a life-long interest in science and technology. However, some respondents (**ST11**, **ST9** and **ST10**) made reference to an innate, independent desire to 'tinker', or experiment with electronics, gaming consoles and/or computers from an early age, without any prior involvement from parents or other peers.

Respondent **ST11** developed his interests at high school with encouragement and support from the teaching staff:

RQ1:SC7 #5 ST11	*"I was an electronics hobbyist at high school, and started the electronics after-school club at senior high with the encouragement of my physics teacher. I went on to study Software Engineering at university during the early 1990s, which further fuelled my interest in computer networking that ultimately got me in to the Internet and service provision business."*

While **ST9** pursued a hobby in radio and electronics independently at home:

RQ1:SC7 #4 ST9	*"I'd always tinkered with electronics, pulling apart old radios in the garden shed, and then reconstructing them back to a working state. My folks just left me to it, but that tinkering cultivated a life-long interest in technology and how it had the power to enlighten and change lives. When the internet arrived in the mid-1990s, well, that was the turning point for me: I decided that this was going to be the career of choice for me after many years working in accounts."*

While many respondents progressed to a scientific or numerically-based course of study at college or university, others pursued an early career in the science/technology sector that also sponsored part-time study in a subject relevant to their employment, thus:

RQ1:SC7 #3 ST14	*"Before deciding to set up on my own I'd worked for a big local employer in the telecoms sector. They had sponsored my degree as part of a modern apprentice scheme, and so I kind of owed it to them to work for them after I'd graduated - for a couple of years, at least."*

Respondent **ST10** commented that he had never shown any early interest in science, engineering or technology, but had always been a keen computer games player. He suspects that this cultivated a later interest in the games programming career that he eventually pursued, thus:

RQ1:SC7 #6 ST10	*"Other than playing Nintendo, Atari and arcade-based games when I was a kid, I wasn't really that interested in a tech-based career: I just wanted to play games. Somehow though, that morphed in to the desire to become a games programmer, and that in turn got me in to general programming. I guess without the games to begin with, I wouldn't have set-up as a software developer, and probably wouldn't be where I am in the industry now."*

Of interest here are the concepts of *Play* and *Experimentation*, both of which appear frequently, not only when expressed directly as the sub-category RQ1:SC8 *Experimenting*, but also in response to RQ2 as crucial ingredients to structured inquiry (see also RQ2:SC5#2, SC5#8, SC5#9). During their adolescent years, respondents could be said to be developing their interests and abilities using experimental play with technology via the safety of a hobbyist approach, which, unlike the business world, was wholly forgiving, nurturing, and free from any of the associated penalties, should anything happen to go wrong. In other words, it was possible to make mistakes at this stage without having to fear any of the wider consequences or repercussions that would ensure in a real-world business context.

5.1.8   RQ1:SC8 – Experimenting

Experimenting (RQ1:SC8) was the highest ranking sub-category for RQ1 in terms of the number of conceptual properties driving its emergence (see Appendix S), suggesting that it was the dominant factor in an entrepreneurial approach to *Sense-making*, the core category for RQ1. The conceptual strength of the sub-category was expressed by its similarity to the traditional scientific approach, featuring high rates of failure, a playful and inquisitive approach to discovery and knowledge generation, and the constant challenging of established norms by experimentation.

Doubts were raised concerning the allocation of this sub-category, as it exhibited properties that clearly related to both *Sense-making* (RQ1) and *Structured inquiry* (RQ2). While a structured, rigorous approach to experimentation underscores *scientific* inquiry, the same cannot be said when considered from the entrepreneurial need to make sense, as indicated here, which is characterised by a less-structured, haphazard, 'try-it-and-see' experimental endeavour. Although the concept could have emerged in response to both RQ1 and RQ2, the absence of any substantive structure upheld its original allocation to RQ1.

Experimenting (RQ1:SC8) was closely allied with *Networks* (RQ1:SC4) in that the cultivation and management of networks – both of the social and data types - played a crucial role in the ability of the entrepreneur to express a wide degree of diversity in *Collaboration* (see second conceptual indicator in Table 5.1.8) with others (see RQ2:SC6 – *Co-dependent inquiry*). The sub-category also provides foundational in-roads for the support of several RQ2 sub-categories that respond to the changing nature of inquiry, such as *Learning* (RQ2:SC1); *Access to knowledge* (RQ2:SC4); *Creative thinking* (RQ2:SC5); *Co-dependent inquiry* (RQ2:SC6); *Diversity* (RQ2:SC8) and *Context* (RQ2:SC12).

Collaboration, Diversity, Reflexive learning and *Rapid prototyping* formed the group of secondary conceptual indicators driving this sub-category, indicating that collaborative, group effort was preferred over individuals working alone, and that professional collaborative partnerships formed with business and academic research groups formed an essential part of successful inquiry that promotes effective knowledge transfer. Technology was complicit in its ability to enable a *Diversity* of contact with otherwise disparate, global collaborators in terms of the instantaneous, communications provided

by e-mail, but more recently by the dynamically synchronous video-conferencing applications such as FaceTime and Skype.

Table 5.1.8   *Conceptual indicators for sub-category RQ1:SC8*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
entrepreneur as scientist; experimentation (x3); trial-and-error; high cost; thrive on experimentation; creative experimentation; adapt approach; risk taking (x2); change variables (x2); inventive; challenge norms; changing objectives; variable environment; multiple attempts; 24/7 experimentation; success; initial conditions; variable technology; life analogy; contingent; failure rate; frequent failure; high rate of failure; low hit rate; perseverance	*Experimenting (29)*
allied endeavour; solo operator; experts in field; technological factors; technologically enabled; social engineering; human factors; global access; research collaboration; research groups; student sponsorship; user instigated; sponsored research; university collaboration	*Collaboration (14)*
differentiation; diverse approach; diverse combinations; playful; different viewpoint; contrasting attitudes; unique perspective; engaging with unfamiliar; outsider perspective; entrepreneurial outsider	*Diversity (10)*
quest for solution; reject dogma; recursive learning; failure as learning; recursive feedback; recursion; components of venture creation; dynamic learning; instinct	*Reflexive learning (9)*
3D-printing (x2); advanced prototyping; cheap prototyping; creative freedom; creative inspiration; creative; experience as guide	*Rapid prototyping (8)*

N.B. Shows lead indicators only: see Appendix RQ1:SC8 for full table

Seeking diversely-located collaborators was seen as a key enabler of multiple worldviews, different viewpoints and unique perspectives, all of which may result from sustained engagement with hitherto unknown parties (see RQ1:SC4 *Networks*), often introduced on-line, and who offer the unparalleled richness of various outsider perspectives, as highlighted by respondent **ST13**:

RQ1:SC8 #5 **ST13**	*"Although it may seem like many entrepreneurs act alone, fact is that many of them make a point of surrounding themselves with some of the best and most talented individuals in their field of operation. I know a few successful guys who partner with the engineering laboratories at their local university, funding research students to look in to the latest idea for a new product. With the advent of global messaging, the research department you end up working with could be on the other side of the planet."*

Respondent **ST14** differentiates entrepreneurs from non-entrepreneurs on account of their approach to experimentation, risk, diversity, and critical approach, thus:

RQ1:SC8 #7 **ST14**	*"Another difference between the standard owner-manager or small-business owner and the aspiring start-up entrepreneur is their attitude towards variety, diversity and risk. Unlike our non-entrepreneurial colleagues, us entrepreneurs thrive on experimentation, risk, diversity and constantly challenging prevailing attitudes and practices."*

While entrepreneurial experimentation driven by a relentlessly critical approach creates constant change and diversity, it also forces established reference points to be in a state of 'reset' or permanent flux, leading to uncertainty and increased risk. Although many entrepreneurs thrive on such challenges (see RQ1:SC1#4, SC4#9, SC8#7; RQ2:SC5#5, SC5#12; RQ3:SC3#1), when the upheaval and turbulence that characterise high-velocity environments is coupled with lower levels of experience, this may go some way to explain the high degrees of start-up failure, as pointed out by respondents **EX3** and **ST11**:

RQ1:SC8 #3 **EX3**	*"Risk taking and experimentation are all part of the same approach to venture creation. Risks need to be taken when venturing in to unknown territory, and the approach is very much experimental. Something is tried, the desired result is not achieved; variables are changed, and try once again. Probably explains why scientists and start-up entrepreneurs experience so much failure early on – they're trying various approaches, one after the other…only a small fraction of which will prove worthwhile."*

RQ1:SC8 #6 **ST11**	*"The reason entrepreneurs fail so often is that they can't resist changing the goal posts from one minute to the next, in terms of their approach to creativity and new ventures. It's all part of their search for the perfect solution, but also represents an extremely risky and often expensive approach. However, with the arrival of 3D printing, it is now much cheaper to commission a working prototype than ever before."*

The recent emergence of 3D-printing technology is seen as a way of significantly accelerating entrepreneurial experimentation and discovery for production-based ventures, where prototype models that would otherwise have taken months to commission, design and manufacture may now be turned-around for 'printing' within a matter of hours. When changes to the design or build material are required, the data file describing its form is updated and a new prototype is printed – again, within hours. The potential for this kind of technology was pointed out by both respondents **ST11** (above) and **ST9** (below)**.**

When it came to discovery and knowledge generation, respondents often recognised the concordance between their business activities as entrepreneurs and those of 'white coat' scientists, as explained by respondent **ST14**:

RQ1:SC8 #2 **ST14**	*"Entrepreneurs conduct experiments all the time, but venture creation must also address the vagaries associated with human, financial, and technological factors. Other than that, we're just performing the same 'suck it and see' experiments as the guys in white coats. We conjure-up a new device or service by combining technologies – just as the chemist mixes chemicals or whatever – then we check if that combination performs or reacts as expected. If not, we back-track, change things a little, and give it another go; making sure that we maintain a note of what hasn't worked as we go along. OK, 99 out of 100, or even 1000 attempts will fail, but all it needs is that one success to make a break. It's all just a case of trial and error."*

ST14 differentiates entrepreneurial endeavour from the scientific approach in that it is required to uniquely address the 'vagaries' that arise from human, financial and technological factors, but highlights similarities in terms of the common, reflexive approach adopted by both as common element of the discovery process. The essential role of failure as playing an integral part in the reflexive learning process is also mentioned as applying to both scientific and entrepreneurial enterprise alike.

Respondent **ST9** compares life to 'a 24/7 experiment', where disruptive behaviour and the element of playful surprise are seen as essential components to life outside one's own comfort zone. Again, failure is lauded as a critical component of success and learning, where the reattempts that follow must not only include the lessons learned previously, but must be re-approached each time from a different angle in order to maintain the creativity and diversity that arise from the disruptive element.

3D-printing was mentioned as an emerging technology that is helping to expedite the experimental approach to discovery, thus:

RQ1:SC8 #1 ST9	*"I see myself as taking part in a 24/7 experiment called life. Whether at work or at home, if you don't venture out of your comfort zone then the chances of learning something new are minimal. You have to take risks and be prepared to recognise failure as part of the learning curve. When you fail, adjust your approach and try again from a different angle. The technology now available has accelerated the speed at which new approaches can be tried. For example, 3D printing is a game changer when it comes to prototyping new products."*

In contrast to the many 'entrepreneur-as-scientist' references, respondent **SC5** likens the entrepreneur more to the 'social engineer' than scientist:

RQ1:SC8 #4 EX5	*"Entrepreneurs are social engineers when you think carefully about it: they propose new and inventive ways of doing things, with the hope of improving some aspect of life, and making a living out of it in the process. Problem is that most of the ideas they come up with fail miserably; it's only when they begin to tinker around with the variables, the technology and the operating environment that the magic starts to happen. Perseverance and gut instinct are an absolute necessity."*

Again, reference is made to the concept of speculative 'tinkering': a form of playful experimentation that was also encountered in RQ1:SC7 *Prior exposure*, and referenced by various narrative excerpts supporting RQ2:SC5 *Creative thinking:* #2, #9 and #10.

Respondent **EX1** describes learning as consisting of a *'constant tinkering'* and exchange of ideas with other interested parties, referring to it as *'incidental, on the go learning, taken as and when required, in little snippets here and there'*, thus:

RQ1:SC8 #9 **EX1**	*"Like most people, I never read the manual – assuming there is a manual to begin with. I think most smartphone manufacturers have realised that too, because I can't remember the last time a manual was included with a phone or tablet. So how are we expected to learn how to use these ever-complex gadgets? Me, and most others I know just resort to tinkering and exchanging ideas with other on-line users – that's how we learn. It's no longer applied learning – more like incidental, on the go learning, taken as and when required, in little snippets here and there."*

Learning from an instruction manual was dismissed in favour of a casual 'try it and see' experimental approach: should it not be possible to intuitively figure out a new device – something that **EX1**'s excerpt claims many of the current hi-tech vendors assume – then one only needs to pitch the question to others in specialist user groups (Twitter, Facebook etc.) or one or more of the many online technical forums catering to the operation and use of specific devices. Referencing alternative media platforms, other respondents (RQ1:SC6#1; RQ3:SC1#2) have highlighted the utility of YouTube and other video-sharing applications as useful contemporary adjuncts to learning, by offering instructional 'how-to' videos catering to every need. At once, the collective *practical* expertise of a global community of users is made available; something that no instruction manual or text book could ever hope to compete with.

Breaking from rigorously structured approaches to scientific experimentation – such as the kinds found in science and engineering research groups at universities - and transferring it to a practitioner-oriented commercial enterprise is explained by respondent **ST10**, who suggests that the entrepreneurial tendency to disregard academic boundaries enforced by the ethics and propriety associated with scientism is what facilitates a bridging of the theory: practice gap; therefore allowing a full operationalisation, and potential commercialisation – of an otherwise laboratory bound innovation, thus:

RQ1:SC8 #8 **ST10**	*"Truly innovative start-ups are the result of creative entrepreneurial experimentation with new ideas imposed by impartial, outsiders on a particular industry. It is particularly evident when an entrepreneur approaches a university research group for inspiration: the entrepreneur's previous experience initially guides the choice of domain for exploration, but their abject indifference to the routines and norms of the field - funding, departmental politics, rankings etc. - uniquely provide the entrepreneur with the freedom to break free from any limiting factors that have otherwise hindered the incumbents from advancing commercially in the field - students and professors in research groups are a classic example of this 'turn-around' phenomenon, that I have seen. Engagement with the entrepreneurial mind-set is a prerequisite to operationalising trapped inspiration."*

5.1.8   RQ1:SC9 - Cutting corners

Although *cutting corners* (RQ1:SC9) was a relatively weakly expressed conceptual indicator when compared to the total number of properties indicating other concepts (see Appendices S1, S4), it nevertheless held some degree of relevance for entrepreneurial action, as it expressed contextual synergy with indicators across the other RQs, such as the opposing concepts of *Thoroughness* (RQ2:SC3); *Doing the right thing* (RQ3:SC1); *Universal good* (RQ3:SC4); *Compliance* (RQ3:SC6), and the remaining five sub-categories feeding-in to RQ3 that variously relate to concepts of propriety and good conduct, labelled SC7 to SC11 inclusively.

Cutting corners was euphemistically used to refer to activities that others would perceive as dubious, illegal, and/or unethical. As the narratives in this section will demonstrate, 'corner cutting' was casually dismissed by many as par for the course – an essential part of the survival response for those struggling financially - which was generally seen as acceptable during challenging economic times. Corner-cutting in the corporate context, however, was viewed poorly, being associated more with greed and the selfish pursuit of wealth and corporate power at the expense of others (e.g. RQ1:SC9 #4).

An inspection of the properties driving the lead conceptual indicator exhibits a wide-ranging interpretation of the concept, ranging from corporate misconduct, to a the lesser 'crime' of exploiting technical ignorance in others. Subsequent indicators (e.g. *Corrective response*) suggest that the propensity to cut corners was mediated by the introduction of software controls that aimed to enforce accuracy and reduce errors. Of importance also was the relevance of *Narrative*, either as a supportive adjunct that helped to increase user confidence when needing to understand and/or make sense of new technologies, or its ability to confound, intimidate, or even deceive non-technical individuals with 'jargon' and unfamiliar specialised/technical terminology.

Table 5.1.9   *Conceptual indicators for sub-category RQ1:SC9*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
deceit (x2); belief in widespread misconduct; corporate misconduct; acknowledges wrong-doing; prolonged deceit; misguided intentions; underplaying criminality; duplicity; ease of abuse; software exploits; technical ignorance (x2)	*Cutting corners (13)*
digitisation; automation; ghost records; forces common workflow; change log; promotes level playing field; rationalisation; restoring balance; accuracy of work; increases confidence	*Corrective response (10)*
narrative (x2); technical jargon; user feedback; anecdotal claims; resigned compliance; disbelieves honesty claims; incredulity	*Narrative (8)*
need to provide; need to survive; survival measures; mitigates error; performance targets; penalties; mitigating acts	*Survival measures (7)*
unfit for purpose; unreliable; superficial; vendor presumptions	*Quality (4)*

N.B. Shows lead indicators only: see Appendix RQ1:SC9 for full table

The interview excerpt from respondent **ST8** implies that those who claim success in business will have, at some time or another, engaged in some form of 'corner cutting' in order to achieve their winning status. Although he does not elaborate on the type and extent of the alleged activity, the suggestion that most may have filed the occasional late tax return, or mis-declared accounting figures – accidentally or otherwise – does not seem unreasonable; especially when such actions are prompted by the overriding need to survive and provide for a family, as suggested by the fourth conceptual indicator, *Survival measures*, thus:

RQ1:SC9 #4 **ST8**	*"I don't believe anybody who claims that they have never cut corners in order to be successful. All the people I know, either working for themselves or as part of a larger outfit, are up to some kind of skulduggery - however large or small in scope - in order to meet their targets, or to simply survive. The deception almost always relies on exploiting some kind of technological flaw in the accounting, finance or management software, and it's becoming easier to pull-off with the latest packages, in my opinion. For smaller guys like me, it's always – but always – down to a basic need to survive and provide for my family. For the bigger guys, such wrongdoings are driven by greed for profit and power, and so it probably gets a little more tricky when external auditors are involved. That said, look at Enron and Barings Bank: even when the auditors were in on the game, they got away with it for years…and I bet it's still going on to this day."*

The error checking and quality controls built-in to contemporary stand-alone and on-line applications not only prevent potential misuse and abuse, but are also perceived as being beneficial when enforcing a homogenous workflow: forcing the uniform and accurate entry of data, encouraging attention to detail, and instilling greater confidence in users' own capabilities to readily adapt to new technologies, as explained by **EX5** thus:

RQ1:SC9 #5 EX5	*"Once-manual processes are now imbued with automatic checks-and-balances that serve to prevent human error during the transcription of data, and compel all users to adhere to identical work and process flows, according to the strict demands of the software. This forces a level playing field amongst users, instilling a greater degree of confidence regarding their attention to detail and the accuracy of their work."*

Respondent **EX2** makes reference to the inability of official inspectors to keep up with the ever-evolving range of software applications used to prepare and file statutory accounts and taxes, noting that it would be impossible for them to be familiar with every software variant available on the market at any one point in time. How such gaps are opportunistically exploited in support of dubious accounting practices is readily explained:

RQ1:SC9 #3 EX2	*"Because tax officials are not required to be familiar with every accounting app ever written – how can they when faced with an ever-expanding multitude of products? – it has become quite easy to just delete one or two invoices, or shift a few large bills from one quarter to the next to mitigate tax liability. It really does get that tight on the cash flow front sometimes. Even though the app tracks deletions and amendments via a hidden audit trail, many officials cannot keep up with the training required to effect a forensic investigation."*

Further questionable activity that relied on 'technically confounding' an unsuspecting non-technical audience was reported by respondent **EX1**, who makes reference to the under-hand tactics deployed by a team of software developers to deceive external funders, and therefore protect future tranches of seed funding that were scheduled to be injected in to the venture. As explained in the original narrative:

RQ1:SC9 #1 EX1	*"We all knew that the software didn't do its job properly. On the surface it worked fine, but when it was under heavy load conditions in certain circumstances, it would always break – it just stopped working, and data was lost. We managed to cover the flaw up, and still sold about half a million copies worldwide, anyway. I couldn't believe that people bought software that just didn't work…More's to the point, I can't believe that we got away with it for so long."*

Along similar lines, another respondent (**ST12**) explains how 'techno-babble' would be tactically deployed during meetings to deceive funding partners in to believing that a project in which they were investing was meeting all the required specifications to meet staged delivery deadlines; when in fact the reality of the situation was quite the opposite. Although the board members installed to protect the interests of the funders would always be from highly experienced, corporate, technical backgrounds, they nonetheless fell in to the category of 'non-coding architects': i.e. while fully conversant with the technicalities of technical project management, they had almost no understanding of the deeper, more esoteric aspects of coding; especially when the project build was based on one of the more

contemporary languages Web 2.0 development languages such as Ruby or Python. Similar to the recollections of **EX1**, such deceit was routinely applied to protect subsequent funding rounds, but in the case of **ST12**, it also served to avoid punitive contractual penalties, as explained in the narrative:

RQ1:SC9 #2 **ST12**	*"The problem with VC funding is that you trade control of your company for a big wedge of money and a chunk of stock. If your product doesn't meet the agreed milestones in terms of market share or some other performance metric(s) by Y1, Y2, Y3 etc. then they start to claw-back the stock – I think they call it 'ratcheting' or something? Anyway, by Y4 you could be left owning zero percent of your own company, and no money. So of course, the aim was to avoid this scenario, and in some cases the software we churned out to meet a final release deadline didn't work exactly as it should – we all knew that – but it was easy to bullshit the non-technical board members with techno-babble and get them to sign-off for general release. It was only subsequent feedback from users – usually early adopters - that revealed the true story; but by the time a new release was due, we'd worked a fix in to the product to account for earlier...ermmm...indiscretions. Everyone was happy, and we kept control of the company."*

The author dismisses such deceit as an innocent measure deployed to protect the livelihood, and ultimately, the survival of his firm, but the ethical and moral aspects of such actions cannot be ignored, as outlined in the RQ3 sub-categories dealing with propriety and ethical conduct.

Although the narratives in this section may suggest that entrepreneurs regularly engage in dubious activities, addressing basic needs such as survival by whichever means – legally and illegally – may go some way to accounting for the high mortality rates associated with new venture creation. Of course, this may explain, but does not necessarily excuse, recourse to such action.

This sub-category has demonstrated empirically that technology may be used not only to promote the accuracy, uniformity and efficiency of process workflows – as one would expect of the normative definition for technology - but that it may also be exploited and co-opted in to serving duplicitous ends. When considered in terms of its relevance to RQ1, the narrative here talks about the exertion of *Control* (RQ1:SC2), by *Cutting corners* (RQ1:SC9) in the pursuit of some form of *Empowerment* (RQ1:SC3).

Data Analysis (RQ2)

5.2   Introduction

This section analyses the narrative excerpts contributing to each of the sub-categories responding to RQ2: SC1-SC12. In conjunction with any post-sessional field notes (Appendix F) and drawing on my [temporarily unbracketed] experience in the field, a thick *description* of the narrative is provided. Note that this stage of analysis does not rely upon academic literature as a source of theoretical inspiration, and so maintains the independence of the emergent concepts until the theory building of Chapter 6, where the analysis undertaken in this chapter *is* compared with the extant literature for signs of correspondence or refutation.
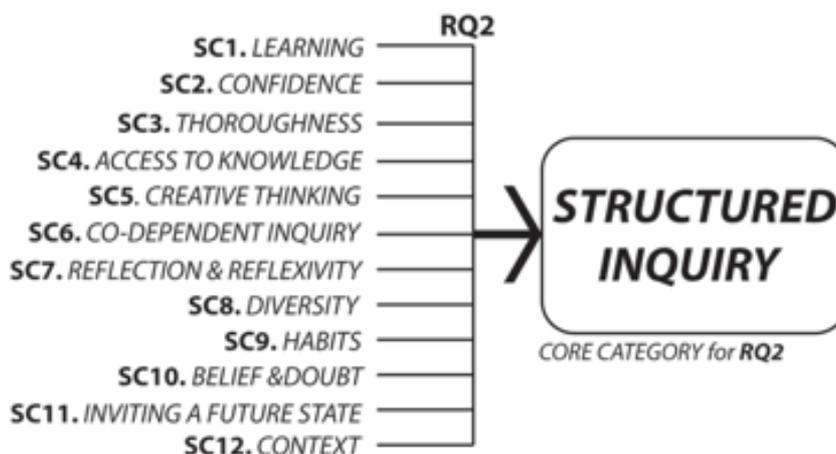
Figure 5.2   *The 12 sub-categories driving core-category 'Structured inquiry'*

5.2.1   RQ2:SC1 - Learning

Learning was the least dominant of the conceptual indicators to emerge in response to RQ2, ranking twelfth out of twelve (see Appendix S2). However, strength of emergence does not readily equate to importance or relevance in any way; it merely indicates that the concept may be more deeply embedded than others within the narrative, and because it was less-obviously elaborated in the narrative, its expression may hold more potential for novel theory generation; especially when combined with the extant literature and/or other empirical artefacts that emerge later in the study.

Table 5.2.1   *Conceptual indicators for sub-category RQ2:SC1*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
desire to learn; keeping current; passive learning; always learning; survival; acquiring skills; work experience; making connections; communication; connectivity; social relations; training; confidence; business intelligence (x2);	*Learning (15)*
mining; filtering; discerning; selecting; source; meta-search; over-abundance	*Selectivity (7)*
no barriers; facilitator; ease-of-access; automation; ease-of-access	*Admittance (5)*
casual setting; office environment; atmosphere; location	*Setting (4)*
past & present; perspectical; awareness; pragmatic	*Pragmatism (4)*
catalyst; motivation; authority	*Motivation (3)*
reputation; impact; consumer choice	*Impact (3)*

N.B. Shows lead indicators only: see Appendix RQ2:SC1 for full table

The constituting properties of this sub-category reveal that *Learning* arises from the expression of an ongoing desire to retain currency of skills (see also RQ1:SC6 *Competence*), where entrepreneurs make use of both human and non-human resources to effect a form of personalised training in the pursuit of knowledge acquisition.

Respondent **EX4** notes the direct role played by technology in his didactic approach to self-improvement by referring to a kind of continuous 'passive' learning enabled by 'always-on', connected devices. Here, residual skill-sets are maintained and regularly updated by productive engagement with on-line information systems via smart-device and search engine technologies, enabled by a reliable internet connection, thus:

RQ2:SC1 #1 EX4	*"Much of the knowledge I have has accumulated as a result of my experience at work, but I find that I can now easily supplement this, on- and off- the job, by what I see as a form of 'passive learning', which takes the form of random and spontaneous searches for everything and anything on the internet. The fact that I have a smartphone connected to the internet all the time, wherever I go, now means that I am learning all the time."*

Such comments were counter to those expressed in *Adapting to change* (RQ1:SC1), where technology was perceived to be changing too fast for new working practices to be cognitively assimilated by users, leaving them with outmoded skill sets (RQ1:SC6 *Competence*) and a loss of hope in terms of future employability (cf. RQ1:SC1 #1, #2, #5, #14, #17, and RQ1:SC6 #3).

The same combination of technologies, however, was also perceived as having a transformative impact on respondents' abilities to learn more than ever about the activities of competitors and changes in their operating sector or area of expertise, as explained by **EX2**:

RQ2:SC1 #3 **EX2**	*"Knowing what your competitors are up to is one hell of a motivator, and to me, it represents one of the key drivers behind the desire to learn more and more about your sector: the who, the what, the why etc. Don't get me wrong: I don't engage in any kind of corporate espionage, but I do increasingly use information freely available in the public domain to gather as much information as possible about who I'm up against."*

Respondent **EX6** expands on this by making reference to a recent (2015) *Companies House*[9] initiative aimed at providing access to the accounting data of all UK limited companies free of charge. Whereas once a £2 charge was levied per company search, such - albeit insignificant - 'barriers' to access had now been removed:

RQ2:SC1 #4 **EX6**	*"Only very recently has Companies House opened-up its entire database of limited company accounts for free. Previously they would charge £2 to pull the accounts of any UK limited company, but even that relatively small barrier – and it was a barrier - has now been removed, meaning that I can get the latest financial position on any competitor or potential supplier I choose free of charge. I can also query the latest world-wide patent applications on-line; the corporate profiles of executives on LinkedIn or eCademy; and all kinds of other information that would previously have been quite difficult to get hold of."*

Respondent **EX6** also refers to the way in which on-line technologies were becoming an indispensable tool for keeping track of developments in one's own sector, enabling immediate access to world-wide patent information, including the most recent 'pending' applications. They also cited professional networking sites like 'LinkedIn' and '*e*Cademy' in terms of their usefulness not just as professional networking platforms, but also as an informal, yet comprehensive source for detailed profiles of those in business; including past associates, competitors, and potential business partners.

The desire to learn more was linked to technological diversity (RQ2:SC8), but at the same time tempered with a sense of intimidation (RQ2:SC2) when faced with the sheer abundance of information and the many sources from which it could be drawn (RQ2:SC4), as explained in the narrative of **EX1**:

RQ2:SC1 #5 **EX1**	*"There is little doubt that the desire to acquire more and more knowledge is stimulated by the many options that modern technology provides. In fact, there are more sources to satisfy my 'data mining' activities than ever before; to the point of not choosing any particular one because there are so many."*

Respondent **ST13** makes reference to the superficial attempts made by some larger companies at increasing levels of employee learning, where training is often reduced to

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[9] *Companies House: The UK government body responsible for company registrations and all statutory information relating to limited liability companies.*

an impersonal, bottom-line driven measure, paying little regard to the ultimate impact on, or long-term benefit to, the employee. He then contrasts this to learning within the entrepreneurial workspace, where it is perceived as a strategically critical survival measure aimed at enriching and improving the lives of employees, in every way as much as it stands to benefit the business, thus:

RQ2:SC1 #8 **ST13**	*"Whereas many larger companies measure their ability to learn in terms of how much training they offer and how much it might have contributed to their bottom line or market share, few - if any - make any reference to how much impact such training measures have, and how it has benefitted the individual(s) or wider stake holding community concerned. In entrepreneurial start-ups, there are only a few of you to begin with and immediate survival is the order of the day. Focussing on yourself is all you have, and so everything becomes very pragmatic, where everything is done for a specific purpose, and with a specific goal in mind."*

Respondent **ST11** makes direct reference to the need to survive, and how an ongoing, positive culture of learning within an active communicative environment is an essential component of that need:

RQ2:SC1 #6 **ST11**	*"The need to survive dominates everything, especially during the first couple of years operating a start-up. Learning as much as you can about business in general - as well as keeping on top of current advances in your specialist area – are the two main rules; followed very closely by the mantra to 'communicate, communicate, communicate'. Talk to everybody and anybody about what you do. Get the message out there, and don't give a stuff about what anybody else thinks."*

Learning was seen to flourish in highly networked environments (RQ1:SC4) where communication and access to a diverse (RQ2:SC8) set of [information] sources was key. Learning was further enhanced on account of the abundance of information made available by recent advances in on-line information systems and the sophisticated nature of advanced search algorithms offered by companies like Google. Such advances were perceived as facilitating the enhanced and accelerated acquisition of new knowledge (RQ2:SC4) and the gathering of new expertise (RQ1:SC4) from particular fields or areas of specialisation.

Respondent **EX3** proceeded to link the act of being 'entrepreneurial' with a 'permanent state of learning', where the detection of opportunity was seen as a function of the entrepreneur's receptivity to 'relevance and fit' embedded within a constant stream of inbound information, thus:

RQ2:SC1 #2 EX3	*"When you are being actively 'entrepreneurial' you are in a permanent state of learning; constantly filtering the streams of information coming towards you for relevance and fit to the job in hand. When combined with the experience accumulated to date, this stream of information plus the aggregated past knowledge forms a seriously potent tool on which to base decisions and move forward."*

Learning as much as possible about the emergent trends in one's own sector or area of specialisation was seen as key to survival in terms of the possibilities it conferred in fighting competitive forces (e.g. RQ2:SC1#3), with specific reference to the challenges faced during the start-up years. This had been enhanced and enabled in recent years by the ability of on-line databases to provide essential information on the activities of competitors in terms of their web-site content, social media profiles, patents held or applied for, financial status and other key performance metrics (e.g. RQ2:SC1#4).

A link between productive learning and the availability and location of broadband connectivity (RQ2:SC12) was suggested by respondent **ST14**, who points out that the increasing prevalence of internet connectivity offered opportunities to learn at times and in places that would not previously have been possible. Mostly contingent on the availability of a good Internet connection, an underlying implication that ran common to many of the narrative excerpts was that the most successful and productive learning occurred where the environment was optimised in terms of good Internet connectivity coupled with a convivial atmosphere conducive to learning. For example, coffee shops, bars and other 'off-site' venues were suggested as ideal locations in which learning and creativity could be most comfortably accommodated (cf. excerpts RQ2:SC1 #7; SC5#5, SC5#6, SC5#12).

RQ2:SC1 #7 ST14	*"Location and Wi-Fi connectivity play a large part in how efficiently you develop new ideas these days. I find that getting together in a relaxed, friendly atmosphere with a fast internet connection is more conducive to good learning than the stuffy confines of an office meeting room with a whiteboard and flip chart, being presided over by a boss figure with a time limit of 30 minutes. So long as there's a good quality Wi-Fi connection on hand, and at least one of you has a Wi-Fi enabled tablet or smartphone, then any good quality coffee shop, pub or even comfy train carriage will usually get the creative juices flowing, free from work-based power and time constraints."*

How consumers are learning to interact with on-line markets was also referenced: not only are decisions being made for and on behalf of consumers by the meta-databases driving so-called 'comparison' web sites like *comparethemarket.com* and *gocompare.com* – both of which act as intermediate aggregators for car, travel, pet and home insurers - but such sites are also unwittingly contributing to a redefinition of work in the new economy, as explained by respondent **EX7**:

RQ2:SC1 #9 **EX7**	*"The powerful ways in which data from many sources can be mined is astonishing. We now have databases of databases, and even database of those databases: look at how sophisticated comparison web sites like GoCompare.com and Comparethemarket.com are becoming – by doing all the hard work of searching and ranking for you, and presenting the meta-results according to price and/or popularity, that process of forming your own consumer judgements has been redefined and replaced by technology, fundamentally changing the way we select and identify our common purchases."*

In terms of other areas undergoing significant transformation at the hands of the emerging digital/information economy, one only needs to consider how the travel industry is being redefined by web-based applications like *TripAdvisor, Kayak* and *Skyscanner*, and the taxi industry is similarly undergoing a radical restructuring because of on-line services such as *Uber*.

5.2.2   RQ2:SC2 - Confidence

This sub-category exhibited close ties with RQ2:SC1 *Learning*, where respondents described the impact that technology was having – for better or for worse - on their ability to learn, and the corresponding changes in levels of confidence felt with respect to their skill-set and/or competence at work. In many respects technology was seen positively as an enabler of individual confidence and competencies when engaging with on-line information systems, in the knowledge that expert and 'how-to' advice to facilitate on-demand training is available via any number of on-line media platforms.

The primary conceptual indicator was closely followed by *Group expertise, Humility, Global village, Cultural cues* and *Narrative*; indicating that the *Confidence* of respondents was also informed by the comparative perception of what others know, and the humility associated with accepting that one might not be as knowledgeable as one's peers; especially in group settings.

Table 5.2.2   *Conceptual indicators for sub-category RQ2:SC2*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
own limitations (x2); relative intelligence; appreciate limitations; arrogance; on-line etiquette; formalities; social intercourse; context appropriate; emboldens critique; emboldened critique; freedom to criticise; experience driven	*Confidence (13)*
defer to experts; on-line collaboration; wisdom of crowds; brainstorming; group collaboration; group brainstorming; concentrations of expertise	*Group expertise (7)*
humility (x3); put in one's place; "出る釘は打たれる"; intolerance; intimidation	*Humility (7)*
abundance of knowledge; expansive; global reach; comprehensive analysis	*Global village (4)*
social cues; nuances; cultural nuance	*Cultural cues (3)*
narrative; lexicon; specialist terminology	*Narrative (3)*

N.B. Shows lead indicators only: see Appendix RQ2:SC2 for full table

Accordingly, respondents made reference to confidence issues in multi-participant on-line forums, concerning measures of etiquette and 'net' culture, as well as other often-tacit narratives that permitted an understanding and sense-making of on-line interaction protocols. Respondent **EX5** explains how a simple internet search often causes him to realise how little he actually knows when faced with the vast expanse of knowledge 'out there', thus:

RQ2:SC2 #1 **EX5**	*"It makes you appreciate how much more there is to know about something once you start to dig away at a topic via an internet search. It certainly brings you back down to earth with a thump, and it's then that you realise you have so much more to learn."*

Respondent **EX7** provided an account of the intimidation experienced in collaborative group settings, thus:

RQ2:SC2 #2 **EX7**	*"I had been so blinkered in my approach to problem solving, especially when we had brainstorming sessions for new products. It took collaborative group sessions like these for me to realise that other people approach things from a completely different perspective and/or starting point, based on their previous life and work experiences. The fact that other people know more and are perhaps better than you becomes even more apparent when you take part in on-line collaborative exercises…then, you realise the whole world working together is so much better than you could ever hope to be by yourself, which is quite intimidating."*

The enhanced ability of recent telecommunications technologies to facilitate contact with a much wider expert audience via on-line forums, message boards and social media groups was accepted as a distinct benefit when considered in the context of *Networks* (RQ1:SC4), but the cloak of anonymity behind which many on-line participants are apt to hide, coupled with the increased diversity of characters (culture and personality) involved caused some respondents to experience similar insecurities and lapses in confidence to those described by **EX7**, thus:

RQ2:SC2 #4 **EX4**	*"I am always knocked-down a peg or two when I arrogantly try to assert any kind of intellectual superiority in on-line collaborative settings. I don't know whether it's a cultural thing or not, but the moment you begin to get even a bit above your station, you are quickly put in your place – maybe the anonymity of it all emboldens people to be more critical?"*

Continuing with the topic of anonymity, respondent **EX3** explains:

RQ2:SC2 #6 EX3	*"I think it's the pseudo-anonymous nature of on-line collaborative forums that goad people in to saying things that they usually wouldn't say, and this helps to promote a deeper inquiry and discussion. While this can extend to the much-publicised phenomenon of trolling and on-line bullying – especially among younger participants - I wouldn't have it any other way with adult users, as that very anonymity allows for total and unrestricted freedom of expression, without any accountability or recourse."*

In the context of on-line user forums, chat groups and expert user groups, anonymity is seen to play an interesting role for the inquiring entrepreneur: it offers a chance to boldly express views and opinions that would not normally be expressed during face-to-face encounters, and may be used as a creative heuristic for inquiry, to venture thoughts and ideas that may have the potential to threaten one's reputation (i.e. exposing their true level of knowledge in a field) on one hand, but which on the other has the power to challenge and/or disrupt the status quo of a dominant discourse or persistent dogma stubbornly attached to a particular field. Respondent **ST12** has an interesting way of explaining why anonymity might continue to be useful when it comes to protecting one's on-line reputation:

RQ2:SC2 #5 ST12	*"Remember at school when you were the smartest in your class? You then went up to high school and there may have been one or two as good as, if not better than you? You then went to college/university, and were surrounded by only smart people? Well, the next step to this sequence is a seldom-mentioned and unintended consequence of the latest social communications technology: when you engage with global collaborative forums brainstorming a particular topic, believe me when I say that you will be, by far, the dumbest member in the group."*

Having knowledge of, and being able to respect the boundaries associated with on-line etiquette was also cited as a key component of successful on-line interaction, with respondent **ST8** referring to the potential for misinterpretation of the written message – whether in an e-mail or part of a forum discussion – and its ability to unintentionally offend, depending on how the reader interprets the content:

RQ2:SC2 #3 ST8	*"Knowing the various etiquettes and formalities expected of the different types of on-line social interaction is the key to successfully engaging with other users on-line, especially when part of a social media platform. For example, we've all had the experience of inadvertently offending via e-mail, when what we thought we had typed was completely innocuous, right? Well, the same extends to chat rooms and expert forums on specific topics: you had better be fully conversant with the language and customs associated with that 'group', or you'll be unceremoniously 'kicked' from their channel – the technical forums especially do not suffer fools gladly."*

5.2.3   RQ2:SC3 – Thoroughness

Thoroughness, attention to detail and experience – or the absence of these qualities - in the execution of entrepreneurial duty was of particular concern to a number of respondents, who focussed on best practice and rigour as part of an approach to *Structured inquiry* (core category for RQ2). The concept was driven by properties indicating the application of best practice, a strengthening of clarity and group encouragement in the elimination of mediocrity amidst a burgeoning 'culture of least effort', as outlined by the defining properties:

Table 5.2.3   *Conceptual indicators for sub-category RQ2:SC3*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
develop best practice; standing up to scrutiny; removes mediocrity; commonality; enhances clarity; culture of least effort; satisfaction; embrace mistakes; habits of best practice; encourage others; completing the picture	*Thoroughness (11)*
future planning; reliance on past; temporal elasticity; apperception; historical perspective; correlation of past with present; relying on experience; apply to present	*Apperception (8)*
errors due to inexperience; wisdom comes with experience; increased wisdom; increases experience; wisdom of crowds; subjective experience; assimilation	*Wisdom (7)*

N.B. Shows lead indicators only: see Appendix RQ2:SC3 for full table

Apperception emerged as a distinct means of operationalising *Thoroughness* via a form of structured planning that relied upon a reflexive engagement with accumulated (past) experience and an appreciation for historical events. It was clear that respondents depended upon the outcome of past events to help them determine a course of future action, thus:

RQ2:SC3 #6 **EX1**	*"We all work in the present and apply responses to situations based on what has worked for us in the past. When something works, that adds to our stock of 'on the job' experience, which I guess makes us wiser. When confronted with new situations, we try and relate them to similar occurrences in the past; that's all we can ever do. So, it stands to reason that those new to the job will make many more mistakes until they become as experienced as older workers."*

Respondent **EX1** points out that *Thoroughness* guided by an *Apperceptive* approach relies particularly on experience, which over time is reified in to advancing degrees of increased *Wisdom*. The respondent uses this to explain why those with less experience are apt to make more mistakes, having less experience and accumulated wisdom on which to rely. As time progresses however, experience and wisdom are both seen to mature:

RQ2:SC3 #3 **ST8**	*"We can only every rely on the past, and our experience of it. Whether to take on board what others say involves a considerable amount of trust; after all, how do you know that they're not lying? I find that gathering as many opinions as possible helps. If enough people start saying the same thing over and over, then you're pretty much assured that that must be representative of the truth."*

Developing the habit (RQ2:SC9) of never accepting one version of events; of marshalling as much information from as many diverse (RQ2:SC8) sources as possible, and of encouraging thoroughness and best practice in all that is done is the essential message offered:

RQ2:SC3 #5 **ST11**	*"Even though many people I know disagree with me on this one, developing habits of best practice in the workplace helps to get rid of sloppy attitudes and what I call the 'culture of least effort'. Mediocrity has no place in a start-up: only the best will do, otherwise you may as well go work a regular 9-5."*

Respondent **ST11** refers to the development of 'habits of best practice' as being particularly entrepreneurial in nature, indicating that mediocrity and the perpetuation of a 'culture of least effort' have no place in any start-up environment:

RQ2:SC3 #4 **ST15**	*"Knowing how things should be done usually has no relation whatsoever to how they are actually done in real-life, and to develop habits of good practice I've always encouraged our employees to ask as many questions as possible – no matter how stupid they may think the question – to get a better understanding on complex topics. Making mistakes and asking stupid questions is how we all learn, and I encourage staff to celebrate both."*

Not worrying about the consequences of failure, or how one might be perceived by peers when asking 'stupid' questions were seen as key to gaining a thorough understanding of complex topics.

Recently emerged broadband, Wi-Fi and search engine technologies offering ubiquitous access to on-line information systems and searchable databases were referenced as enabling factors critical to the pursuit of a thorough and rigorously comprehensive inquiry:

RQ2:SC3 #2 **ST9**	*"Having full access to searchable databases full of archived material is what helps to complete the jigsaw when searching for the complete picture. Of course, nobody can know the future, but by taking on the historical, and then seeing how that fits-in with the current state of things, you might just get a glimpse in to how things may turn out tomorrow."*

Respondent **ST9** notes how technology is particularly useful in enabling lesser-experienced individuals to 'complete the picture' in terms of gaining an appreciation for

the wider historical record; especially where they themselves may have had no direct experience of past events.

5.2.4   RQ2:SC4 – Access to information

Access to information (RQ2:SC4) and *Inviting a future state* (RQ2:SC11) ranked joint-first in terms of the number of properties expressed, not only in response to RQ2, but also across all three research questions, with 137 properties driving each of the sub-categories. From a grounded theory perspective, this indicates that both are key determinants in the elaboration of the core category for RQ2, *Structured inquiry*, and, at a higher level, could play a crucial role in satisfying one or more of the stratified *needs* as they relate to a hierarchy - see Maslow (1943) in §6.1.9.

The two leading conceptual indicators for this sub-category: *Access* and *Privileged knowledge* highlight the significance of a ubiquitously available, 24/7 access to resources - in the form of digital content and human *Networks* (RQ1:SC4) of expertise - regardless of requestor or source location, thus:

Table 5.2.4   *Conceptual indicators for sub-category RQ2:SC4*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
speed of access; ubiquitous accessibility (x2); unfettered access; on-demand; universal access (x3); universal accessibility; prevalence of information; variety of sources; multiple sources; pervasive access; pervasive connectivity; global connectivity; 'always on' access; 24/7 access; 24/7 availability; public access; bandwidth improvements; choice of access; diversity of source; specialist exhibitions; instant access; on demand content	*Access (25)*
publication pay wall; protection of Intellectual property; publicly funded research; intellectual property; ease of disclosure; less guarded; commercial information; impediment to R&D; academic departments; multi-user engagement; brainstorming; socio-technical collaboration; assured assistance; mutual disclosure; mutual respect; shared problems; social media; unlikely alliances; centralised points of contact; social contact; research groups; unimagined consequences; unrealised potential	*Privileged knowledge (23)*

N.B. Shows lead indicators only: see Appendix RQ2:SC4 for full table

Respondent **EX4** summarises the general situation relating to accessibility, thus:

RQ2:SC4 #17 **EX4**	*"Solutions are no longer based on one single source of information: the more diverse the information source, the more surprising the yield in terms of creative solution. For example, users rely on smart phone technology to access Facebook and Twitter via a wireless connection to gather responses from expert user groups; key-words are mined from those expert responses to form a new search engine 'metasearch'. You then take those results and present them to your team - chew over with your colleagues. Now, just think about how many sources – human and non-human - that you have relied upon here."*

The emerging and future potential of wireless connectivity as a potent enabler of enhanced access to information was addressed by respondent **ST12**:

RQ2:SC4 #11 **ST12**	*"Wireless connectivity has been a game changer, and a major vindication of the telecoms sector's ability to be able to deliver. When local wireless hot-spots are combined with the 4G and soon-to-be 5G cellular data protocols, then we will begin to really understand the benefits that an 'always-on' connected world will bring. At present connectivity is still very patchy unless you're based in a big city, but expect that to be remedied within the next decade."*

Respondent **EX3** explains how presently emerging technologies such as cloud computing, the 'Internet of Things' (IoT) and 'Big Data' stand to radically alter the way in which information will be stored, processed and accessed. Coupled with a communications infrastructure on course to provide 'infinite' quality bandwidth regardless of user location, the coming years will offer access to content on an unimaginable scale:

RQ2:SC4 #14 **EX3**	*"The so-called Internet of Things [IoT] is just a fancy way of describing the next phase of our journey towards complete and seamless connectivity. It describes a world of infinite bandwidth, accessible by anything and any-one, at any time, from any location. I don't think people living outside the Valley [Silicon Valley] can quite yet imagine the consequences of such a world, but we had all better get ready, because it's coming, and it's only a decade or so away."*

Respondents recognise that traditional barriers to communication and business are disappearing rapidly (e.g. RQ1:SC3#3, SC5#10; RQ2:SC4#12), enabling anybody with a fast, reliable internet connection to access sophisticated information systems at any time of the day or night, and from almost any location. The issue of location-dependency will not be an obstacle for much longer, either, according to respondent **ST14**, who explains how '*WiMax*'[10] and '*white space*'[11] technologies are set to revolutionise wireless internet connectivity, by providing reliable access for those in rural and remote areas that may previously have been unable to secure a suitable connection:

RQ2:SC4 #13 **ST14**	*"WiMax will be the next major technological revolution in terms of wireless connectivity: Its full roll-out is something we are eagerly anticipating, as it will herald the beginning of an environment saturated with ultra-high speed wireless availability, regardless of location. This means that we will no longer have to depend on the patchy availability of internet access; as the signals will be so pervasive that even in the remotest parts of the country you'll have full, high-speed connectivity."*

Not only is speed and availability of concern to respondents, but also the expedience with which a lodged query may subsequently be satisfied is referenced by respondent **EX5**,

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[10] *WiMax: Wireless communications standard designed for creating city-wide WiFi networks*
[11] *White space: Old analogue TV frequencies being used for the transmission of high speed internet*

who extols the benefits offered by the recent emergence of so-called 'aggregator' web-sites. In this example, much time and effort is saved where such web sites centrally gather and rank multiple quotations for insurance products using advanced meta-databases, thus:

RQ2:SC4 #6 EX5	*"Have you noticed the recent arrival of all these so-called 'aggregator' web-sites, designed to accelerate your search for hotels, flights, car insurance and the like? Well, meta-sites like these are just the beginning of the kind of 'BigData' that everyone has been talking about: those who can aggregate the most data in the best indexed, most useful mega-sites will be the ones who ultimately control our on-line search and shopping habits."*

In contrast to issues relating to general speed and ubiquity of *Access, Privileged knowledge* elaborates on the positive and negative aspects of collaborative access to content and human resources; expressed either by groups seeking out specialist 'expert' alliances, or for those wanting to challenge or protect intellectual property rights, as described by respondent **EX1**:

RQ2:SC4 #9 EX1	*"We used to be fiercely protective when deciding who could access our intellectual property, but the internet has changed all that. It's now easier to disclose what would once have been seen as commercially sensitive to a competitor, because it works both ways when you have similar problems, as you inevitably do when working in similar sectors. There's an unspoken rule that we won't abuse the relationship – especially to the benefit of third party competitors – on the promise that we help each other out. Everybody wins in the end, and it has helped us form some amazingly strong and lasting relationships with the most unlikely partners."*

With respondent **ST12** touching on the ethically dubious implications of the digital portability and widespread ease-of-access to copyright materials:

RQ2:SC4 #5 ST12	*"I am sure that we have all copied something from the Internet that we shouldn't have; whether it's downloading a music track, a movie, or even a whole book that's available in digital format. The fact that many of us do this doesn't make it right, of course, but people do it just because they can, and it's far easier to download a song, book or movie than going to the shops and having to buy it, right? Many distributors have latched-on to this, and offer e-books, music and movies on demand via services like iTunes and NetFlix."*

Where some respondents indicated a keen willingness to establish stronger ties with academic research departments (see also RQ1:SC4 *Networks*), the paywalls installed by academic publishers were perceived as a direct impediment to the fruitful development of industrial-academic partnerships, excluding non-academic interests from the commercial and/or industrial potential of academic output. Furthermore, systems enforcing intellectual property and patent rules were seen as complicit in killing-off the spontaneous creative potential of smaller firms, where large(r) corporates use their

financial strength to file broad-scope patents, instantly laying claim and title to whole territories of creative endeavour, and shutting-off the chance for any external competition; now, or in the future.

RQ2:SC4 #1 EX3	*"We produce innovative accounting software for use in the cloud by smart devices, so technology defines every aspect of what we do. The one thing that continually impedes our progress on the R&D front is the 'pay-wall' that bars access to important research in our field. We are held to ransom for up to sixty US dollars per research paper, all for a report on research that we have already paid for with our tax dollars. The results of all publicly funded research should be made available to all; not handed over to money-making profiteers."*

Such anticompetitive activities clearly have links with the conceptual domains covered by the sub-categories relating to corporate social responsibility, ethical and moral behaviour, as well as the common good, as elicited in RQ3:SC1 *Doing the right thing*; RQ3:SC4 *Universal good*; RQ3:SC7 *Copyright & intellectual property*; RQ3:SC8 *Trust and respect*; RQ3:SC9 *Reputation*; RQ3:SC10 *Privacy & identity* and RQ3:SC11 *Ethics & morals*.

Respondents had much to say about the ways in which access to information was both enabled and restricted by recent advances in technology. The abundance of choice on offer was seen as somewhat intimidating, described by EX4 thus:

RQ2:SC4 #2 EX4	*"I have always been intimidated by how much information is out there, and like a rabbit frozen to the spot by the glare of approaching headlights, I often freeze and don't know which way to go when faced with the need to do a bit of research on a topic."*

Generally, the ability to access information on a wireless-enabled smart device, more-or-less regardless of location, and at any time was seen as a positive advantage:

RQ2:SC4 #4 ST12	*"It's easy to forget that the rest of the world isn't in the same time zone as us, and the nature of the 24/7 broadband connection now makes it even easier to conduct business around the clock. By getting up at 5.30am every day I can have most of my work done before the others even clock-in. This leaves the rest of the day for me to spend either with family or friends, or to engage with what I refer to as my 'discovery mode,' where I tinker around with new ideas and form impromptu solo brainstorming sessions."*

This concept exhibited strong links with RQ2:SC6 *Co-dependent inquiry*, showing that many of the properties driving *Structured inquiry* (the core category for RQ2) stood to be enhanced via collaborative (rather than solo) brainstorming and the exchange of ideas, located in convivial environments characterised by an atmosphere of light-hearted play, mutual trust and collective endeavour.

Respondent **EX7** draws parallels between entrepreneurial practices in the West and contemporary management styles found in the East; making specific reference to strategic approaches to decision making, thus:

RQ2:SC4 #18 EX7	*"It is now much easier to just 'get things done', as and when the need dictates; and almost according to demand. I've been involved in high-tech product development for some time, and can see strong parallels between the Japanese manufacturing techniques of the just-in-time [JIT] approach, the Kanban technique and others, with our day-to-day strategizing and decision-making. In other words, because of the additional power technology provides, I can make accurate decisions 'just in time' based on optimised search engine results that provide an exact snapshot of the requirements at that precise moment. I suppose what I'm saying is that our decision making has become more of an ordered process, rather than the series of chaotic hand-waves and guesses that it once was. It certainly feels more productive, and endows you with a greater sense of confidence when deciding things."*

By making reference to *JIT* and *Kanban*, respondent **EX7** is expressing some familiarity with *Lean/Agile* methods, both of which are real-time processual approaches to manufacturing, software development, and other time-sensitive productivity systems, as indicative of an underlying systems approach.

5.2.5   RQ2:SC5 - Creative thinking

Creative thinking represents one of the most revealing conceptual categories, as the 12 distinct narratives driving it provide real examples of the various mechanisms adopted by respondents to initiate and drive the creative process. It was clear that a multitude of distinct approaches to creative inquiry exist, with respondents describing a variety of styles; many of which had been developed and nurtured over time in response to the need for diversely unique and novel creativity in the solutions they produced.

Creative thinking ranked fourth in terms of conceptual expression for RQ2, preceded only by *Access to information* (RQ2:SC4), *Inviting a future state* (RQ2:SC11) and *Co-dependent inquiry* (RQ2:SC6). This sub-category therefore represented a prominent driving force in the elaboration of the core-category responding to RQ2, *Structured inquiry*.

The dimensional properties defining this sub-category were dominated by *Creative thinking* and *Receptive state*; between them indicating almost half of the 111 properties found to be expressing the category (see Appendix S2), thus:

Table 5.2.5   *Conceptual indicators for sub-category RQ2:SC5*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
creative discovery; creative mind-set; creative side; creativity (x3); satisfies ego; critical discourse; most creative; mischief; play (x2); playful adjunct; best practice; combine variants; peripheral aspect; combined inputs; thrive on chaos; constructive blending; innovation; comic heuristic; diverse contributions; abstract thought; engaging; celebrate mistakes; entertain outliers; casual interaction; abstract hunches; deadline compliance	*Creative thinking (29)*
space to be filled; zen-like mood; vacuum; subconscious; undisturbed; blank slate; semi-consciousness; meditation; unrestricted thought; dream-like; frame of mind; free to wander; neutral state; situation; cognitive state; cognitively disengaged; relaxed setting; distracted (x2); maintain open mind; peaceful surroundings; correct surroundings; relaxed environment	*Receptive state (23)*

N.B. Shows lead indicators only: see Appendix RQ2:SC5 for full table

A brief inspection of the properties driving both indicators shows a deep connection with light-hearted attitudes towards creativity characterised by fun, mischief and play in diverse and unpredictable settings, where mistakes and errors are to be embraced as solid foundations on which to build 'insanely' creative (see RQ2:SC8#5) solutions.

Receptive state suggests links with a cognitively disengaged 'dream-like' phase of being, referred to by several respondents (RQ2:SC5#1, SC11#2) as resembling a space or gap waiting to be filled with inspirational musings or thoughts, while in a state of 'disengaged expectation'. Here, engagement with the creative process is more likely to occur when one is in such a passive, disengaged state with one's environment.

Respondent **ST9** makes specific reference to this:

RQ2:SC5 #1 **ST9**	*"The best ideas and solutions seem to appear when you are least expecting them. It works for me when I push all problems to the back of my mind, don't dwell on them, and then allow that space to be filled with whatever happens to drift along – often while I'm dozing, day-dreaming, or running on 'automatic'. Much of what comes by is irrelevant garbage, but once in a while, a true gem appears that sets you on a course for life."*

Engaging with a 'dream-like' state is further described by respondent **ST10**:

RQ2:SC5 #10 **ST10**	*"Some of my most creative insights arise at times when I'm least expecting them. It's usually when I'm involved in some mundane, repetitive or automatic task like playing with the kids, waiting for the kettle to boil, driving, or even when I'm in that daze of semi-consciousness just before falling asleep, or in the morning during the process of waking up. It's as if the brain needs to be in neutral; disengaged and free to wander [wonder?] before insights start to spontaneously pop-up, out of nowhere. I can't think of any other way to explain it."*

For others, courting creativity was compared to the 'zen-like' cognitive state of mind often associated with yoga and meditation, as explained by respondent **EX6**:

RQ2:SC5 #5 **EX6**	*"For me, being in the right 'frame of mind' and relaxing in the appropriate environment is vital to creative discovery. Some people I know thrive on the chaos arising from high-pressure business and deadlines in order to be creative, but I'm the complete opposite: I need to reach an almost zen-like meditative state before my creative side reveals itself."*

Being open and receptive to criticism was cited as a call to creativity for some, as explained by respondent **EX5:**

RQ2:SC5 #4 **EX5**	*"I love to be challenged and told that I'm wrong – it's a red flag for me to then go out and find out what the real deal is – or probably just my ego wanting to prove that I'm right, once and for all. Either way, it's creative."*

Carefully choosing the correct situational settings is also an important antecedent for effective group creativity, where the need to be cognitively relaxed is ideally supplemented by informal, casual surroundings, thus:

RQ2:SC5 #12 **ST11**	*"Engaging with a creative mind set needs some forethought and advance preparation, where both the location and general environment are amenable to unrestricted, abstract thought. I know a few people who claim to come up with their best ideas when working under tremendous amounts of pressure, but for me, it tends to be the exact opposite."*

The right place coupled with the right people represented a move from individual- to group-based creativity, where the benefits and advantages of creativity in a group context were highlighted by respondents **EX2**, **ST13** and **ST10**:

RQ2:SC5 #6 **EX2**	*"It's difficult to be creative on demand, as I need to be surrounded by the right people, in the right kind of place. Forget the office, as there are too many distractions. Get a group of you together; rent a log cabin up-state, and lock yourselves away with some food and a few kegs of beer for a long weekend. You'll be amazed at what comes out of those sessions."*

Respondent **ST13** articulates the dynamics of effective group brainstorming, describing it as a two-stage process: the first involves individual speculation relating to an initial anchor, point of 'musement', or grounding point for further inquiry; the second stage invites all group participants to a critical discussion of the group's collective speculations. Those able to survive the combined force of a directed group critique were earmarked for further discussion:

RQ2:SC5 #3 ST13	*"The best brainstorming at [company name] happens in two stages: to begin with, you come up with a bunch of off-the-cuff hunches about how to solve a problem; you then introduce these to your colleagues over a beer or two, critically pitching all hunches against one another in a 'battle of the hunches'. When combined together, the surviving hunches probably represent your optimal solution. Problem solved."*

Respondent **ST10** describes an almost identical approach that relies on group effort: the material sourced by each individual is subjected to group critique as part of a rigorous search for ideas that express both novelty and a viable commercial potential:

RQ2:SC5 #7 ST10	*"I see innovation as a multi-stage process: First, you have to come up with your own ideas, doubts and beliefs concerning the need for a new service or product. You then use the internet to gather as much existing information as possible already out in the field. Finally, you compile your case and present it to your peers for a thorough appraisal. The ensuing process usually consists of having your ideas being ripped apart, but when what remains is blended with the constructive input of others, it probably represents the best that you can come up with at that point in time."*

A playful, almost juvenile approach to inquiry was seen as the best way of dealing with some of the more 'avant-garde', less conventional ideas, where even the 'craziest' suggestions were permitted expression as a legitimate pathway to creativity. Respondents **EX3** and **ST14** explain:

RQ2:SC5 #9 EX3	*"Don't dismiss the crazy suggestions; think around and play with them for a while, and you'll find that they're not so crazy after all. If you then go on to adopt a more playful, almost teasing attitude with respect to such ideas, you will find that very interesting and powerful concepts begin to emerge."*

The notion of a 'disengaged interest' against a backdrop of playfulness is again mentioned in respondent **ST14**'s narrative:

RQ2:SC5 #2 ST14	*"Intentionally looking for a specific solution never seems to work that well. The real winners come along when you are off-guard or looking at some peripheral aspect of the original problem; and is especially effective if you happen to be in a playful, impish, or mischievous mood."*

Some respondents adopt a 'hybrid' approach to creative thinking, where traditional techniques related to innovation and discovery are combined with other, less traditional methods, so as to differentiate their own type of novelty from others:

RQ2:SC5 #8 ST11	*"When I'm trying to innovate or get my creative juices flowing, I apply a technique I read about a few years back that some comedians use to produce their new material. You do it by taking the basic idea – in my case, represented by the problem – then think of ideas negative to it or opposing it, and then grab some totally unrelated, avant-garde concept verging on the playfully ridiculous, and throw it in between the two. For the comedian this process hopefully results in a laugh, but for entrepreneurs, it has the power to conjure up the latest 'killer app' to hit the market. It doesn't work every time, but when it does, it produces winners."*

Another technique independently expressed by respondent **EX2** also alluded to the exploitation of negativity by encouraging creativity from an inverse perspective. Here, the components leading to previous mistakes and failures are used as a heuristic to indicate how *not* to do something, rather than a conventional *how-to* approach:

RQ2:SC5 #11 EX2	*"Knowing how not to do something is a very informative lead when it comes to wanting to know how to do that same thing properly. This inverse way of thinking is a very powerful approach to learning, and is why I encourage staff to always reflect on – and even sometimes celebrate - their mistakes. The flawed parts of a process that lead to mistakes can usually be isolated, inverted, and reincorporated in to a new approach next time a similar issue arises. Iteratively isolating flawed antecedents over time will eventually result in a flaw-less solution."*

The various mistakes and errors of the past are therefore aggregated as part of the entrepreneur's collective experience to-date, and used as a guide for future *positive* action that will hopefully result in better outcomes.

5.2.6   RQ2:SC6 – Co-dependent inquiry

This sub-category highlights the importance of co-dependent/group inquiry as a collaborative exercise, and how it contrasts with individual approaches, where the 17 distinct excerpts driving it support the advantages of a co-ordinated group approach to *Structured inquiry* (core category for RQ2).

The sub-category was dominated not only by its leading eponymous indicator (see Appendix S2 for full table), but also *Accessibility; Achievement; Creativity*, and *Limitations*. All were secondary to *Co-dependent inquiry* in terms of the number of expressed properties, as shown in Table 5.2.6.

Table 5.2.6   *Conceptual indicators for sub-category RQ2:SC6*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
co-dependence; co-opting others; collaborative brainstorming; credible sources; collective experience; combined intuition; combined power; group collaboration; group effort (x2); group effort; group success; grouped talent; pooled resources; appropriation; joint decision making; key decisions; common goals; reliable source; external contributions; delegation; over-delegation; outsourcing; selection of source; perfect partner; invisible army; like-minded; shared responsibility; enhanced effect; engineering students; aggregate wisdom; aggregate experience; technology as partner	*Co-dependent inquiry (33)*
global expertise; global introduction; global reach (x3); broadcast; inaccessibility; availability; reaching out; invites altruism; pay wall; academic cloak; accessibility; marketing; evangelise; opportunism; digital promotion; keeping track; on-line sources; on-line tools; social media; viral incentive; knowledge	*Accessibility (23)*
failure breeds success; accept failure; failure; responsibility of failure; letting go; success; components of success; consequences; achieve goals; reassurance; responsibility; blame (x2); satisfaction; work satisfaction; maverick inventor; lifelong work; evasive action	*Achievement (18)*
well-formed questions; speculative ability; creative heuristic; creative mind-set; conceptualisation; strengthens case; spontaneity; first step; inspirational; intuitive catalyst; incentivise; innovation; innovative talent; knowledge creation; extending frontiers; human necessity	*Creativity (16)*
lone warrior (x3); limitations; own limitations; onerous; barriers; complacency; life before search engines; familiarity; threat; development time; tacit presence; theory-practice gap	*Limitations (14)*

N.B. Shows lead indicators only: see Appendix RQ2:SC6 for full table

Co-dependent inquiry ranked third in terms of conceptual expression for RQ2, preceded only by *Access to information* (RQ2:SC4) and *Inviting a future state* (RQ2:SC11); both of which ranked joint-first (see Appendix S2). This sub-category therefore represents an important driving force contributing to the elaboration of the core-category for RQ2: *Structured inquiry.*

As with *Creative thinking* (RQ2:SC5) many respondents were keen to convey their own prescriptive approaches to group-based inquiry, with many of the same themes expressed in *Creative thinking* appearing independently across other sub-categories, such as situational context (RQ2:SC12), diversity of participant (RQ2:SC8), diversity of information source (RQ2:SC4), and the ability to be confident (RQ2:SC2) in one's pursuit of new knowledge (RQ2:SC1). Respondent EX4's narrative begins the discussion, thus:

RQ2:SC6 #17 **EX4**	*"The technical design of a new product or service relies on knowledge and experience that you have accrued professionally in the past. It can be, but rarely is, the lone pursuit of the maverick inventor; but in group settings, the potential for unique and powerful design is enhanced to the nth degree."*

…with respondent **EX5** confirming the same basic message:

RQ2:SC6 #9 **EX5**	*"All good start-ups are based on groups of dedicated talent working towards similar goals. No matter what anybody tells you, it's impossible to get to the top all by yourself."*

The properties driving the main conceptual indicator *Co-dependent* inquiry refer to the pooling of intellectual resource, effort, and experience, underpinned by a like-minded approach to delegation, problem solving and responsibility; all of which draws on a collective sense of wisdom, thus:

RQ2:SC6 #4 **ST10**	*"The best solutions arise from the best questions, and the best questions are most often formulated when a group collaborates; pooling the collective experience and wisdom of its members together."*

Although co-dependent inquiry appears to have little to do with advances in technology, the *way* in which humans and resources are now connecting with each other, and how they are instantly and mutually accessible on a global and transparent level (see also *Networks* – RQ1:SC4) was seen as a crucial supporting factor in enhancing and 'power-enabling' the contemporary collective approach to inquiry. Instant access to global expertise via the digitisation of specialised content, on-line user forums and videoconferencing application facilitated by commercial-grade (i.e. reliable) 'always on' broadband connectivity represented the latest routes to thorough inquiry, as evidenced by respondent **ST11**:

RQ2:SC6 #11 **ST11**	*"Being completely up to date and familiar with the latest that technology has to offer in terms of locating and acquiring new knowledge, and connecting with the right kind of knowledge source, is crucial to an effective, modern-day creative mind-set. Being able to pool your intuitive capacity to discover with the search and analytical capabilities of on-line databases, and then inviting third party 'experts' to develop things further probably represents the best kind of rigorous inquiry I am aware of at this point in time."*

Knowing when the limits of one's own knowledge or capabilities have been reached, and knowing when/where to 'draw the line' and/or delegate is expressed by respondent **EX6:**

RQ2:SC6 #2 **EX6**	*"To succeed as an entrepreneur, you need to accept that you can't be good at everything, knowing when to delegate and/or outsource those elements that you can't or don't want to do. Learning how and when to 'let go' is key.*

Respondent **ST15** explains how the outputs of co-dependent inquiry (multiple inquirers, information sources and platforms) are associated with higher degrees of validity and claims to truth, as the likelihood of a 'bigger picture' being closer to the truth increases with the level of resource involved, thus strengthening the case:

RQ2:SC6 #14 ST15	*"Making decisions together helps strengthen your case, and certainly validates what you're saying in the eyes of others. Furthermore, if it can be backed up by multiple evidence from credible on-line sources, such as competitor web sites, supplier forums, academic research portals etc. then you can be sure that you've done as good a job as you possibly can, and nobody can accuse you of a half-hearted attempt."*

Technology is seen as a vital tool not only for establishing new connections, but also for its power to mobilise disparate, globally based resources towards enabling a superbly rich and diverse inquiry process that stands to yield equally 'thick' results, should the correct resources be selected. By drawing together otherwise unlikely alliances of individuals that would never before have had the chance to meet, contemporary telecommunications technologies have forever changed the ways in which humans communicate:

RQ2:SC6 #7 ST11	*"The fact that you can rely on help from random people, anywhere in the world, is a tremendous boost to my confidence as a valued employee who contributes positively to the success of my company, and its future."*

On-line applications and other platforms/forums that help facilitate co-dependent inquiry by programmatically matching like-minded individuals were also mentioned as a useful tool that draws on the connective power of modern information systems:

RQ2:SC6 #13 EX4	*"There are many 'apps' out there that specialise in creating mind-maps to assist with the creative process; they help by clarifying thinking and conceptualise complex issues by adding structure. The truly amazing aspect of these on-line tools is that they are able to classify the various types of mind-map, and put users in touch with others who are working on similarly structured problems, no matter where they may be located. They instantly match-make you with brainstorming buddies all over the world."*

However, the limitations of technology are similarly recognised in that human intuition will always be a prerequisite to inquiry; no matter how sophisticated the technology may become, as expressed by **EX3**:

RQ2:SC6 #16 EX3	*"No matter what others say, humans will always be needed to provide that initial spark of intuition. I doubt that machines will ever be capable of replacing that side of our ability to reason speculatively, it's just too random to be ever simulated programmatically."*

Again, the relatively recent ability to connect seamlessly with expert sources regardless of location allows businesses to form strategic alliances with disparately located industrial and academic research groups:

RQ2:SC6 #6 ST9	*"University and college engineering students represent a massively under-rated source of innovation and new thinking. Here, you have very eager and intelligent groups of youngsters working on fantastic projects, many of which will never see the light of day in the practical world, because their research has either been pay-walled off and made inaccessible to the general public; the university has no idea how to bridge the gap between theory and real-world practice; or, worst of all: the work poses a threat to the lifelong work of some fusty old career academic who sees to it that the work is promptly buried in order to avoid any personal discredit."*

Unfortunately, some of the traditional problems associated with the protection of academic intellectual property via the 'pay-walling' of cutting-edge journal research articles continues to act as a barrier: not only is it seen to inhibit creative flair, but it also does nothing to help bridge the ever-present gap perceived between industry and academia, and/or practice with theory.

5.2.7   RQ2:SC7 - Reflection and reflexivity

Reflection and reflexivity emerged as a sub-category driven by properties that describe how entrepreneurial respondents are willing to engage with the many ways in which past experience may inform present action. Respondents reflectively consider their actions via a form of reflexive introspection, reflecting on the outcome of past actions and incorporating those reflections reflexively in to future choices.

The lead conceptual indicator defining this sub-category was driven by interesting properties like *Temporal elasticity* and *Recursive inquiry* which refer to the ability of respondents to move temporally from past to present while maintaining an overall perspective focussed on a future yet to be determined. *Creative diversity* and *Inviting a future* presented as secondary and tertiary adjuncts that facilitated a reflective/reflexive attitude; as was *Facing failure*: the sometimes inevitable, yet necessary face of entrepreneurship.

Table 5.2.7   *Conceptual indicators for sub-category RQ2:SC7*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
past appreciation; prior experience; past; temporal elasticity; present; maintaining perspective; power of feedback; recursive inquiry; optimisation; reflection (x2); habit; influences present; joint effort; historical performance; expectant solutions; rely on experience; previous knowledge; recognised expertise	*Reflection & reflexivity (19)*
cross-pollination; biological metaphor; diversity of solution; forced diversity; unexpected inspiration; controlled evolution; added dimensions; novel; unusual outcome; tenuous connections; unlikely alliances; mixing ideas	*Creative diversity (12)*
future-proofing; future; inevitability; one step ahead; keeping pace early failure; embracing error; frequent failure; loss of meaning; pride	*Inviting a future (5) Facing failure (5)*

N.B. Shows lead indicators only: see Appendix RQ2:SC7 for full table

The notion of a reflexively recursive feedback was noted by respondent **ST9**, who suggests its use as a heuristic for encouraging the emergence of new and innovative ideas, thus:

RQ2:SC7 #5 ST9	*"The many techniques available to encourage the emergence of new ideas when innovating all have their place, but few recognise the power of feedback when applying these methods. By feeding previous results back in to a fresh round of inquiry, old errors are corrected, refined and help to optimise resulting solutions.*

However, respondent **EX5** sounds a note of caution regarding the over-analysis that an invitation to enhanced reflection and reflexivity may lead to:

RQ2:SC7 #1 EX5	*"Cutting-edge can very quickly turn in to overly-complicated 'bleeding-edge' if too much reliance is placed on the mass of unstructured data available on-line. The way to keep things in check is by tempering any proposed advances or improvements to your existing portfolio by taking stock and reflecting on how previously successful products were typically improved in the past; usually in a step-wise, controlled series of releases."*

…explaining here how a structured, step-wise approach to the enhancement of products or services encourages entrepreneurs to resist the temptation to 'embrace-all' available technologies at once (resulting in 'bleeding-edge' output), and how a reflectively considered knowledge of the past could help inform the considered rollout of future new products and services.

Respondent **ST11** considers the relevance of a reflective/reflexive attitude when trying to account for the higher failure rates faced by entrepreneurs with less experience, explaining that the adoption of a reflective attitude via a continuing appreciation for past events is a skill that can only ever develop over time, and with experience, thus:

RQ2:SC7 #3 ST11	*"You always have to maintain an appreciation for the past, and how it affects what you're doing now. This is the problem that new entrepreneurs have: they have no previous experience by which to reference things, which explains why they tend to fail quickly and often in the early years. It's par for the course, unfortunately."*

Another respondent likens such thinking more to a kind of 'perspectival thinking', calling for the need for a continued awareness based on the perspective of what was, what is, and what can be:

RQ2:SC7 #2 EX7	*"Maintaining a keen perspective relating to what is, what was, and what can be is key to ensuring that your product portfolio evolves in line with changing environments, and also keeps you one step ahead of the competition."*

A more prescriptive description is offered by respondent **EX6**, who compares entrepreneurial attitudes towards reflection and reflexivity with the type of collective management style encountered in successful East Asian economies: by working together on well-defined issues, pausing at each stage to reflect, and then incorporating any new knowledge in to subsequent iterations, thus:

RQ2:SC7 #6 EX6	*"The Japanese and Koreans have long been recognised for their technical and engineering prowess, but I think that we could all very easily incorporate their practices in to our working culture, too: by working closely together on small, incremental tasks; reflecting on what has been accomplished at each stage; taking pride in our work, and accepting errors readily. Such qualities already exist as prominent features of the Lean and Agile approaches that have been the mainstay of our Eastern colleagues' approach for years; something that we in the West are only just beginning to discover."*

One respondent dismisses any comparison with the past, citing a continuing and never ending underlying change dynamic to everything, therefore advocating an ahistorical, more pragmatic reaction focussed primarily on the here-and-now, thus:

RQ2:SC7 #7 ST15	*"Part of the whole change dynamic is that no matter how good the solutions you and your team may happen to develop, they will only be appropriate to the language, technology and cultural understandings of today. Don't believe any vendor who claims to offer a 'future proofed' solution – it's impossible.*

Respondent **ST9** offers an interesting alternative approach to inquiry based on a habitually formed, reflexive approach to framing initial questions. Here, the inquiring agent(s) attempt to force diversity (RQ2:SC8) by disrupting the 'problem space' intentionally, by including elements of perturbation, or an unexpected 'surprise' that prompts a sudden 'jolt' or disconnect from the 'comfort zone', thus:

RQ2:SC7 #4 ST9	*"I encourage colleagues to get in to the habit of pausing and re-framing the questions that they would have normally asked, to include concepts from other technical areas that have only a loose connection to the problem space. To use a biological metaphor, I refer to it as 'cross-pollination', because that's exactly what it is. Forcing diversity of this type when posing the question causes a corresponding diversity in possible solutions, which give rise to highly unusual outcomes that very often provide unexpected inspiration and additional food for thought."*

The circularly reflexive relationship between cause and effect is mentioned by respondent **EX4**, who states that a reflexive attitude is required if one is to know how to correctly frame a question, or set of questions that define the early stages of inquiry, thus:

RQ2:SC7 #8	*"Knowing the right questions to ask is very difficult. Think about it: if you already know what to ask, you must already have a fairly good idea of the kinds of solutions you are expecting. The same goes for kick-starting the search for knowledge: you have to base searches to begin with on something that you have previously experienced or encountered…it doesn't just appear 'as if by magic.'"*
EX4	

Knowing 'where to start' with correctly framed questions was of concern to other respondents when questioning their own levels of self-confidence and competence (see RQ1:SC6#2). The issue can be traced to Meno's paradox, which states that if one knows what one is looking for, then inquiry is unnecessary. However, if one does not know what one is looking for, then inquiry is impossible. Both statements lead to the paradoxical conclusion that inquiry is either unnecessary, or impossible. (see §1.7.4 for discussion)

5.2.8   RQ2:SC8 – Diversity

Properties expressing the various conceptual dimensions of *Diversity* related to the selection of information source(s) and their possible role in not only framing questions correctly, but also formulating a solution, or set of solutions, as part of a *Structured inquiry*. The concept was seen as a means of effecting best practice inquiry in the pursuit of *Sound knowledge*, while *Escaping the norms* and traditions associated with conventional (mono-dimensional) inquiry. Contemporary IS technology was cited as key to the *Empowerment* (RQ1:SC3) of inquiry by enhancing the potential levels of diversity open to an inquirer.

Table 5.2.8   *Conceptual indicators for sub-category RQ2:SC8*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
diverse approach (x2); diverse mix; diversity of thought; break-free; generates diversity; promotes creativity; combined perception; multiple strands; prior experience; decision making; wisdom of crowds; mass collaboration; encourage mistakes; invite discomfort; social media; challenge norms; comfort zone; outside the box; creative thinking; social media groups	*Diversity (21)*
ethical approach; honed approach; perfection; propriety; repeated attempts; stagnation; confidence; best endeavours; empowerment; enabling; no challenge	*Best practice (11)*
university specialists; academic; comprehensive sources; best expertise; technical resources; theory meets practice; direct communication	*Sound knowledge (7)*
novel conceptions; new meanings; mind prison; subjective trap; search keywords	*Escaping norms (5)*

N.B. Shows lead indicators only: see Appendix RQ2:SC8 for full table

'Challenging norms', 'encouraging mistakes' and 'inviting discomfort' are properties (Table 5.2.8) usually avoided in the conservative status-quo of a 9-5 working environment, suggesting that such an open approach to diversity by respondents here may be indicative

of the entrepreneurial mind-set's natural inclination towards decision making and inquiry, as explained by respondent **ST15**:

RQ2:SC8 #6 **ST15**	*"We are all trapped inside our own heads, and can only sensibly relate to what we have experienced or encountered before. I've come to learn that in order to break out of this 'mind prison', you have to do something that is first of all outside your comfort zone, and see if it works. If it doesn't, then try, try and try again. Keep getting disturbed, keep getting uncomfortable, and keep making mistakes. That's what makes the difference between those that create businesses, and those that just work in them. It's what gets creativity flowing, in my opinion."*

The narrative suggests that diversity is best achieved when one operates disruptively and outside traditional boundaries; thereby differentiating entrepreneurs in one respect from the 'comfort-zone' in which their traditionally employed colleagues tend to dwell.

Respondent **ST10** expands further on the idea of thinking 'outside the box' or a 'comfort zone', noting that added degrees of awareness are needed when addressing audiences on a global basis; taking care to respect cultural and age-appropriate boundaries, thus:

RQ2:SC8 #5 **ST10**	*"Thinking outside the box doesn't just mean being creative in your thoughts, although that is a major part of it. No, I take it to mean that you also need to be insanely creative in the diversity of your approach. The more strands you can add to an initial inquiry, the more results you will get; and the more peculiar the mix, the better – for example, by offering a monetary award to a group of college kids who come up with the best solution to your problem – then you really will begin to see the benefits of a diverse approach. It's easy to access such groups via Facebook or other social media platforms these days. Of course, everything must be above board: you simply cannot leave room for any misinterpretation of your intentions etc. especially if money or children are involved."*

Respondent **EX2** makes reference to tapping-in to the '*Wisdom of the crowd*'[12] via the massively collaborative power of contemporary social media platforms; suggesting that diversity may be an in-built advantage that comes with the applied use of such tools, thus:

RQ2:SC8 #1 **EX2**	*"I was convinced that making decisions using the 'wisdom of the crowds' only ever gave results that represented a 'perceived average', and so tended not to be a reliable indicator of the truth. This may be correct when talking about numerical measurements, which do require accuracy; but when you pitch a question 'to the crowds' via social media platforms such as Facebook or Twitter, asking for an opinion on how something could or should be done, then the responses you get back can be astonishingly intuitive, utterly blowing you away by revealing things that you – in your blinkered little world – would never, ever have previously imagined or conceived of."*

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[12] *Wisdom of the crowd: the collective opinion of a group of individuals rather than that of a single expert*

The kind of diversity embodied by a *'Wisdom of the crowd'* approach was perceived by respondents as foundational to the kind of creativity that fuelled inquiry at the 'entrepreneurial' level – i.e. the level needed for the kind of enhanced modes of discovery that lead to uniquely the types of creative and innovative services and products that give entrepreneurs their name.

Having the outward confidence and strength of character to approach others 'in your quest for the best' was described by respondent **EX3** as an important element of decision making:

RQ2:SC8 #2 **EX3**	*"Diversity of approach helps tremendously when it comes to making the best decisions. You must have the confidence to use everything and everybody in your quest for the best."*

This point was further elaborated by respondent **EX5**, who focussed on the benefits that various technologies brought to sourcing diversity of expertise, databases and search-engine keywords used in the search for knowledge:

RQ2:SC8 #3 **EX5**	*"To get the best outcomes you have to be cunning and completely versatile in your approach: track down the most knowledgeable experts; find the best databases; consult with others on the best keyword combinations for your search. All this is made so much easier now with the advent of the technical resources at our disposal – use them: that's what they're there for."*

Inviting diversity was seen as a means of escaping the 'mind prison' previously referred to in narrative RQ2:SC8#6, to which all subjectively bound. Habitually 'thinking outside the box', coupled with a disruptive attitude and repeated attempts in the face of failure, was beginning to emerge from the various narratives as a common foundational feature of inquiry.

When recalling the tendency of managers to hire only those perceived as less intelligent than themselves ('down-hiring'), respondent **ST14** highlighted the need for owner/managers and entrepreneurs to develop the habit of intentionally surrounding themselves with those better qualified, highly skilled, and different in as many other ways as possible to themselves; thereby selflessly ensuring a continued diversity in terms of experience, knowledge, and expertise, and instantly quenching the perpetuation of old habits, practices and procedure, thus:

RQ2:SC8 #7 **ST14**	*"Employ as many people who are different from you as you possibly can. Most business owner/managers make the fatal mistake of hiring people who they perceive to be less intelligent than them, and then wonder why nothing ever happens. Don't be threatened by them if they are more intelligent than you: you need them to challenge your standard response to life, and shake-up the stagnation. You might not like it, but I can you tell you that it will improve things no-end.*

Respondent **ST8** expands on the notion of increased diversity by explaining how he directs his search for new talent exclusively towards those working in university-based research groups, working on projects that have a close affinity or some overlap with his business interests, thus:

RQ2:SC8 #4 **ST8**	*"If there's information I need on a specific and highly complex topic, I do my preliminary searches for information on-line, but then go that extra step further by finding out which universities in the world specialise in the area, and e-mail their head of department directly. Most of the time, and not-withstanding time differences, I'll get a reply within a day or two, with some eager professor delighting in the fact that a foreigner is showing interest in his research."*

5.2.9   RQ2:SC9 - Habits

Although weakly expressed in terms of its ranking relative to other sub-categories (see Appendix S2), the sub-category *Habits* (RQ2:SC9) exhibited strong conceptual links with other sub-categories relating to the maintenance of *Reputation* (RQ3:SC9), compliance with legal and statutory measures (RQ3:SC6), and the upkeep of *Moral* and *Ethical* standards (RQ3:SC11). Although this sub-category arose specifically in response to RQ2 it could also be said to possess a strong affinity with the operationalisation of RQ3-based attitudes towards developing a *Principled praxis* (core category for RQ3).

In addition to the defining concept, the eight narrative excerpts driving the category gave rise to indicators focussing on *Best practice*, *Diverse opinion* and *Embraces technology*:

Table 5.2.9   *Conceptual indicators for sub-category RQ2:SC9*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
habit of record keeping; past record; good habit; habits; habitual action; habitual; useful habit; habit of critique; develop habits; coding habits; working habits; cultivate good habits; temporal persistence	*Habits (13)*
doing the right thing; focus on truth; better trading; best-practice; eliminate junk; efficiency measures; support; proper conduct; enforced standard	*Best practice (9)*
learning culture; wisdom of the crowds; multiple sources; social media; diverse posting; trust network; trust sites	*Diverse opinion (7)*
receptive to technology; adaptable; techno-change; co-opting technology; automation; co-ordinated change	*Embraces technology (6)*

N.B. Shows lead indicators only: see Appendix RQ2:SC9 for full table

Mention of habit in terms of a response to a particular stimulus (habit of response) or a repeated action (habit of action) was accompanied by references to best practice and 'doing the right thing' (cf. RQ3:SC1). Indeed, the cultivation of (good) habits was recognised as being beneficial in terms of introducing structure and ritual to an otherwise chaotic environment. Technology was similarly cited as an adjunct to developing good habits with respect to attention to details, accuracy, and efficiency:

RQ2:SC9 #1 **ST8**	*"Cultivating good habits based on best-practice and doing the right thing as much as you possibly can, is what it's all about. Working with technology – as opposed to against it – tends to push people in the right direction."*

Although this respondent did not explain why working with technology might 'push' people in the right direction, referring to the comments made by other respondents helped clarify a possible answer. For example, **ST10** states that:

RQ2:SC9 #5 **ST10**	*"Because there is just as much trash as useful stuff out there on the internet, you are forced to develop a habit of always questioning your choices, your search criteria, and any conclusions you draw from those choices. The down sides to technology are what actually help you to refine your critical skills in the end. Before you know it, such unrelenting questioning becomes a useful habit to have."*

Here, the downsides associated with sheer variety of choice and abundance (see RQ2:SC4#2) of information is cited as helping users to develop a more critically refined approach to on-line searches. Respondent **ST15** explains how his behaviour adapts in line with technological change:

RQ2:SC9 #7 **ST15**	*"When thinking about how recent changes in technology have helped my attitudes to business, I would say that I have become more receptive to the way tech[nology] has the power to change things. With that change, I too am forced to change, and my working habits adjust accordingly – always for the better."*

The impact of technology on the coding habits of software developers by the increased use of IDEs (Integrated Development Environments) was cited as one way in which a 'level-playing field' within **EX3**'s community of users, could be encouraged; at once promoting aligned habits of action and response, and thereby discouraging the cultivation of bad habits, should the temptation to to 'cut-corners' (RQ1:SC9) arise, thus:

RQ2:SC9 #2 **EX3**	*"Developers are always looking for ways to cut corners in a bid to make their code more efficient, but their approaches don't always pay-off. It's really up to the IDE to enforce a level playing field, by ensuring that all code meets a common standard. There are various tools out there that do this, and all ultimately ensure a certain level of quality, and force good, lasting coding habits."*

The excerpt provided by respondent **ST11** explains how his on-line buying habits were being progressively influenced by the ranked and rated opinions of previous purchases via so-called on-line 'trust' sites, where aggregated reviews on common consumer purchases (holiday destinations, hotels, restaurants, white goods etc.) had the power to influence whether a sale proceeded, or not:

RQ2:SC9 #4 ST11	*"Trust sites like TripAdvisor are now forcing us to uptake an attitude of trust when buying, and responsibility when selling. Sites like this with inbuilt trust monitoring systems really are revolutionising the way we transact with each other in terms of honesty and a principled way of conducting ourselves in business situations. They are forcing us all to develop habits of proper conduct."*

The respondent refers to such technological developments as a revolution in the way on-line buyers are beginning to transact with each other, encouraging a base-level of mutual trust, respect (RQ3:SC8) and confidence (RQ2:SC2) in on-line transactions, thereby '*forcing us all to develop habits of proper conduct*' (**ST11**).

The overly positive perception of this respondent does not, however, take in to account the duplicitous activities deployed by some who pay to have 'fake reviews' composed and posted by 'fake consumers' (see RQ3:SC8#2, SC9#4, #6), where such reviews are engineered to artificially promote a targeted product or service to the higher ranks – thereby encouraging further sales – or slander a competitor's offerings, resulting in the instant vilification of not only the service/product being 'reviewed', but also casting doubt over the vendor's reputation and general propriety.

When searching for the latest knowledge pertaining to a specialist topic, respondent **EX4** makes reference to the habit of 'cross-posting' search criteria to multiple information platforms. These include not only multiple search engines, but also chat rooms, specialist forums and user groups: on-line spaces where experts in a field tend to gather and exchange information (see excerpt RQ1:SC4#3). It outlines a contingent approach to inquiry, where 'casting the net far-and-wide' to multiple sources is certain to guarantee at least one favourable response. Should one or more good result ensue, then an average view across the solution set would tend towards a near-perfect answer, thereby representing the on-line embodiment of the 'Wisdom of the Crowds'. Such an approach is not only indicative of a synergistic take on inquiry, but also ensures a minimal degree of in-built diversity; something that has been cited elsewhere as essential to creative discovery (see RQ2:SC8 *Diversity*, and RQ2:SC5 *Creative thinking* and SC6 *Co-dependent inquiry*).

RQ2:SC9 #6	*"I make a habit of pitching my latest queries to multiple chat-rooms, social media forums and search engines when looking to gather the latest and best information on a particular topic. Cross-posting like this helps me eliminate the junk responses and build-up a vision of perhaps how something should be done. If this is what people refer to as the wisdom of the crowds, then I think it's a good habit to have."*
EX4	

5.2.10   RQ2:SC10 - Belief & doubt

Belief & doubt emerged as a conceptually tied pair, existing as polar opposites, yet expressed by 19 dimensional properties that embody the various attitudes of respondents towards truth-likeness, reality, and the various degrees in between that ultimately lead to doubt and disbelief.

Table 5.2.10   *Conceptual indicators for sub-category RQ2:SC10*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
belief; express beliefs; challenge belief; challenging norms; converge on truth; increased doubt; misinformation; check sources; express doubts; doubt-all; doubt as heuristic; entrepreneurial doubt; establishing truth; invites opinion; expert opinion; folly of faith; blind acceptance (x2); seeking alternatives	*Belief & doubt (19)*
social media; global reach; viral inquiry; diversity of information; accessibility; resource-rich	*Accessibility (6)*
laziness; dimensions of thoroughness; no rules; added rigour; path of least resistance	*Endeavour (5)*
reliability; reputable source; self-reliance; respect; enhanced standing	*Reputation (5)*
dangerous outcome; consequences; points to solution; decision making	*Destiny (4)*

N.B. Shows lead indicators only: see Appendix RQ2:SC10 for full table

Attitudes towards doubt were supported by a critical approach to inquiry, where 'being as critical as possible, as often as possible' (see respondent narrative below) was seen as a way of consistently challenging established norms and the dogma that grows to surround them the longer they remain unchallenged. Those with a rigorously critical approach are also recognised and respected for their refusal to accept the status-quo, as described by respondent **ST8**:

RQ2:SC10 #5	*"To doubt is what makes us challenge the norm. Not to doubt is just plain silly, and blind acceptance – what others might also refer to as 'faith' – is very slippery territory to get in to. Be as critical as you can, as often as you can. You probably won't be admired for it at the time, but it will add that extra dimension of rigour to your standing, and eventually you will be respected for it."*
ST8	

Respondent **EX4** called for a comprehensively critical approach when determining what should and what should not be believed:

RQ2:SC10 #1 EX4	*"Doubt everything you come in to contact with, no matter how reputable the perceived source – whether human or non-human - is meant to be. OK, others may think that you are a nightmare to deal with, but rest-assured, it's the only way you will survive in the long-term. Everything must be questioned."*

Managers in traditional employment with an otherwise uncritical attitude were singled-out by respondents on account of their willingness to accept single-source information, without thoroughly subjecting the facts to their critical scrutiny first. The implication from respondent **ST9** is that an overly critical attitude may be another feature that differentiates entrepreneurs from their traditionally employed counterparts, thus:

RQ2:SC10 #2 ST9	*"The problem with many managers is that they unquestionably accept what they are being told, without looking in to the source of the information, or possible alternatives for an answer. I think it says something about human laziness and going for the path of least resistance."*

The narrative of **ST9** is perhaps more appropriate to the sub-category RQ2:SC3 *Thoroughness*, as it relates to mediocrity and a lack of rigour; but when considered in the context of the wider (interview) discussion, the respondent was found to be referring to the general absence of a critical approach to management inquiry and its impact on the ability to doubt, believe and subsequently settle on a (perceived) truth.

RQ2:SC10 #4 ST14	*"There's so much lies and fakery out there that it's difficult to know where to look for the truth. Knowing what to believe and what not to believe is the biggest problem I'm faced with when confronted with some unfamiliar technical situation at work. Much of the stuff portrayed as 'news' or 'fact' on the internet is known to be fabricated, and has the potential to be extremely dangerous. I'm thinking about ill-informed medical advice, or anecdotal stories of cures by people who are coincidentally selling a remedy off the back of their story."*

Here, the trustworthiness of information – all of which is ultimately human-generated, whether human or machine originated – is called in to doubt, highlighting a direct correspondence with other sub-categories based on the concepts of value, reputation and the potential for consequential harm, e.g.: *Trust & respect* (RQ3:SC8); *Confidence* (RQ2:SC2); *Reputation* (RQ3:SC9) and *Ethics & morals* (RQ3:SC11). If the information one acquires cannot be relied upon, then it has the potential to harm from a physical (e.g. mis-diagnosed illness based on a single Google query), or non-physical perspective, such as the impact that 'fake' reviews may have on a firm's sales and long-term reputation (see RQ3:SC8#2; SC9#4, #6, #8).

Respondent **EX7** explains how belief becomes settled when the challenges that cause its truth-likeness to be doubted subside. Likened to a 'juggling act' between belief and doubt,

belief in a certain truth (of being, of reality etc.) is only ever maintained for as long as it remains unchallenged, thus:

RQ2:SC10 #6 EX7	*"Doubt and belief are like a juggling act that gradually veers towards the truth, or something close to the truth, but never quite gets there. Both go hand in hand when you're trying to weigh-up the pros and cons of any situation."*

Whereas the entrepreneur will strive to eliminate doubt by removing imbalance (see also RQ1:SC2 *Control*), in the foregoing narrative, truth seems to be a negotiated product of the struggle between doubt and belief: if doubt is eliminated, then belief – whether true or not – will reign…until such time as it become subject to doubt.

In terms of the maintenance of certain beliefs, diversity of resource, and therefore information source (cf. RQ2:SC8), is lauded as a positive benefit, where the latest up-to-date information relating to a specialist area may be quickly acquired and used to compare against the current state of knowledge.

Respondent **ST10** is reassured by the diversity of knowledge made available by contemporary information systems, as between them, they help to consolidate and strengthen firmly held beliefs, but at the same time, gradually erode those beliefs that are subjected to doubt. This process of 'juggling', or negotiating results over time, represents an evolutionary progress towards a state of truth that corresponds to prevailing attitudes and worldviews.

RQ2:SC10 #3 ST10	*"I won't believe anything until I've had the opportunity to check it out for myself. The modern-day advantage accompanying this attitude is that I have so many resources at my disposal to thoroughly check anything I'm presented with, and I am able to do it from a number of distinct vantage points. For example, I read something about the latest developments in hard-drive storage capacity and doubt its authenticity, or the accuracy of the portrayed 'facts'. I simply drop a post in to Twitter, and/or the appropriate specialist forum on-line to get an immediate take on the situation from some of the world's most informed experts in that area."*

The caveats relating to accuracy of source still hold, but this respondent takes a statistical view relating to information quality in order to mitigate any outlying or extraneous doubts: the more sources that information may be drawn from, the more accurate the aggregate level of belief. What's more, he further validates the authenticity of information by consulting with global expertise via the Twitter platform – another example of engaging with the 'Wisdom of the Crowd' (cf. RQ2:SC8#1, SC9#6).

Respondent **ST15'**s excerpt singles out the entrepreneurial case as being especially receptive to dealing with challenges to belief: unlike traditional top-down management hierarchies, where employees are expected to unconditionally adopt the transmitted 'beliefs' of the company 'line' and/or senior management, entrepreneurs are free to entertain as many competing beliefs as they desire:

RQ2:SC10 #7 ST15	*"It's good to express your doubts to as many co-workers as possible, who will inevitably counter with their own beliefs. But when should you allow your doubts to turn in to a belief? And when that does happen, how and when should you allow that belief to be challenged when further doubt creeps in, as it inevitably will? I think entrepreneurs are especially adept at dealing with this, because there are no 'company lines' or 'house rules' to maintain in the face of doubt... and represents the ultimate freedom of being your own boss: there's nobody to tell you what or how to believe."*

Unlike his employed counterpart, the entrepreneur is therefore endowed with the freedom to form beliefs drawn from a variety of diverse sources; beliefs which stand to evolve over time, moulded and shaped by successive challenges to the status-quo, but which are also able to 'keep pace' with the closest match to the present state of truth as possible.

5.2.11   RQ2:SC11 – Inviting a Future State

This sub-category represents one of the largest in terms of narrative-expressed dimensional properties. Both *Inviting a future state* (RQ2:SC11) and *Access to information* (RQ2:SC4) occupied joint first position in the list of categories emerging in response to RQ2; each of which were express by 137 indicating properties (see Appendix S2). Furthermore, the same two sub-categories also occupied joint first positions across the whole study when considered in response to all three research questions (see Appendix S4). Clearly, both concepts are of core significance, not only to the development of a *Structured inquiry* (core concept for RQ2), but also in their contribution towards entrepreneurial survival or self-actualisation.

Table 5.2.11   *Conceptual indicators for sub-category RQ2:SC11*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
future consequences; future employment; future family life; future goals; future needs; future perspective; future planning (x3); future self; future-self; future state (x2); future window; future work environment; concern for future; imagined future; anticipating future state; living in the future; multiple futures; unexpected advances; unintended consequences; unanticipated; thinking ahead; vision of a future state; vision of future; unknown future; thinking in perspective; imagining a future state; Imagining future state; build mental image; imagined response; setting expectations; scenario planning	*Future states (34)*
question formulation (x2); self-questioning; hypothetical; realisation; supposition; reassuring goals; decision making; specialised knowledge; initial search; comparative search; speculation (x3); speculative future; speculative questions; accurate speculation; uncertainty (x2); multiple outcomes	*Speculation (20)*

N.B. Shows lead indicators only: see Appendix RQ2:SC11 for full table

The empirical evidence suggests that entrepreneurial respondents invite future states by not only considering past experiences, but also by responding to and invoking change driven by a *temporally* framed, *speculative* outlook, characterised by *Planning*, *Change*, *Disruption* and *Creativity* (see Appendix RQ2:SC11 for full table). Less dominant indicators refer to the *Accessibility* of information when inviting future states, as well as the need to establish a firm *Starting point* to the *Inquiry* (see full table). The notion of a firm starting point is further articulated by respondent **ST13**, who describes the need to carefully frame and formulate questions that initiate and form a rigorous basis for inquiry, thus:

RQ2:SC11 #1 ST13	*"Asking 'What if…' type questions uniquely allow you to project in to an unknown future by supposing a potentially infinite number of scenarios to your plans. There are no boundaries with these kinds of questions, because the whole thing is speculative and hypothetical, to the point that it doesn't matter what you throw in to the mix. I find it especially powerful during brainstorming, because the 'what-if' scenarios are quite distinct from the 'how-can' types, which appear to usually dominate such sessions."*

Respondent **ST11** highlights the role of contemporary information systems by suggesting that a 'good web search' helps to kick-start the process by providing initial reference points and/or anchors that are often found to be lacking, thus:

RQ2:SC11 #9 ST11	*"Being expected to make decisions about the design and functionality of products or services that don't even exist yet is similar to being asked to look in to the future, and say with confidence what's going to happen – there's no way you can guarantee an accurate outcome, as there's always a degree of uncertainty in everything you do, and a multitude of possible outcomes. A good web search for similar ideas often helps to kick-start the process: seeing what others are doing or have done before you provides a firm reference point from which to begin. Then, co-opting others in to the process means that a good, well-considered end result is more or less guaranteed."*

Respondent **EX5** then proceeds to describe how, from a firmly grounded starting point, he encourages a form of perspectival thinking, or 'temporal shuttling', between the past, present and future to encourage the emergence of future solution spaces, thus:

RQ2:SC11 #10 EX5	*"Being able to think clearly in perspective, moving forwards and backwards in terms of the present situation and any number of futures is the way I believe that many of us entrepreneurs come up with new ideas for business. To do it well though, you must have a sound understanding of the current state-of-play in your specialist area, and this tends to only come with experience. By firmly grounding yourself there to begin with, you can then start tinkering with a few of the variables relevant to that industry; changing a few things here-and-there, and then imagining the possible outcomes. Doing this repeatedly builds a mental image of how the business will likely pan-out in the coming years, but only If you've grounded yourself sufficiently well to begin with."*

Respondent **ST10** further elaborates on the process by using a vacuum metaphor[13] in reference to nature's 'abhorrence of the vacuum', thus:

RQ2:SC11 #2 ST10	*"Imagine where you want to go in terms of how you see your product adding to a future user's experience; then bring yourself back to the here-and-now by picturing what they already have. That void – that gap – that exists between those two extremes, contains the steps that need to be taken by you and your team to get from A to B. I know it sounds like I'm stating the obvious here, but by shifting your perspective - by casting the timeline forward, backwards, and then forward again - and imagining yourself in the shoes of a future user, your mind can't help but step-in and come up with creative suggestions to fill the void."*

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[13] *Field Note FN14:10*

'Temporal shuttling' represents one example of a purely cognitive endeavour, where a future state is invited by exploring subjective (or inter-subjective when brainstorming or collaborating in a group) interpretations of what has been in the past, what is now, and how they might combine with experience and knowledge of the field to form hypothetical extrapolations; all of which point to what *could* potentially be in the future, or any number of possible futures. A similar technique is described by respondent **EX2**:

RQ2:SC11 #11 EX2	*"Whatever I set my mind to requires a vision of the future – first and foremost, to help me plan in which direction I want my firm to go. To get this vision I need to pitch a series of questions to my 'future self' and imagine what the responses might include. While this is probably one of the most difficult things to carry-off – precisely because you have no way of knowing what will happen – such visions offer reassuring goals to work towards. Even though these future aspirations are held entirely within your mind, it helps optimise and tune every action you take now, to be geared towards fulfilment of that picture - that goal - that you have in mind."*

So-called 'temporal shuttling' in collaborative settings ensures that multiple futures are entertained by default, and while multiple future consideration may also be possible in the case of a single creative individual, the task is far easier to accomplish in group settings:

RQ2:SC11 #4 EX1	*"Groups have the ability to pool their resources collectively, and this includes the ability to picture a future that hasn't happened yet. There's nothing unusual or supernatural going on here; they are merely situating themselves in a future that hasn't happened yet by asking a series of simple, yet powerful 'what-if' questions. For example, 'What if wireless Internet was unlimited and available at the same ultra-high speed everywhere on the planet?' is a real future possibility – I would go so far as to say inevitability - based on current progress in the proliferation of communications technologies. It hasn't happened yet, and is probably a good ten years or so away, but we can be almost 100% certain that it IS going to happen. By picturing a world in which this is the case, which is a very reasonable assumption to make, our current portfolio can be optimised to accommodate such an eventuality NOW; years before that level of technological maturity even reaches us."*

The concept depends on knowledge and experience of past events (RQ1:SC7), an appreciation of the current state of play with respect to the area of investigation (RQ1:SC4) achieved by an active learning culture (RQ2:SC1), and the ability to creatively speculate (RQ2:SC5) in to the unknown via a form of abductive inference; an experimental exercise (RQ1:SC8) in what 'could be', thus:

RQ2:SC11 #15 EX5	*"How things ought to be and how things actually are represent two very different ways of looking at the world, and if you think about it, picturing how things should be in future is one way of setting goals for yourself and/or the company. It is possible to set goals way too high of course, so when thinking about what should or ought to be the future case, the goals should be realistic and attainable; then, you may have some chance of getting there."*

Contrary to inviting a future state, one respondent refers to how his team are often faced with the need to wait for technology to 'catch-up' in order to meet the requirements of pre-planned developments scheduled for inclusion in new products:

RQ2:SC11 #5 EX2	*"Waiting for the technology to 'catch-up' is a game that we often play when designing new features in to products. In some ways, we intentionally over-specify a design in the knowledge that when the product finally goes in to production, the new stuff it has been designed to rely on will have matured. Most of the time we get it right, but sometimes we don't, and are faced with having to explain why production needs to be delayed, which has a knock-on effect to the final release date."*

Others have developed specific habits as heuristics tools for planning and forecasting, where **ST12** effectively makes decisions and reacts to situations as if situated six months in to the future. By acting this way, he provides himself with a six-month 'safety-net' via which any adverse future-scenarios may be neutralised in advance, thus:

RQ2:SC11 #8 ST12	*"One of the methods I attribute to my continuing success is by having an active financial forecast at all times. It's only a simple cash flow spreadsheet, but it deals with the coming six-month window at all times, ensuring that my 'business mind' is always six months ahead of the present. retrospectively act only if the decision I make toward impact favourably on my future self. Does that make any sense? It's only a simple spreadsheet, but it works well for me.*

Respondent **EX1** turns his attention to the ethical dimensions and future moral consequences associated with actions taken today, especially when the historical record has demonstrated numerous times that the over-ambitious adoption of emerging technologies can, and often does, result in unintended consequences thus:

RQ2:SC11 #7 EX1	*"The decisions you make today, especially if they involve the design and implementation of transformative technologies, may entail significant consequences for future generations that you haven't even considered. Do you think the inventors of the atom bomb thought about what they were doing in the closing years of World War II? I very much doubt it. No, they simply wanted an end to the misery of the war there and then. Unfortunately, things can't be un-invented, so think very carefully about what you get involved with."*

Although not referenced specifically, some respondents continue to rely on traditional modes of forecasting such as Moore's law and Metcalfe's law. For example, respondent **ST12** outlines the likely path that data storage technology will take in the coming years:

RQ2:SC11 #6 ST12	*"It's easy to extrapolate in to the future and see how some frontiers will have advanced in coming years. For example, data storage was once a straight-line graph and it was easy to predict the dollar cost of a Gigabyte of disk storage. In recent years though, and with the advent of cloud technologies, it is tending to take on more of an exponential form, suggesting that by about 2040, we will have an infinite capacity for data storage. I'm not sure exactly what 'infinite storage' will look like, as it's still in the future and hasn't happened yet; but I would venture to suggest that it will focus on 'big data' in a cloud environment, where all data is stored in a fragmented fashion, across many thousands of networked devices spanning the globe. The traditional concept of local storage on fixed hard drives and the like will have likely faded in to history."*

Respondent **ST8** describes how advances in technology will be responsible for the loss of many of the jobs that currently provide employment in an early twenty-first century workforce; claiming that many of these will disappear within the next 20-30 years. He then proceeds to explain how some of his Silicon Valley based colleagues attempt to address such uncertainties by 'living the future' – not 6 months in advance as described by respondent **ST12** (narrative RQ2:SC11#8) – but many years in to the future – by relying on their unique perspective relating to all-things technical, in a bid to anticipate and understand the coming transformative change, thus:

RQ2:SC11 #12 ST8	*"Because of AI [Artificial Intelligence] and robotic automation, more than half of the jobs that currently employ Americans will have disappeared in 20-30 years. If that doesn't prompt you to look in to the future and consider what things might be like, then perhaps you should start imagining what it might be like, as you too will soon be playing a part in that same future. Many of the techies I know who live in the San Francisco-Silicon Valley 'bubble' actually live this future now – economically, socially, and of course technologically – as they rely on the unique perspective of being able to plan and forecast the types of technology that they will be engineering and producing in future, and that we will ultimately use."*

While respondent **ST13** acknowledges the inevitability of change, he points out that many of his managerial trainees often fail to include or incorporate the change dynamic in to their every-day forecasting and planning tasks, thus:

RQ2:SC11 #14 ST13	*"When trying to teach colleagues about goal and scenario planning, the one critical point that many consistently forget to take in to account is the inevitability of change. For example, when planning sales forecasts, they assume a flat-line sales profile by not building-in growth percentages or seasonal highs and lows in to the predictions. In other words, their figures reflect a snapshot of the firm's business as it stands on that day, with sales figures based on existing business up to that point, and no provision made whatsoever for the possibility of new customers. I immediately challenge this by asking them if they plan to do nothing during those projected months, as this is what they are essentially implying with their figures."*

With **ST9** supporting the thesis that the inevitability of change is largely ignored by mainstream management, thus:

RQ2:SC11 #13 ST9	*"Something that continues to amaze me is a person's inability to appreciate change, and incorporate it in to their future-based thoughts when planning and forecasting. I was once accused of changing my mind concerning a fundamental decision relating to one of our manufacturing processes, and was challenged by the CTO who was clearly under pressure to deliver…I simply replied: 'that was then, this is now: don't you realise how much has changed since I made that decision?'"*

5.2.12   RQ2:SC12 – Context

This sub-category relates to the relevance of context when respondents attempt to make sense of, and ultimately survive in, the turbulence of a high-velocity, technological environment. The lead conceptual indicator *Context* was driven by 16 properties pertaining to the awareness of time and space, and how they were related to *Change* and *Creativity* (second and third expressed indicators). An awareness, or *Recognition*, of situational and temporal change was required in order to *Reflect* on how *Creativity* may lead to improved innovation, inquiry, and decision making.

Table 5.2.12   *Conceptual indicators for sub-category RQ2:SC12*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
temporal awareness; temporal change; temporal contingency; context of action; temporal dimension; temporal recognition; spatial recognition; spatio-temporal awareness; contextualisation; spatio-temporal contingency; foregrounding context; time sensitive; context sensitive; out of context; contextual interpretation; casual setting	*Context (16)*
recognition of change; responding to change; perpetual change; shifting response with change; inevitability of change; lack of change; change with time; stagnation; alert to change; frozen in time; shifting nuances	*Change (11)*
creative inspiration; creative precursor; prompting creativity; extending frontiers; contingent creativity; free-flowing thought; horizontal diversity	*Creativity (7)*
situational awareness; situational contingency; situational dimension; situational response; contingent response; adapting	*Recognition (6)*
same beginnings; back to beginning; reflection; foundational; apperception	*Reflection (5)*
one step ahead (x2); prediction; vision of future	*Prescience (4)*
incongruence; inappropriate action; lack of understanding; inexperience	*Credibility (4)*
cultural memes (x2); zeitgeist; contemporary fads	*Cultural milieu (4)*
failure breeds success; failure; survival of business; interim survival	*Survival measures (4)*

N.B. Shows lead indicators only: see Appendix RQ2:SC12 for full table

The ephemeral nature of change and how it drives human creativity and innovation in a bid to adapt, and ultimately survive, is described by respondent **ST14**, thus:

RQ2:SC12 #5 ST14	*"Our best and most creative ideas come from an ultimate recognition of change. Just as a product is released, we force ourselves to begin thinking about the next one, realising that things never stay the same for long. Look as MySpace for example, where did that go? The same fate will no doubt befall Facebook and Twitter one day – to be replaced by the fad of that period. This is the way it is if you are in the technology game – you must always be on your feet, as nothing lasts forever."*

Context was mentioned by a number of respondents (e.g. RQ2:SC12#1, #8) as a crucial factor in the maintenance of perspectival awareness when reflecting on past events (RQ2:SC7) as a means of inviting a future state (RQ2:SC11). Knowing how things relate to one another in terms of their spatio-temporal attributes requires a thorough (RQ2:SC3) and up-to-date knowledge (RQ2:SC4) of the historical (via accrued experience) and environmental (cultural) dimensions of the various relationships at play, as explained by respondent **EX1**, thus:

RQ2:SC12 #1 EX1	*"Putting everything in to context is a skill only possessed by few individuals. It's the skill of recognising everything in relation to the time and place of occurrence. For most, time and place remain static and boring. But to be creative – as entrepreneurs are – context is something that you have to repeatedly nudge yourself in to remembering...it has to become a habit of sorts, where you keep resetting the starting point back to zero, so that you don't get trapped in to relying on the same old beginnings."*

Respondent **ST14** further explains how situational context changes as one moves from one environment to the next, thus:

RQ2:SC12 #3 ST14	*"I've noticed how people respond to technology according to where they happen to be. At home it's all about entertainment, shopping and holidays; in colleges and universities it's about extending the frontiers of knowledge; and in the workplace, it's about keeping up with it in order to survive. The problem has always been its changing nature: just as you get accustomed to something, it gets replaced with something more complicated and difficult to understand."*

Respondent **EX4** concentrates on the cultural aspects of context, thus:

RQ2:SC12 #6 EX4	*"Reflecting on past actions and trying to predict a best course of action for the future all concerns an element of time when you think carefully about it. I know that location in terms of geographical and cultural settings play a significant role in planning, too: my colleagues in China, for example, fully immersed in their Chinese culture, will have a completely different take to me when faced with an almost identical challenge. Because we (in the West) are not usually privy to this side of things, we often miss-out on significant advances, especially when it comes to developments in certain specialist fields. Fortunately, modern communications technologies like E-mail, Facetime etc. now allow me to tap-in to that kind of contextual diversity, and wow, what a difference it has made to our outlook. Our products now cater to a much wider audience of global users, because we consider a horizontal diversity that would previously only ever have been vertically oriented."*

The disruptive nature of (contemporary) technological change ensures that the conceptual goalposts and guiding narratives (see RQ1:SC1#12, #13, #17) normally used by managers to make sense of their environments remain in a constant state of flux, thereby forcing an ongoing appreciation of context via a temporally adaptive perspectival awareness. As respondent **EX2** explains:

RQ2:SC12 #2 EX2	*"Dealing with technology on a daily basis – in work and at home – often prompts me to reconsider how I approach things creatively, because as the technology changes, it too forces a change in the way I interact with it. If you don't want to become enslaved by it, you need to maintain an acute awareness of how things change with time, and with the overall situation. I suppose when it's all added together, this is what constitutes our culture of the day – the Germans refer to it as the 'zeitgeist' or something, don't they?"*

The foregoing narrative excerpt alludes to issues of control (RQ1:SC2), enslavement and freedom: unless such a context-in-action is maintained, then one stands to succumb to the demands of technology over time. Evidence of this in action is articulated in narratives belonging to RQ1:SC2 – *Control* (see excerpts RQ1:SC2 #1, #2, #5, #11).

The need for increased situational awareness in an environment characterised by dynamic change was also articulated by respondent **ST9**, who focusses on the temporal dimensions, thus:

RQ2:SC12 #4 ST9	*"There is a time and place for everything, but many owner/managers seem to be locked in to a time-freeze, where they assume that nothing really changes and tomorrow will be the same as today. I make a point of actively noticing the changes in nuance and meaning of things as the location changes, and as the whole lot changes over time. This is key to being a good manager, I am sure. Unfortunately, most managers are completely oblivious to it, and its implications."*

Respondent **ST8** makes a general reference to how he perceives action-in-context; something that he claims many professionals are apt to overlook:

RQ2:SC12 #8 ST8	*"Acting appropriately and according to the context of a situation is a skill that many in business overlook. As they say, there is a time and place for everything. Unfortunately, many owner-managers and so-called entrepreneurs that I know decide things – and subsequently, act – in a manner so ill-suited and out of context with the prevailing situation that they fall flat on their face. I've seen this mostly with inexperienced entrepreneurs, but I must also say in their defence, that acting like this may go a long way towards building the person they will eventually become…if they can survive until then, that is."*

Data Analysis (RQ3)

5.3 Introduction

This section analyses the narrative excerpts contributing to each of the sub-categories responding to RQ3: SC1-SC11. In conjunction with any post-sessional field notes (Appendix F) and drawing on my [temporarily unbracketed] experience in the field, a thick *description* of the narrative is provided. Note that this stage of analysis does not rely upon academic literature as a source of theoretical inspiration, and so maintains the independence of the emergent concepts until the theory building of Chapter 6, whereupon the analysis *is* compared with the extant literature for signs of correspondence or refutation.
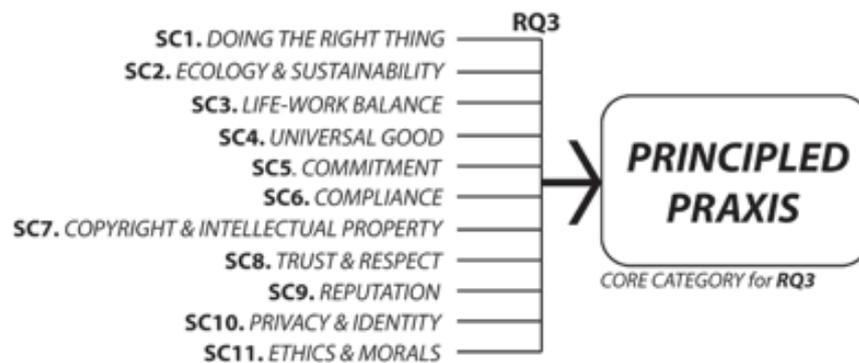
Figure 5.3   *The 11 sub-categories driving core-category 'Principled praxis'*

5.3.1   RQ3:SC1 – Doing the right thing

Doing the right thing is a sub-category driven by narrative excerpts leading to conceptual indicators of *Duty, Responsibility, Learning* and *Adapting*, as depicted in Table 5.3.1. The sub-category exhibited very close conceptual ties with two other sub-categories: RQ3:SC4 *Universal good*, and RQ3:SC6 *Compliance*, which led to difficulties during the later stages of analysis; a detailed account of which may be found by referring to §5.6.4 in Part I of this chapter.

The lead conceptual indicator for this sub-category was driven by a diverse range of properties concerned with propriety, sound ethical awareness, and a rigorous approach to life characterised by quality, best practice, and consideration for others. Less prominent indicators referred to *Tenacity*, *Survival measures*, and *Relations*, suggesting that 'doing

the right thing' was perceived by respondents as being bound to the careful management of relationships in the tenacious pursuit of satisfying one's [survival] needs.

Table 5.3.1   *Conceptual indicators for sub-category RQ3:SC1*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
doing the right thing (x3); law-abiding; ethical; financial propriety; remaining legal; mediocrity; minimal effort; ethical contribution; habits; avoid mediocrity; quality; making the effort; accuracy; perfection; develop best practice; builds best-practice; comparative action; health and safety	*Doing the right thing (20)*
revised approach; improvisation; tailored to situation; digitisation; corrective measures; mundane tasks; tech influence; barrier to progress; external interference; contemporary attitudes	*Adapting (10)*
sources of knowledge; multiple sources (x2); multimedia learning; on-line learning; acquisition of skills; experience; enforced accuracy; enabling technology	*Learning (9)*
management of others; responsibility; key individuals; chastisement; awareness; consequences; impact on others	*Responsibility (7)*
commitment; noble purpose; wider purpose; beneficiary of actions; caters to close contacts	*Duty (5)*

N.B. Shows lead indicators only: see Appendix RQ3:SC1 for full table

Respondent **EX3** explains that responsibility, maturity of approach and the ability to serve a wider purpose usually develop with experience over time, whereas focus tends to be centred on the need for survival during the early years:

RQ3:SC1 #3 **EX3**	*"When making decisions as an entrepreneur you always have to consider who the ultimate beneficiary of your actions will be. Initially, your choices have to serve at least yourself and your customers, if only from a basic survival perspective; but when you become more established, your decisions need to serve a wider, more noble purpose, such as 'helping people transact safely over the internet' or 'preventing cyber-bullying of children via social media' etc."*

Respondent **ST12** characterises 'doing one's best' as acting in comparison and with respect to the actions of others in context; continually reflecting on how their actions may be improved upon, and reflexively responding (cf. RQ2:SC7) when faced with similar situations in future encounters, thus:

RQ3:SC1 #1 **ST12**	*"Learning how to do things well isn't just about doing them to the best of your ability; it's about remembering how others performed in similar situations, and incorporating what you see in to an adapted and improvised version; appropriate, relevant and specific to your own needs. As time progresses, this is what counts as experience."*

Similar to the above excerpt from **EX3**, respondent **ST13** also recognises the role that experience plays when making choices, pointing out that it adds to reputation and good management acumen in the habitual execution of one's duties, leading to recognition and respect as a dedicated professional, thus:

RQ3:SC1 #7 ST13	*"It's all about doing the right thing, all of the time. Most people generally make a point of keeping others in line, which of course is what management is all about. You soon get to know if you've been doing something that could bring the firm in to disrepute, and you're expected to correct it without question. If you perfect such an attitude by developing a habit of always acting properly to the best of your abilities, then it will stick, and continue to serve you well in later years."*

The need to nurture close relationships is also recognised as important to continued success:

RQ3:SC1 #5 EX5	*"Doing what you think is right carries with it a lot of responsibility, because you're making choices that will inevitably have some impact on others: fellow workers, customers, suppliers, and anybody else involved with helping your venture to make it past the first three years and still be around. It doesn't take long to realise that these individuals are key to your survival, so do everything you can to keep them happy – you'll soon know about it if you upset them."*

The role of technology in compelling its users to 'do the right thing' is mentioned by respondents **EX2** and **ST8**, where both understand the influence of technology from different angles. **EX2** extols the learning potential of on-line applications such as 'YouTube' and 'Vimeo' where any user may quickly acquire new skills by watching video demonstrations, thus:

RQ3:SC1 #2 EX2	*"Before the web came along, you either learned how to do something at school, looked it up in a book, or were shown in person, or by some TV programme dedicated to a specialist area - like DIY for example. Now the whole game has changed: you want to learn how to do anything – and I mean, anything – you can watch any number of 'demonstrator' videos on apps like YouTube or Vimeo. By combining the best elements from the various video tutorials, it's then very easy to formulate your own 'best practice' rendition. As ridiculous as I might sound, I have watched videos on how to cut an onion properly, how to cook rice so that it stays fluffy, wire an Ethernet plug, and even replace the oil filter on my car."*

On the subject of office productivity and workflow, respondent **ST8** explains how the recent emergence of on-line office applications encourage users to 'do the right thing' with respect to best practice and operating procedure. Such technologies are able to enforce strict *Compliance* (RQ3:SC6); thereby mitigating the temptation to *Cut-corners* (RQ1:SC9) or leave a job unfinished (RQ2:SC3), thus:

RQ3:SC1 #8 ST8	*"Being forced to perform your duties 100% correctly, and not being allowed to proceed to the next stage until you've complied in full may sound harsh, but that's exactly what technology can do when enforcing a standardised workflow. Whether you are picking items to fulfil an order in a large distribution warehouse, doing the accounts on-line, or completing an on-line questionnaire, there are no short-cuts; you simply have to get the job done accurately: no room for only half-done jobs anymore."*

Furthermore, technology is seen by respondent **ST11** as a complementary force working alongside (human) colleagues; the combined effect of which is to encourage best practice by encouraging users to develop *Habits* (RQ2:SC9) of critically reflexive (RQ2:SC7) awareness in all they do.

RQ3:SC1 #9 ST11	*"Do it well, or don't do it at all, is something that we have all heard parents or teachers say at one point or another, but the great things about working in a technological environment, surrounded by other so-called 'techies', is that you are very often compelled to do things right, and to the best of your ability anyway, because anything less will be criticised or rejected, either by your peers, the technology you're working with, or a combination of the two."*

Here, pressure from peers and the technology itself contribute towards enhanced levels of accurate engagement between user and machine, thereby maintaining a guaranteed level of quality in all work. Should any element of the process be lacking or unwilling, then it will be replaced by a more capable/willing human being, or alternative software.

5.3.2   RQ3:SC2 - Ecology and Sustainability

Indicated by a strongly emergent lead conceptual indicator, the sub-category *Ecology & sustainability* ranked highly in terms of its number of constituting properties (see Appendix S3). The lead indicator was closely followed by the concepts of *Capitalist imperative*, *Future planning* and *Tech-factors*. It was clear that respondents were of the view that *Ecology & sustainability* as a sub-category driving *Principled praxis* (core category for RQ3) was intimately tied to a capitalist future defined by technology.

Table 5.3.2   *Conceptual indicators for sub-category RQ3:SC2*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
ecological primacy; ecologically aware; sustainability; sustainable; durability; carbon footprint; guaranteed redeployment; resourcing; life cycle framework; device longevity (x2); concern for planet; potential for re-use; recycling devices; recycling; redundancy; repair or replace; innovative recycling measures; residual value; raw material processing; build materials; disposability; end of life plan; disposable culture; materialistic waste; disposal; electronic waste; built-in obsolescence; acknowledging waste	*Ecology & sustainability (29)*
profit & cash flow; financially driven; greed; true entrepreneurial spirit; capitalist imperative; capitalism; cost saving; forecasting; inequality; shareholder satisfaction; shareholder value (x2); financial implications	*Capitalist imperative (13)*
future consequences; future considerations; future planning (x2); unintended consequences; responding to external forces; slow realisation technological change (x2); enables connectivity; upgrade frequency; local access; lust for the new; infrastructure relocation	*Future planning (7)* *Tech-factors (7)*

N.B. Shows lead indicators only: see Appendix RQ3:SC2 for full table

Properties driving the definition of this conceptual category were concerned primarily with pollution of the environment arising from the disposal of end-of-life technological artefacts, and the endemic lack of awareness among those involved in all stages of development and production. Respondent **EX4** introduces the present state, as he generally perceives it:

RQ3:SC2 #8 **EX4**	*"All manufacturing industries are in desperate need of a rigorous framework defining the birth-to-grave journey of the raw materials they use: how they are ecologically resourced and sustainably re-manufactured in to consumer goods; followed by how the post-consumer items are then recycled at the end of their life. I worry that we will have poisoned the planet beyond repair before most even realise that such basic guidelines are even required."*

Respondents refer to a materially-obsessed, consumerist culture driven by relentlessly advancing technologies prompted by increasing consumer demand for enhanced feature sets, and a lack of information relating to the responsible end of life disposal of products.

When combined with the super-efficiencies brought about by instantaneous, boundary-free, multi-user communication, such a recursive socio-technical cycle was perceived as being responsible – partially or fully - for the high-velocity environments experienced by entrepreneurs and other business owners in the contemporary era. The situation was described by respondent **ST12**, thus:

RQ3:SC2 #1 **ST12**	*"Modern consumer culture now dictates that things – especially electronic things – should be disposed of and replaced, rather than repaired. This is a symptom of the way technology is changing in front of our very eyes, and any item that has been designed to be repaired indefinitely is not only bad for turnover, but bad for the customer too, who will be left stranded with a device that very quickly becomes obsolete. And if there's only one important lesson to learn from our friends at Apple, it's that customers will do anything to ensure that they continue to have the latest, shiniest model, and are prepared to part with considerable sums to keep it that way."*

A cycle of perpetual supply and demand is therefore seen to emerge: continued consumer demand for the 'next best thing' at whatever price drives the accelerating emergence of increasingly sophisticated technological artefacts, and the fervent emergence of those artefacts in response continues to fuel an insatiable increase in consumer demand. The situation was succinctly outlined by respondent **ST13**, thus:

RQ3:SC2 #2 ST13	*"If we could only teach people that it's OK to use a cell phone, car or computer that's more than five years old, and we could get manufacturers to significantly increase the elapsed time between version releases, then we might start making progress. Unfortunately, we can't, because (a) the pace of technological advance will not slow down, and so frequent upgrade is a necessity if these devices are to stay compatible, and (b) the drive to make more and more money, and grab a bigger market share to keep shareholders happy with ever-bigger dividends overrides all. Yes, greed trumps all anyway, even if you could slow-down the technology."*

Reading the foregoing narrative illustrates why the *Capitalist imperative* plays an important part in conceptually driving this sub-category: short-term consumer demand and the bottom line cannot be divorced from long term issues relating to ecology and sustainability. Respondent **ST12** elaborates further to help clarify the practicalities of the situation, thus:

RQ3:SC2 #3 ST12	*"Everything we manufacture has a very short lifespan – 18 months at best is the current guideline. It's not something we plan intentionally, as we're simply responding to consumer demand. Every six to nine months our entire product portfolio is upgraded just to keep up with the competition and trends in the market. Not only that, but our suppliers will regularly update the firmware [software hard-wired in to a device] and chipsets that the products are based on, so we have to jump whenever they jump. It's very wasteful on one hand, but on the other, it keeps the cash flowing and turning over."*

From this description, vendors appear to be in lock-step with manufacturers who determine the availability of hardware, and consumer demand determines the advanced feature sets for inclusion in future versions of the products that manufacturers produce. This is simply another rendition of the cycle of perpetual supply and demand elicited earlier.

End-of-life issues for consumer and commercial technological hardware prevailed in the narratives representing this sub-category. Simply stated, all parties concerned - manufacturers, distributors, vendors and users - were complicit in their lack of awareness relating to the responsible disposal, re-deployment or recycling of consumer electronic goods.

While some respondents despaired about the current and future state relating to responsible disposal, others were already engaging with innovative pilot projects aimed at rejuvenating electronics hardware; some of whom were refurbishing and redeploying devices for a second useful life in developing nations:

RQ3:SC2 #9 **EX2**	*"I was pleased to discover that many of our old wireless router products now end-up in Africa, where solar-energy is used to power them and provide a wireless connection to the internet for a whole village. The guy doing it – who is a true entrepreneur of the future – realised the potential for these devices, and asked us to send all our old units to him, which we gladly did."*

Other respondents declared a neutral carbon footprint in all of their commercial activities:

RQ3:SC2 #4 **EX7**	*"The carbon footprint of what we do here at [company name] is roughly neutral – possibly even negative if you count the number of trees we have saved by transferring all data that was previously maintained on paper record in to digital CRM format. OK, some may claim that carbon power is needed to power the servers and drives that store the data, but what if I told you that our primary data centre has recently been re-located to Iceland, where 99.98% of their grid power comes from geothermal generators? And the best bit? It's 40% cheaper to run than our previous data centres in London and New York."*

Respondent **EX6** called for a shift from capitalist attitudes that focussed on maximizing profits and shareholder value, to raising awareness of ecological and sustainable issues:

RQ3:SC2 #5 **EX6**	*"Focus has to be shifted away from capitalist attitudes associated with maximum profits and shareholder value, to an increased awareness of limited resources, sustainability and the reduction of inequality. If we can teach this stuff to kids and business school students, then we just might have a future to look forward to. However, as somebody who has personally benefitted from the very social ills of the modern world to which I am referring, it would be remiss – even hypocritical – of me to try and change things."*

Continuing with themes of re-education and increased levels of awareness, respondent **ST9** lays the foundation for a series of questions that ecologically-concerned consumers should ask of a new device before committing to a purchase:

RQ3:SC2 #6 **ST9**	*"Is the outer casing made from naturally degradable polymers? Are the internal metals easy to reclaim and recycle? Has a dedicated end-of-life pathway been planned for the 1 million plus of these devices you are planning to manufacture? Will you be providing the consumer with a post-paid bag to send it back when they upgrade? Will upgrade to the next version be heavily discounted on return of the old model? Only a small fraction of today's producers are in a position to answer 'yes' to just ONE – never mind all five – of these questions."*

Respondent **ST11** suggests that all those involved in the manufacturing and distribution chain have a moral responsibility to uphold in terms of the impact their present activities may be having on future generations. By asking questions similar to those suggested by respondent **ST9**, and nurturing *Reflection & Reflexivity* (RQ2:SC7) as well as *Habits* (RQ2:SC9) that consider and *Invite a future state* (RQ2:SC11), today's decision makers could have a dramatic impact on the future, thus:

RQ3:SC2 #7 ST11	*"Those involved in the design and manufacture of new products have a moral duty to us all: they have to be able to imagine where the artefacts and gizmos they are producing today will be in five, ten, or even twenty years' time. It's safe to say that 100% of today's output will have been supplanted many times over by more advanced versions within 3-4 years – let alone 5. Just think of your last cell phone: I doubt you had it for more than 4 years, right? Where do you think it is now? Based on current WEEE [Waste Electrical and Electronic Equipment Directive] recycling statistics, there's an 80% plus chance that it just went straight in to a poisoned land-fill somewhere, and probably not even in this country."*

5.3.3   RQ3:SC3 - Life-work balance

Life-work balance was the most weakly-expressed sub-category responding to RQ3, ranking lowest among the group of core categories informing *Principled praxis*. However weakly expressed, the properties responsible for driving the conceptual emergence of the category were noted to relate primarily to family and health, coupled with *Realistic expectations* and the need for strategic *Exit planning*, thus:

Table 5.3.3   *Properties Driving Conceptual Emergence for RQ3:SC3*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
busy fool; impact on health; life satisfaction; health and well-being; seek help; pseudo-entrepreneurs; self-reliance; sharing the burden; loss-making trap; challenges of venture creation; time with family; misguided belief; needless stress; needs to be enjoyable; burden-free; lone warriors; needs to be profitable; quality of life; unfulfilled life; control of own destiny	*Life-work balance (20)*
knowing when to walk away (x2); sold as going concern; work ethic; experienced mentors; contingency planning; contingency plans; business acumen; realistic outlook; acting immediately; early recognition; easy in hindsight	*Realistic expectations (12)*
exit planning; exit strategy (x2); recognising failure; clean shutdown; experience of failure; graceful departure	*Exit planning (7)*

N.B. Shows lead indicators only: see Appendix RQ3:SC3 for full table

This category exhibited close ties with *Control* (RQ1:SC2), where respondents recalled their steady battle with the need to restore balance – via the exertion of control - in response to change (RQ1:SC1) of one form or another during the start-up years; entropic change that could lead to premature ruin if not acknowledged and responded to.

Conceptual overlap was also exhibited with the sub-category *Commitment* (RQ3:SC5). This was mostly on account of the strong emotional ties noted to exist between family, colleagues and the endogenous/exogenous environmental forces; forces that ultimately meet or challenge their combined ability to meet the needs essential for survival or to enable higher levels self-actualisation to be achieved.

The careful maintenance of a *Life-work balance* featured as a key enduring challenge brought about by a steady stream of demands on the entrepreneur arising variously from statutory *Compliance* (RQ3:SC6); *Adapting to change* (RQ1:SC1) prompted by the ever-present need to 'keep-up' with technological progress; and the need to adopt a positive, life-long attitude to *Learning* (RQ2:SC1) as a way of maintaining the relevancy of their skill-set and remaining *Competent* (RQ1:SC6).

Realising that balance between life and work represents a key indicator of short- and long-term success, respondents refer to the need for a continuous and pragmatic approach to business when weighing-up the amount of 'life' forsaken in exchange for the benefits associated with running a business. For example, respondent **EX3** refers to himself as a 'busy-fool' when working 80-hour weeks during the early years in order to maintain a significant turnover, while yielding almost no profit. Knowing when to quit therefore featured as an important hallmark of experience, thus:

RQ3:SC3 #6 **EX3**	*"To protect my sanity and the long-term well-being of my family, I have walked away from businesses in the past. Twice actually. Both ventures had survived the bumps and humps of the early years as typical start-ups, and were thriving in their respective sectors. On paper the turnover was very healthy – in the millions – but the profit was not so good. After paying all the overheads associated with the business, what remained in terms of gross profit just wasn't worth the effort. I had been working 80-hour weeks, never saw my family, and was beginning to miss-out on the kids growing up – all for a director's salary of about £22,000p.a. Life as a 'busy fool' just wasn't worth it. So I sold both businesses with full disclosure of company accounts to the buyers, so they knew what they were getting in to. Both firms failed within 12 months of being bought."*

Respondent **ST15** highlights the plight of past entrepreneurial colleagues who failed to make a success of any of their venture(s), and although he does not offer reasons for individual cases of failure, in subsequent conversations[14] he revealed that they were incapable of striking the correct balance between work and real life, suggesting that such individuals would have perhaps been better suited to conventional (salaried) employment, thus:

RQ3:SC3 #2 **ST15**	*"I know many so-called entrepreneurs who have been trapped in loss-making ventures for years, convinced by the misguided belief that 'one day' things will turn around and they will make their fortune. Of course, this never happens, and those poor guys live desperately unhappy lives, having given up all hope of making a success of things and often dying prematurely from exhaustion and overwork."*

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[14] *Field Note FN15:13*

Respondent **EX5** explains that part of the life-work balance entails knowing precisely when and where to draw the line, thus:

RQ3:SC3 #4 EX5	*"Recognising when your venture isn't working is vital; and acting immediately on this recognition, even more so. In the early years I naively re-financed my home and maxed-out all credit cards to raise the capital for a new idea that I was convinced would be the 'next big thing' on the Internet. The stress and worry associated with the financial risk just wasn't worth it in hindsight: I became seriously ill through lack of sleep and obsessive worry; the business suffered as a consequence and almost failed. Fortunately, a friend recommended I get in touch with an old business mentor of hers; an experienced entrepreneur with twenty or so years, and just as many companies under his belt. We met, and he decided to bail me out there and then. OK, he now owns 51% of my company, but I ask you to consider which is better: 100% of nothing, or 49% of a business which has an annual turnover of twenty-five million dollars? Sometimes you simply have to share the burden when it is so abundantly clear that you can't manage on your own. To do otherwise, is, well, just stupid. Thankfully, I was taught this lesson at a very early stage without being burned. Unfortunately though, there are plenty of others who are prepared to just fail, never having anything to do with business again."*

Another respondent makes reference to the need for a well-considered exit strategy:

RQ3:SC3 #3 EX1	*"To be fair to yourself and others, you must have a well thought out exit strategy in place for each venture. Should things not work out, for whatever reason, then you can sell the business on, or gracefully wind it down with minimal debts or other lingering contractual obligations. It's such a simple bit of forward planning, yet many – especially those who have yet to experience significant failure - don't give it a second thought. Of course it's easy for me to say this now, because I've been at the head of several failed ventures over the years; and it's only because of those failures that I now recognise the absolute need for a well thought-out exit plan."*

Knowing whether to continue, sell the business as a going concern, or exit gracefully via a pre-considered plan was seen as a sign of entrepreneurial maturity among respondents, and was something that could only be fully appreciated once failure had been (repeatedly) experienced.

The excerpt below refers to the early influence that the parents of respondent **ST12** exerted over his future career path, and could be equally relevant to the sub-category *Prior exposure* (RQ1:SC7). However, analysis of the wider narrative indicates that the discussion here was more concerned with how one strikes a balance between life and work by learning from others, thus:

RQ3:SC3 #5 ST12	*"My parents were both self-employed programmers from age 16 right through to retirement, and, although I'm not in the same line of work – I'm more of a hands-on hardware guy - I guess that a certain amount of their work ethic and business acumen has rubbed-off on me over the years. I always looked-up to them and recognised, even at an early age, that they were in business to guarantee that they had direct and total control over their quality of life. They were – and still are – totally self-reliant, and when I get to the later decades of my life, would like to be exactly as they are now: happy, without debt, and enjoying every moment of life."*

5.3.4   RQ3:SC4 - Universal good

This category exhibited strong conceptual overlap with *Doing the right thing* (RQ3:SC1), and although it did generate some concern during the analysis stage (see §4.6.3), a subsequent review of the underlying empirical data helped to resolve the issue, with the sub-categories concerned remaining unchanged.

Universal good focusses on elements of duty as observed and executed for the common good during the operationalisation of a new venture. Its conceptual expression is driven by properties relating to mutual trust, community, social interaction, quality of life, and welfare, and represents a broader-scoped instantiation of the aforementioned category *Doing the right thing* (RQ3:SC1).

Table 5.3.4   *Conceptual indicators for sub-category RQ3:SC4*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
mutual referral; mutual respect; mutual trust; unlikely alliances; loyal fan base; connected stakeholders; community of professionals; exchange intelligence; wider benefit; improve quality of life; altruism; "do unto others as you would have them do unto you"; social interaction; welfare of others; social consequences	*Universal good (15)*
questioning purpose; self-reflection; inviting a future state; concern for future; guiding principle; continuing success; ground rules; forward planning; best practice; business decisions; historical record; communities of practice	*Critical inquiry (12)*
honest dealings; unethical; poaching talent; superficiality; greed; immorality beware automation; benefits of technology; purpose of technology; advances in field; ground-breaking technology; data storage blinded by financials; capitalist imperative; corporate hypocrisy; wealth accumulation; financial independence; vested interests	*Conduct (6)* *Emerging technology (6)* *Capitalism (6)*

N.B. Shows lead indicators only: see Appendix RQ3:SC4 for full table

A review of the properties driving the lead conceptual indicators of the category reveal that *Universal good* is supported by a *Critical* approach to inquiry, where *Conduct* is characterised by honesty and an ethical approach. The antipodal properties indicated here, however, suggest that the correspondingly positive dimensions in contemporary entrepreneurship may be largely absent.

Respondent **EX7** denounces aspects of greed that he has clearly encountered during his entrepreneurial years, claiming that there is little point in business for those focussing solely on the accumulation of wealth. He calls for a greater observance of mutual well-being and the active deployment of technology in realising this; although he fails to expand any further on this point – instead preferring to give a health warning about the dangers of 'total automation', thus:

RQ3:SC4 #6 **EX7**	*"What's the point of all the things we do every day – this so-called 'busy-ness', if it isn't to improve lives and lessen the burden somehow – no matter how small? That's the whole point of technology, surely? Unfortunately, greed gets in the way, and for some, it's a race to the end…but for what: to see who can die with the most money in the bank? We all need to stand back and realise that we need to concentrate more on the wellbeing of others, and less on money. The so-called capitalist imperative to work has much to blame for this, but I think technology can play a huge part in helping us to do this, but the dark side of total automation also needs to be carefully mediated."*

As indicated in Table 5.3.4, *Capitalism* is a conceptual indicator defined by dimensional properties that describe financial independence and the accumulation of wealth, but the table also reveals that the contemporary case is supported by an increasing reliance on *Emerging technology,* coupled with a responsible level of *Conduct* underscored by *Critical inquiry*. Could this be indicative of how contemporary entrepreneurs collectively perceive the 'Universal good'? The narrative of respondent **EX6** offers some clarification on the issue:

RQ3:SC4 #2 **EX6**	*"I think most entrepreneurs would admit that they're in it for the money first-off, and secondly for the independence that being your own boss brings. I'm not so transparent, in that I have a wider perspective in terms of who I'd like to benefit. I'd go so far as to say that I want everybody I come in to contact with to benefit from the fortunes of my business dealings in one way or another. Customers, suppliers, family, friends, and even – yes, even – competitors. I don't ever expect anything in return except for complete down-the-line honesty. Once that fine thread of trust is broken, by being ripped-off or scammed in any way, then I let them know about it, and ditch them."*

Respondent **ST8** was resigned to a more cynical view of servitude under the traditional work imperative, claiming that once a venture had outgrown its 'start-up' status, it was time [for the entrepreneur] to move on:

RQ3:SC4 #1 **ST8**	*"When you realise that everything you are doing and working towards only serves to benefit the financial interests of corporate investors or remote stakeholders, then it's probably time to start thinking about your next venture."*

Respondent **EX1** offers a possible solution to remedy the perceived lack of morality and greed he experienced in his business dealings over the years. He unwittingly relates his version of the 'universal good' according to a well-known Kantian maxim, thus:

RQ3:SC4 #3 EX1	*"'Treat others as you would expect to be treated yourself' is the one thing that I remember my Granny teaching me from way-back-when. That one guiding principle has never left me, and I am convinced that it's the only reason why I am where I am now."*

Respondent **EX4** turns his attention to the perceived lack of universal good demonstrated by large technology vendors, citing the irresponsible way in which they profligately target children in pursuit of corporate profits. Although his narrative excerpt resonates deeply with the sub-category *Ethics & morals* (RQ3:SC11), the commentary was felt to be more in line with the present concept, thus:

RQ3:SC4 #7 EX4	*"It upsets me when huge corporates try to give the appearance of 'doing good' for the benefit of all; yet at the same time they are the biggest distributors of mind-numbing games that play [prey?] on kids to progressively extract increasing amounts of money from their parents, to pay for 'gaming points' and other 'virtual' add-ons that don't even exist in the real world. The social consequences of such overt greed aimed directly at kids does not have a good outlook."*

The narrative excerpt of respondent **ST13** adopts a more conciliatory note, where he describes how mutual trust should be extended even to those traditionally viewed as competitors, citing its long-term benefits and the possibility for mutual respect in an atmosphere of healthy rivalry:

RQ3:SC4 #4 ST13	*"Our corner of the tech sector is highly specialised and we all know one another well, even though we are – strictly speaking – competitors and should be at loggerheads. However, that just is not the case. We all get together for socials every couple months or so, exchanging the latest chit-chat and information on bad suppliers, late payers etc. and talk about the latest developments in our industry. We regularly refer work to each other if, for whatever reason, one can't fulfil the order and another can. There's just one rule that we all abide by: 'Don't poach customers or staff'. So far, not one breach!"*

5.3.5   RQ3:SC5 – Commitment

A review of Table 5.3.5 indicates that the three dominant conceptual indicators driving the sub-category *Commitment* focus on a sense of duty to one's self, family, colleagues, and dedication to a venture that is expected to meet the continuing and future needs of those involved in its creation. *Capitalism* is perceived as the underlying economic orthodoxy that fuels and encourages contemporary entrepreneurial commitment, as are

the benefits of self-employment and self-sufficiency that characterise the entrepreneurial *Independence* of spirit.

Table 5.3.5   *Conceptual indicators for sub-category RQ3:SC5*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
helping others; duty; ease of delegation; family man; time with family; enduring; importance of family; life bonds; colleagues as family; family business; purpose; common journey; dedication to work; work prioritisation; provide for family; provide for loved ones; best endeavours; realistic outlook	*Commitment (18)*
growth imperative; venture capital; performance indicators; remote stakeholders; external investors; long term impact; targets; founding stakeholders	*Capitalism (8)*
benefits of self-employment (x2); benefits of wealth (x2); subsistence; business as provider; self-sufficiency; consequences of failure	*Independence (8)*

N.B. Shows lead indicators only: see Appendix RQ3:SC5 for full table

Respondent **EX5** supports the conceptual prevalence of *Independence* by noting how a sense of pride in the ability to retain one's own independence was seen as the ultimate arbiter of freedom, highlighted in preference to normative (capitalist-oriented) growth strategies associated with the progressive accumulation of wealth, thus:

RQ3:SC5 #5 EX5	*"Most entrepreneurs would argue that they are not in it for the money, but to simply provide for their family. Of course, if they get things right then the financial benefits will usually follow; but not always. A number of my contemporaries are quite happy to run their businesses not according to an all-out 'dominate the world' growth strategy, as is the general perception of entrepreneurial life, but to keep things running on a sustenance level, where employees are compensated well for their efforts, and the company ticks-along without the need to fulfil ever-demanding and onerous sales targets. The only stakeholders that need pleasing are the founders themselves: professional investors, VCs and the like are not welcome."*

A firm commitment to family and colleagues was also expressed by many of the narrative excerpts driving this sub-category, with respondent **EX6** explaining how life-long family-like bonds and kinship often develop between (entrepreneurial) colleagues after enduring sustained periods of hardship together, thus:

RQ3:SC5 #8 EX6	*"It helps to view your co-founders and colleagues as part of a small, tightly-knit family during the start-up years. When you're all 'in it together' at the beginning, rising and falling with the good and bad times, lasting bonds that would otherwise never be created in the confines of a conventional workplace are formed. Even though you may eventually go your different ways, to have gone through such trials and tribulations together – and survived them – means you'll probably know these people for many years to come, if not the rest of your life."*

Respondent **ST10** further elaborates on the sense of duty that is seen to develop between colleagues during times of hardship, and, unlike the aforementioned kinship, also extends

to customers and others who make any kind of contribution to the well-being and continuing survival of the venture:

RQ3:SC5 #4 ST10	*"You ensure that your friends and family are looked after and provided for out of a sense of duty – it's not just about the money, although plenty of that can help, too. That same sense of duty also compels you to do the very best you can for customers when helping them to resolve their problems."*

A cautionary note from respondent **ST14** is raised on the very real possibility of failure for entrepreneurs; especially those with, or who are planning to have, young families:

RQ3:SC5 #1 ST14	*"Family is what makes you get up every day. It's what drives you and gives you a purpose in this life. You need to provide for them, and running any kind of business has the potential to fulfil this need. The flip side is that if you fail, you'll likely lose your home and your family will desert you. So, going it alone is not an option for the faint hearted."*

Contrastingly, respondent **ST15** provided an alternative viewpoint from the perspective of somebody who is committed to work, rather than family life, thus:

RQ3:SC5 #2 ST15	*"I've always been married to my work, so I don't think I'd ever be able to give enough of myself to a family situation without continuing to put work first. Some say that I'm selfish, and I guess that I am to a degree; but I just see it as being realistic, knowing the type of person I am. I think it was the French actor Gérard Depardieu that once said: 'I work to live, but I will never live to work' – well, that pretty much sums-up my attitude to life, too."*

Celebrating liberation from the strictures (see RQ1:SC1, SC2, SC3) associated with traditional paid employment (authority figures, the daily commute, office politics etc.), respondent **ST10** expresses his unceasing commitment to a future life of self-employment, thus:

RQ3:SC5 #3 ST10	*"Being your own boss allows for additional benefits, over and above those enjoyed by people working a standard 9-5 day. Once your company can run itself without your micro-managerial interventions, you find that you can delegate, and vacation any time you choose, taking the occasional day off here and there to spend time with your loved ones. I could never work for anybody else ever again. The loss of freedom would be unbearable."*

For respondent **ST15**, commitment to the protection of his family turns to an attack on the widespread and potentially damaging forces presented by multi-user gaming and social media. The effects that such platforms were having on the mental and social abilities of children are thus far under-reported, and the helplessness he feels as he sees youngsters senselessly 'glued' to their gaming consoles and smart-devices is palpable:

RQ3:SC5 #6 ST15	*"Social media has turned many of the kids I know in to antisocial morons. How the heck are they going to function in a future society that thrives on networking, socialisation and good old face-to-face chit-chat? I salute those parents that impose an outright ban on smartphones and gaming consoles; no matter how much pressure the kids get from their peers, or the kids put on their parents, it will pay-off for sure in the long run."*

Along similar lines, but somewhat contrastingly, respondent **ST8** expresses his continuing support of a purposeful engagement with social media, encouraging his children to use it as a productive and positive marketing tool to promote the family firm, thus:

RQ3:SC5 #7 ST8	*"My two sons and daughter are already showing an interest in the family business: my daughter works for us on Saturdays maintaining the company profiles on Twitter, Instagram and Facebook. After all, she represents the new generation who understands this stuff, and I just let her get on with it. She's fiercely protective of the firm's reputation and will defend it to the end when faced by a customer or competitor who is intent on damaging our image."*

5.3.6   RQ3:SC6 - Compliance

Compliance (RQ3:SC6) was closely allied – albeit as a mirror opposite - with the sub-category *Cutting corners* (RQ1:SC9), in that its constituting narratives focussed on how technology was helping to reform – whether remedially or by force – many of the dubious actions referred to by respondents in *Cutting corners*. The *Cutting corners* narratives inferred that such actions arose in response to the respondents' need to *make sense* of the changing environment in which their new ventures were trying to survive *and* thrive; thereby contributing towards the core-category emerging in response to RQ1: *Sense-making*.

Table 5.3.6   *Conceptual indicators for sub-category RQ3:SC6*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
compliance checking; enforced rigour; forced completion; child crime; real-time information; strict enforcement; enforced compliance (x2); keen compliance; protective legislation; improved security; wilful wrong-doing; financial crime; statutory enforcement; petty fraud; impropriety; financial impropriety	*Compliance (17)*
automated audit; automated audits; accounting systems; cash flow; permanent record (x2); forensic proof; cash society; activity logging; stoppage calculations	*Audit trail (10)*
delaying payment; delaying tactics; desperate measures; survival measures (x2)	*Survival measures (5)*
past practices; continuing practice; strategy; manual processes; accepted norms	*Practice (5)*
automation (x2); digital efficiency; digitisation; cloud technology	*Digitisation (5)*

N.B. Shows lead indicators only: see Appendix RQ3:SC6 for full table

Compliance (RQ3:SC6) is a sub-category driven by properties that describe how respondents address past indiscretions or misdemeanours, some of which were referenced in RQ1:SC9. By working with technology to comply with the various statutory and legal demands associated with venture operation, they were encouraged to develop *Habits* (RQ2:SC9) of best practice by responding to the thoroughness (RQ2:SC3) and attention to detail forced upon them by contemporary software applications. For example, respondent **ST11** recalled how he would previously delay payments to suppliers in order to preserve cash flow as an interim means of prolonging survival, thus:

RQ3:SC6 #2 ST11	*"Claiming that 'we hadn't received the invoice,' or that 'the cheque must have gone missing in the post' were all used as delaying tactics to hold on to cash for a few extra days. Yes, it gets that desperate when you're first starting out, and you know it's wrong but continue to do it anyway. I would have no shame in saying that I would do it all over again if my firm's survival depended on it. Unfortunately, 'cash is king' as they say, and without it, you're dead."*

…but recent developments in technology now ensure a much higher degree of compliance, by forcing correct procedures and workflows – and at the same time – best practice; especially with respect to accounting and financial operations. Technology had thereby reduced or eliminated the temptation to engage further with any duplicitous activity, as described by respondent **EX6**:

RQ3:SC6 #4 EX6	*"The temptation to engage in petty fraud has been minimised now that accounting systems require rigorous compliance with reporting conditions. Audit logs are maintained in digital format indefinitely, and are all fully searchable; meaning that it's that much easier to spot outlying abusive patterns or trends among a given sample."*

Technology, with specific reference to remotely-based cloud-based application (cf. *Locus of operation* – RQ1:SC5) is further cited by **EX3** as an enabler and guardian of principled, proper practice, thus:

RQ3:SC6 #5 EX3	*"Owner-managers will do anything they can to remain within the law, and fortunately, the latest cloud-based accountancy and management information systems enforce a rigorous degree of compliance. It's not as easy as it once was to circumnavigate systems that have now moved from being manual and paper-based, to wholly digitised and on-line. The checks and balances that were once subject to occasional, manual scrutiny now happen as a matter of course, transparently, and without you even being aware of them."*

Similarly, respondent **EX2** highlights how 'real-time' reporting is now deployed by government departments to ensure that employers fully comply with the various rules that relate to the employment of personnel such as the working time directive;

paternity/maternity pay, statutory sick pay; tax deductions from source; holiday pay and the national minimum wage, thus:

RQ3:SC6 #6 EX2	*"Because of the prevalence of automated reporting and audit trails, employers simply have no choice but to abide by the law. With real-time on-line payroll reporting for example, the revenue department can immediately tell whether an employer is paying less than the minimum wage or not making the right deductions from pay, along with a whole host of other metrics. The systems are so automated that they don't permit you to cross that line, even if you want to; they simply won't allow you to complete a process or proceed to pressing the 'submit' button until all of the data entered has passed through the necessary checks and balances, all in real time."*

One respondent also referred to the permanence of data and its power as a long-term deterrent, should the need arise to forensically prove any historical wrong-doing, thus:

RQ3:SC6 #7 EX5	*"Trying to get around the system just isn't worth it these days. Mis-declaring tax returns or falsifying accounts no longer pays, as digital audits accompany every on-line transaction made. Even though you may think you've permanently deleted an invoice or record of payment, fact is that it has simply been rendered in to a 'ghost' record; invisible to you, but designed to stand-out in an investigative audit log."*

The permanence of data in the form of a digital footprint containing historical audit and activity logs is therefore seen in this respect as a positive force for good, which is in direct contrast to the concerns expressed in *Privacy & identity* (RQ3:SC10), where respondents expressed concern for the safety and protection of personal data, should such data ever be compromised.

5.3.7   RQ3:SC7 - Copyright & Intellectual Property

Respondents in this sub-category expressed concern relating to issues of copyright and intellectual property (IP), which was mostly negatively charged and directed not only towards the producers and vendors of the sharing platforms used to facilitate the illicit copying and distribution of content, but also towards those users who gained advantage from the piracy of protected material, without any concern for the associated legal implications to do with theft, copyright infringement and the erosion of corporate profit. Respondent **EX5** succinctly explains the situation:

RQ3:SC7 #2 EX5	*"The music and movie industries are having a hard time fighting against the widespread digitisation of their catalogues. Apple, Google, NetFlix and the like are already moving in on their territory, and if the old incumbents don't change their business model soon, there will be no business left for them."*

The eight narrative excerpts driving this sub-category expressed a strong affinity with other sub-categories in the group responding to RQ3; all of which pointed to the need for a *Principled praxis* (RQ3 core category) in business ownership and management, whether expressed entrepreneurially or not. Overlapping and relevant properties were also exhibited in several other sub-categories, namely *Principled action* (SC1); *Universal good* (SC4); *Compliance* (SC6); *Privacy & identity* (SC10) and *Ethics & Morals* (SC11).

Table 5.3.7   *Conceptual indicators for sub-category RQ3:SC7*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
intellectual property rights; intellectual property (x2); anti-competitive; protect content; futility of on-line protection; futile countermeasures; patent acquisition; patent infringement; content protection; greed; data security; intentionally vague; inhibits creativity; inhibits innovation	*Copyright & Intellectual Property (15)*
open source; open source approach (x2); freely adaptable; copy 'left'; migration; copyright-free; commercially viable; steep learning curve; license-free; acknowledges authorship; practical approach; open access model; public domain	*Open source (14)*
enabled by technology; enabling; technological change; transformative; digitisation (x2); automation; transferability; portable content; digital content	*Digitisation (10)*
eroded profit; paid-for content; try-before-buy rationalisation; future model; distribution model; business model; publishing industry; publishing model; publishing	*Distribution model (9)*
vendor distancing; vendor lock-in; corporate domination; license costs; overheads; low quality; powerless	*Vendor power (7)*
on-line availability; on-line search; streaming services; widespread distribution; flat access fee; free distribution	*Accessibility (6)*
petty misdemeanour; unauthorised copying; known contravention; content piracy (x2)	*Impropriety (5)*
survival measures; threat to survival; adapt	*Survival measures (3)*

N.B. Shows lead indicators only: see Appendix RQ3:SC7 for full table

Categories concerned with duplicitous or nefarious activity had strong foundational ties with the sub-categories of other research questions too, such as *Cutting corners* (RQ1:SC9), and less-obvious links relating to the convenience afforded by such actions, such as those described by *Access to knowledge* (RQ2:SC4) and *Habits* (RQ2:SC9), which could be indicative of an habitual need (dependency?) for accelerated inquiry driven by enabling technologies such as the 'dark-web'[15] and 'torrent streaming'[16].

The protection of one's own intellectual capital, whether in the form of a product design and specification, software application or other novel technology, was important to a

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[15] *'Dark' web: Part of the world-wide-web hidden from regular users, allowing users to remain anonymous and untraceable. Only accessible via specialised software.*
[16] *'Torrent' streaming: A communications protocol for peer-to-peer (P2P) file sharing. Commonly used for the illicit sharing of copyright content.*

number of respondents (e.g. **EX4**; **EX5**; **ST8**; **ST15**); one example of which is highlighted by the following narrative excerpt:

RQ3:SC7 #1 **EX4**	*"The free and seemingly unrestricted interchangeability of digital content facilitated by modern telecommunications has radically altered a number of industries, but those that first spring to mind are the music, gaming and book publishers who are powerless to prevent the digitisation and widespread copying of their intellectual property; engaged in a constant battle against websites that enable users to locate their desired movie, sound-track or book that exist in abundance. Everybody knows that it is illegal and in direct contravention of most Western copyright laws, but for some reason, proceed and commit the crime anyway. As for me, if I like a film, book or music track enough I might do a 'cheeky' illegal download to see if I like it first, and then if I do decide to keep it, will proceed to pay for it without hesitation. It's just a modern-day equivalent of try before you buy."*

This respondent, while bemoaning the actions of those engaged in content piracy within the industry that he depends upon for his survival (software consultancy), concludes paradoxically by admitting that he himself engages in such activity – therefore becoming part of the problem - attempting to downplay his actions by referring to 'cheeky' illegal downloads under the auspice of a self-appointed 'try-before-you-buy' approach. Respondent **EX6** explains that piracy is an unfortunate and inescapable side-effect of mass-digitisation, thus:

RQ3:SC7 #6 **EX6**	*"We have to adopt a practical attitude towards the impact that technological change is having on the protection and distribution of data. The problem is that once something has been digitised, there is very little that can be done to prevent its widespread copying, which amounts to theft, no matter which way anybody looks at it."*

The activity seems to extend beyond copying for personal use, with excerpt #4 from sub-category RQ3:SC7 suggesting that copyrighted content is also copied and resold for profit:

RQ3:SC7 #4 **ST15**	*"Those that profit from the dissemination of information, whether it be digitised music, videos or other on-line content are facing real problems when it comes to the protection of their intellectual property. They are more-or-less powerless when it comes to others making copies of their content and selling it on at a lower price."*

Several respondents indicated that the illicit trading of copyright material was prevalent across all types of digital content, and did not distinguish between content-type, whether music, films, e-books, games, or software applications. The underlying and common attribute driving the phenomenon was the digitisation of copyright-protected media

enabled by recent advances in communications technology, facilitated by the widespread and instantaneous distribution of such content.

Respondent **EX7** attempts to allay any fears regarding the future of widespread content piracy by citing the recent advent of services such as 'Netflix', 'iTunes' and 'Spotify'[17]; all of which are subscriber-based platforms based on a content 'streaming' model. Here, vast repositories of popular content may be accessed for a modest all-inclusive subscription fee, where the ability to copy and store content has been severely curtailed, thereby removing the ability to distribute the content any further; especially to those who are not willing to pay. He describes the advent of such services thus:

RQ3:SC7 #7 **EX7**	*"Every countermeasure that has been implemented so far to protect software, music or other forms of paid content has failed. However, by allowing unrestricted and unlimited access to all of their content for a flat monthly fee, services like Spotify and Netflix have convinced customers to part with some money on a regular basis in return for their content, which can only be streamed for immediate viewing, and only temporarily stored, but not duplicated. It's a good idea, but there are still those out there who are determined to compromise such services. It's a never-ending battle unfortunately."*

Such approaches offer a possible step in the right direction as they close-down conventional routes to piracy, thereby making it increasingly difficult for novice opportunists; but as with systems security in general, determined individuals will always find ways to counteract the increasingly sophisticated protection and encryption measures that accompany the progressive digitisation of content, as indicated by the foregoing narrative of **EX7**.

Excerpts driving the concept suggest that streaming services represent an intermediate step towards a future state where content may become fully protected, and as vendors begin to design smart devices (e.g. tablets and smart-phones) able to install and run proprietary content from their internally sponsored 'on-line' stores (cf. Apple iTunes, Apple AppStore, Google Apps. etc.), the days of free-for-all piracy may be numbered.

The global patent system did not escape the attention of respondents (e.g. RQ2:SC1#4; RQ3:SC7#3), especially those whose entrepreneurial activities are focused on the research and development of new products and services. For example, respondent **ST8** describes how the global patent system serves to routinely inhibit creativity by creating

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[17] *Popular media-streaming services*

an anti-competitive and dominant stranglehold on whole conceptual areas, thereby preventing new entrants from participating from contributing to the design and development of truly novel artefacts:

RQ3:SC7 #3 ST8	*"Did you know that you can search for any patent on-line? For us, this has been a game changer, but not for the better. Patents are now being filed that are so insanely vague, they effectively prevent other providers from developing products that have even the remotest resemblance in terms of name, appearance, form or operation; and are therefore inhibiting the usual creative and innovative processes on which smaller firms thrive. It means that the larger companies are on their way to gradually 'owning' whole conceptual areas, for now and the foreseeable future. This is completely anti-competitive, and unfortunately technology is complicit in facilitating its ruthless efficiency at spotting potential infractions. Look at Apple and Samsung for example: they are two large corporates known for stock-piling patents, either by acquisition, outright purchase, or generation from source."*

One solution may lie in the wide adoption of open source models, currently pertaining to software licensing and distribution, but which may provide future protection for other types of content, as explained by respondent **ST14**:

RQ3:SC7 #5 ST14	*"All software should be published in the spirit of the open source GNU 'copy-left' licensing agreement, where software is placed directly in to the public domain, uncopyrighted. GNU allows private and business users alike to freely use and copy software as they see fit, so long as the original author attributes are preserved – i.e. not stripped-out and/or replaced with other names. What's more, the source code of so-called 'copy-left' protected software may be freely adapted by companies and sold-on, at profit, providing that all developing parties are acknowledged. When copyright is taken out of the equation you see, wonderful things start to happen."*

5.3.8   RQ3:SC8 - Trust & respect

Trust & respect ranked joint-first with *Reputation* (RQ3:SC9) in terms of the number of properties supporting the conceptual emergence of sub-categories responding to RQ3. The lead conceptual indicators driving the category are supported by properties relating to mutual, enduring levels of trust – or its noticeable absence – when operating in a massively-connected network of interconnected individuals. The need to maintain a good image and preserve reputations built over many years has never been more acute, as respondents describe their dealings with technologically-enabled forces that now have the power to enhance or destroy trust and/or respect in an instant.

Table 5.3.8   *Conceptual indicators for sub-category RQ3:SC8*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
trust in automation; trust in people; trust in staff; friendly competition; trust in technology (x2); trust profiles (x2); trust (x2); enduring trust; customer-supplier trust; respect; mutual trust (x2); mutual referral; positive repercussions; poaching talent; unspoken rules; similar values; unsavoury characters; implicit trust; lack of respect; traits to avoid; respect for others; lasting respect; exchange intelligence	*Trust & respect (27)*
on-line activity; activity profiles; on-line reviews; composite picture; privileged information; data collation; personal background; aggregated data; abuse of data; marketing data; personal data; transaction log; transaction volume; feedback; cumulative scoring; disclosure (x2); misguided claims; consequential action; superficiality; contingent on later success; implications; industry accreditation; corporate social responsibility (CSR)	*Image & reputation (24)*
high pressure; relentless pressure; deadline-driven; management; environment; predatory forces; common objectives	*Work pressures (7)*
possibility of failure; rookie mistakes; necessity of error; baptism of fire; character forming; life decisions; independence	*Early years (7)*
moral dimensions; ethical awareness; ethical implications; impunity; acting within the law; charitable actions; integrity	*Ethics & morals (7)*
social media (x2); sharing experiences; public domain (x2)	*Exposure (5)*
confidence to deliver; confidence; ability to deliver; competence; optimistic flair	*Competence (5)*

N.B. Shows lead indicators only: see Appendix RQ3:SC8 for full table

As with any management-based relationship, the entrepreneurial respondents contributing to this study highlighted the need for enduring trust against a backdrop of turbulent and dynamic change, as explained by respondent **EX1**:

RQ3:SC8 #1 **EX1**	*"Two-way trust is essential when immersed in the highly pressurised, often politically charged environments associated with software and product development. It's a life driven by deadlines and threats – one after the other - and while a project is active, there's just no let-up. The project manager has to trust that the developers will accomplish their tasks, delivering accurately and on-time; likewise, the project owners, clients and various stakeholders have to trust that the project manager is doing a proper job in managing the development team. Trust has to endure for each working relationship, seemingly in every direction, and not necessarily between people: something very often overlooked is the fact that you have to trust your software and hardware platforms to deliver consistently, too."*

There is no reason to suspect why this attitude towards trust and respect is specific to the entrepreneurial case, and technology is certainly not cited as a relevant factor. However, the role of information systems in creating 'trust-profiles' for individuals and companies alike cannot be ignored, as pointed out by **EX2**:

RQ3:SC8 #2 **EX2**	*"Modern web-sites and social media platforms do a very good job of building-up so-called 'trust' profiles for their users: the more one buys or sells, or submits reviews – of on-line products, holidays and hotels, for example - the more one becomes recognised as a 'trusted' contributor. I haven't thought about the ethical implications of this yet, but I am sure there are some dubious elements that will one day come to light, given the potential for marketeers to abuse the data being collected, most of which continues unbeknownst to the users."*

The respondent cites the ethical, moral and corporate responsibilities of those dealing with personal and commercial information that may be considered privileged by many, but for the most part, is now readily available on-line; if not for free, for a modest fee. Enhanced moral and ethical awareness amongst the hosts and processors of such data is required as the technology advances to include deeper levels of detail relating to every citizen of the information age:

RQ3:SC8 #5 **ST9**	*"On-line marketing and sales companies need to refresh themselves on the ethical and moral dimensions associated with the disclosure of personal data and its resale for profit. Many argue that they operate well within the confines of the data protection act, and simply collate their data from multiple, publically available databases. Therefore, they reason, there is nothing wrong with what they do. Really, somebody needs to point out to them just how misinformed they are."*

But on a more personal level:

RQ3:SC8 #6 **ST15**	*"Who to trust and who not to trust, whether it's on a financial or personal level, will soon be the kind of information that can be acquired – for a price, of course – for every connected individual on the planet. Imagine being able to run such checks for a potential love interest on your smartphone, immediately after the first date."*

The scope of personal and corporate data collection is further outlined by respondent **EX3**, who, in pointing the finger at financial institutions and marketing firms, explains how data from multiple on-line sources is aggregated to form 'super-profiles' of consumers and firms alike, with a view to selling the information at profit to the highest bidder, thus:

RQ3:SC8 #4 **EX3**	*"Did you realise that all of your on-line transactions contribute to other databases, compiled by third parties often without your knowledge, and certainly without your authority? The usual culprits are financial institutions and sales marketing firms, who compile cumulative profiles based on scores they assign according to their perception of your honesty, integrity and 'likelihood to default'. Current data is combined with past records, say from social media, the electoral register and your credit file, to offer prospective suppliers or lenders an instant snapshot of your financial and/or personal integrity. Rightly or wrongly, important life decisions will then be based on this single assessment. Insurance companies are already taking an interest in aggregated data like this, with respect to life and other types of cover...so be very, very careful about what you disclose."*

On a more human level, and without any reference whatever to the role of technology, respondent **ST13** extols the virtues of and continuing need for a basic, human trust to exist between those engaged in business – whether competitors or not, thus:

RQ3:SC8 #9 ST13	*"Respect others by showing that you are interested in their story too; even if they are competitors, they too will have values and opinions not too dissimilar from your own. Why make an enemy of them when you're both in the same game and could share ideas? Agree not to fight over customers, and compete on friendly terms; heck, even refer customers over to them as a 'one-off' if your order book gets too full and your feel like being charitable. It doesn't hurt once in a while, and the positive repercussions that ensue can rattle around for years after."*

Respondent **ST10** counters such attitudes with a pure avoidance strategy, upholding others to a subjectively-maintained set of 'base-rules' that should never be broken, and where those [in business] who are known for their sharp practices and ruthlessness should be avoided:

RQ3:SC8 #10 ST10	*"I've encountered more than my fair share of ruthless and unscrupulous characters in business, and now make a point of actively avoiding the more aggressive types who will typically stop at nothing to steal or acquire a bit of your pie. There are some rules that just shouldn't be broken in business: poaching the customers or staff of a competitor is up there; with a close second being not to bad-mouth the competition, no matter what…such action just demonstrates an abject lack of respect, and is downright unprofessional."*

5.3.9   RQ3:SC9 – Reputation

The sub-category *Reputation* ranked joint-first with *Trust & respect* (RQ3:SC8) in terms of the number of properties contributing to the core category *Principled praxis*. The category addresses issues of reputation and power, where personal and corporate reputations tends to be built and destroyed based on engendered levels of trust and respect between the self, the firm, and the technology that is perceived to be increasingly mediating contemporary socio-technical alliances.

Table 5.3.9   *Conceptual indicators for sub-category RQ3:SC9*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
builds reputation; company reputation; aggregate impression; protect reputation; impact on reputation; reputation (x2); trust sites; multiple reviews; group reputation; truth; standing; credibility; comparative ratings; individual reputation (x2); on-line presence; on-line reputation; on-line reviews; onerous reviews; comparison sites; on-line permanence; on public display; forums; unregulated; outside perception; immediate broadcast; public scrutiny; guarantor; score system; warranty; fake reviews (x2); social media (x2)	*Reputation (35)*
power (x2); politics; privileged position; corporate politics; diverse personalities; self-serving individuals; exerting control; personality clash; corporate experience	*Dominion (10)*
dubious intent; attention to detail; accountability; ethical standards; enhanced results; enhances efficiency; ensures compliance; diligence	*Diligence (8)*
immaculate service; prompt response; expected performance; recognised talent; complaints; code of conduct; customer satisfaction; customer loyalty	*Service (8)*
freedom; personal choice; independence; self-reliance (x2); negotiation	*Freedom (6)*
point of failure; systems failure; reliability; standby resource; data loss	*Reliability (5)*

N.B. Shows lead indicators only: see Appendix RQ3:SC9 for full table

The impact of contemporary Web 2.0 ICTs on reputation – both at the individual and corporate levels – was a point of concern for a number of respondents, with **EX7** highlighting the increasing role played by technology:

RQ3:SC9 #4 EX7	*"Firms, as well as individuals, have reputations to maintain, and while it's probably much easier for an individual to keep track of how they are generally perceived in the outside world, businesses – especially those with a significant on-line presence – need to take extra steps now to ensure that their customers have a flawless end-to-end, on line experience. The phenomenon of the 'on-line review' ensures that an increasing number of on line transactions are open to public scrutiny from a variety of angles; whether it's a Facebook group dedicated to rating the company, a Twitter follower directly lodging a customer service complaint for the whole world to see, or a set of onerous trip advisor reviews; on-line providers simply must ensure that all reviews are dealt with promptly, and to the ultimate satisfaction of the complainant. Otherwise, the power of on-line recommendation will see to it that their business dives, and dive quickly it will if ignored: I have seen this happen so many times to others in our industry, and it scares me to death that we could be next."*

The narrative suggests that larger firms may find it more difficult than smaller firms to protect their reputation, owing to the diversity (cultural, language) and extent (presence in multiple countries) of their operation arising from increased globalisation; especially if they have a significant on-line presence. The nature of instantaneous, global communication means that problems that may once have been regionally confined now have the power to become global, very quickly. For this reason, larger firms employ dedicated teams to carefully manage their public-facing social media profiles, as well as other digital media content that has the power to sway consumer and/or market opinion, as explained by respondent **EX2**, thus:

RQ3:SC9 #8 EX2	*"Comparison sites like TripAdvisor are becoming increasingly sophisticated. They have recently started to include user reviews and opinions in with their search results, and in so doing, have immediately re-engineered the selection process away from traditional one-way consumer-targeted vendor marketing, to a negotiation between you – the potential buyer – and a whole host of customers who have dealt with the supplier in the past – many of whom have left on-line reviews. What could be more impartial? Of course, the success of such a system relies on authentic, original reviews that have not been auto-generated by agents intent on swaying opinion one way or the other."*

For larger companies especially, reputational damage is carefully allied with share price, and so the power of on-line review systems, and the need for an immediate response when faced with a potentially damaging negative rating simply cannot be ignored. Here, technology – and specifically Web 2.0 technology - is having a direct impact on the attention to detail (RQ2:SC3 - *Thoroughness*) that needs to be paid by vendors in their treatment of, and attitude towards, customers. Whereas larger companies may once have had a cavalier, almost contemptuous attitude towards customers, this can no longer the

case: no matter how large or small a company, all are obliged to provide attentive levels of customer service, or face potentially disastrous consequences.

Respondent **EX1** expresses caution over the use of 'throw away' comments in on-line forums, explaining how seemingly innocent remarks have the potential – as also noted by **EX7** above – to have a direct and possibly lasting influence on reputation. The potential audience is no longer the readership of a local, or even national newspaper, but any person on the planet connected to the internet who follows with interest – via one of many on-line/social media platforms – what you and/or your company are saying:

RQ3:SC9 #5 EX1	*"When you're an influential player in a niche and emerging area of technology, you don't necessarily realise how much your words, decisions and actions are being monitored by others. Because everything is now so interconnected, transparent, and immediate, it's all too easy to gain a reputation – for better or for worse – and be judged by your comments in on-line forums, discussion boards, Twitter and the like. One throw away comment or word out of place, and they can haunt you for years after."*

Coupled with the permanence of on-line data – as outlined in *Privacy & identity* (RQ3:SC10) – the need for extreme caution when communicating so publicly via a massively interconnected, open forum, should never be underestimated.

Frequent reference has been made to the false or manufactured review, where responsibility lies with platform operator to enforce honesty and truth across all published content. They have an ethical and moral duty to uphold and maintain a base-level of integrity, while at the same time allowing freedom of expression; something which the respondents suspect is clearly missing in this rapidly emerging sector.

Web-sites and applications with in-built trust and ratings systems are especially vulnerable to abuse from those who wish to artificially inflate their reviews/ratings in order to improve sales and reputation. Respondent **ST10** focusses on this problem, highlighting the case of small firms, sole traders and professionals, where careers may be made or broken on reputation alone. Some of the problems that workers in the professions (doctors, teachers, lawyers etc.) could face in an era of the on-line review were highlighted as typical of the emerging problem, thus:

| RQ3:SC9 #6

ST10	*"The problem with so-called 'trust sites' is that they review every possible supplier-customer variation: Employees can review employers; students can review their teachers; a whole community can review a tradesperson, doctor, or lawyer; and travellers can leave a review for every location they visit. The problem I have with these sites is that the reviews could be there forever - a matter of the public record, for all to see - and I think it's grossly unfair to penalise a hotel, school or teacher if they happen to be having an uncharacteristically bad day. OK, the aggregate score system should account for these outliers, but what about a student who decides to fabricate multiple stories about a teacher who gave them a bad grade? That's career changing stuff, and should not be allowed. The purveyors of review sites should adhere to a strict code of ethical conduct, and at the very minimum need to pre-screen every submission prior to publication for truth and accuracy."*

The respondent is calling on platform operators to adopt a code of ethical conduct that protects good, honest companies and virtuous individuals from the devastating effects of unscrupulous entities in their attempt to bypass or introduce digital bias in to the ratings/review systems, perhaps by installing the necessary checks and measures required before material is published: e.g. how many reviews has the same account recently posted? Has the account posting suspect reviews been validated for authenticity? Do multiple accounts emanate from the same data network?

This sub-category has clear and definite links with many of the RQ3 sub-categories, but most notably: SC11 *Ethics & morals;* SC10 *Privacy & identity;* SC8 *Trust & respect*; SC1 *Doing the right thing,* and SC4 *Universal good*.

5.3.10   RQ3:SC10 - Privacy & Identity

Privacy & identity ranked almost identically to *Copyright & intellectual property* (RQ3:SC7), expressed by 68 and 66 conceptual properties respectively; indicating that issues pertaining to the protection of data and knowledge – whether of a personal or commercial nature – were of broadly equal concern to respondents. Unlike RQ3:SC7 which alluded to the protection and security of valuable corporate data or proprietary content, this sub-category referred uniquely to the protection and privacy of data personal to individuals.

As with many of the sub-categories expressed by RQ3, *Privacy & identity* (SC10) held a close affinity with *Ethics & morals* (SC11) in terms of the ability of information systems and those controlling them to observe any required standards relating to the protection, integrity and overall safeguarding of private and otherwise sensitive data. The sub-category also had implications for the preservation of *Reputation* (SC9) and levels of *Trust & respect* (SC8), as well as serving as an indicator of a respondent's *Commitment*

(SC5) to ensuring and upholding *Compliance* (SC6) with the legal and statutory regulations pertaining to data protection (SC7).

With respect to other research questions this sub-category exhibited little relevance to conceptual indicators relating to RQ2, but did exhibit close affinity with several of the sub-categories responding to RQ1, where issues relating to *Empowerment* (RQ1:SC3), *Competence* (RQ1:SC6) and *Cutting corners* (RQ1:SC9) were of concern when determining not only the competence of, but the abuse or use of power exercised by those responsible for the management of sensitive data.

Reviewing the 31 dimensional properties driving the emergence of the lead eponymous conceptual indicator highlights a general concern for the safeguarding and privacy of personal data as it relates to the customers, users and other stakeholders associated with respondents' ventures:

Table 5.3.10   *Conceptual indicators for sub-category RQ3:SC10*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
fear of compromise; identity safeguarding; disclosure; frequent breach; risk of compromise; customer protection; perceived menace; personal data (x2); personal information; public record (x2); resent intrusion; security (x2); platform security; lack of security; sale of user data; permanence of record; permanence; record of activity; availability; data breach; data for profit; data storage; data warehousing; cloud storage; breach; legal; privacy (x2)	*Privacy & Identity (31)*
information aggregators; mining; internet footprint; builds over time; on-line engagement; merged data; information systems; web history	*On-line presence (8)*
consumer targeting; directed marketing; engagement; networking tools; social media participation (x2)	*Engagement (6)*
lost confidence; mistrust; exploitation; respect for data; complacency	*Lack of trust (5)*
ethical; moral; integrity (x2)	*Integrity (4)*
increased connectivity; global reach; distributed data; digital footprint	*Pervasive reach (4)*
personal choice; personal impact; responsibility; design consequences	*Responsibility (4)*
vendor rejection; vendor responsibility; encourage rejection	*Vendor choice (3)*

N.B. Shows lead indicators only: see Appendix RQ3:SC10 for full table

When coupled with the ever-present threat of network security breaches that often lead to data compromise, the role of technology and those interacting with it becomes all-too evident. The increasing ubiquity and presence of interconnected information systems means that the issue will become more pressing as reliance on such systems increases, as outlined by the narrative offered by respondent **ST11**:

RQ3:SC10 #6 **ST11**	*"With the advent of increasingly distributed storage concepts like the cloud, and in a world where everyone is connected, the chance of your 'private' data remaining private diminishes by the day."*

Respondent **ST13** elaborates further on general concerns relating to the security and protection of personal and sensitive data:

RQ3:SC10 #2	*"Data breaches are so common place in the news, that one has to wonder whether any of the information we provide is ever going to remain private. Responsibility could be said to ultimately lie with the systems developers and network managers to ensure that unauthorised parties have no means of access, but as these 'ultra-secure' systems continue to be compromised, we need to consider on an individual level whether we choose to leave personal information with these systems. Time and time again it has been shown that these systems simply cannot be trusted to protect our data."*
ST13	

The concept of the digital 'footprint' (an emergent property driving *On-line presence –* see Table 5.3.10) and the temporal persistence of public and private data in the on-line sphere is also of significant concern to respondents. On-line social media (Facebook, Twitter, Instagram etc.) and professional networking platforms (LinkedIn, eCademy etc.) were identified as major contributors to an individual's on-line digital footprint, as explained by respondent **ST12**, thus:

RQ3:SC10 #3	*"Your entire web browsing history and other personal information is available for immediate download, somewhere on the internet. Unless you personally make a point of browsing the web via an anonymiser service and never provide any personal data on-line, I can promise you that you will have left a fully-traceable digital trail that tells me what you have been up to. As time progresses, the archive will of course expand, and it's only a matter of time before third parties begin to exploit this information to make decisions about you. The very nature of the internet means that this information will always be available, so the onus is on us users to ensure whether we disclose or not."*
ST12	

The long-term persistence of such data is particularly worrisome, with two respondents refusing outright to engage in any way with the emerging social network phenomenon:

RQ3:SC10 #7	*"I refuse to participate in the social media frenzy. LinkedIn, Facebook, Twitter, and all the other 'social media' platforms are now, so I am told, essential tools for keeping in touch, planning events, getting jobs, and well, staying informed. I don't want people to know every last detail of my personal, social and working life, and/or tracking if/when and where I may go on holiday, and who with. I resent any intrusion in to my privacy, and so I intend to keep my internet footprint undetectable for as long as I possibly can."*
EX4	

Respondent **ST14** echoes a similar aversion to mass on-line social engagement:

RQ3:SC10 #8	*"Colleagues look at me in astonishment when I tell them that I do not, and never will have, a LinkedIn, Facebook, Twitter or any other kind of social media profile. In the hope of being able to get increasing numbers to turn their back on what I consider now to be a menace, I explain how logs of their on-line activities are available to the highest bidder, and how, years from now, things that they do which they may later wish to forget about, will still be available as part of the permanent, public record."*
ST14	

Such comments contribute towards a general discourse relating to concerns over the responsibility and duty of care expected of software developers and vendors, platform hosts, and other organisations that process and store privileged information. As part of the emerging 'information' economy, the majority – if not all – of these firms were initially founded on entrepreneurial values[18], and therefore the burden of responsibility could be said to lie with the founding entrepreneurs themselves. Respondent **ST14** explains his perspective on this issue:

RQ3:SC10 #1 **ST14**	*"When designing information-based software, which broadly includes anything that queries a database, then one must very carefully think about the implications – moral, ethical and legal – of any of that data being compromised. As no system can every claim 100% security, it is essential that you treat the data your system is privileged to handle with the utmost respect."*

On a more anecdotal level, respondent **ST12** describes how his firm has fully switched to an open-source technology platform, citing a lack of confidence and concern over cost and security as the two main driving forces behind his refusal to adopt 'mainstream' products:

RQ3:SC10 #4 **ST12**	*"The integrity and security of the data we process has not been breached yet. However, I live in fear of one of our many servers being compromised one day. Our operation runs a 100% open-source based desktop and development environment, which essentially means that we run everything on one or more varieties of the open source Linux operating system, and so have nothing whatsoever to do with Windows. Even the latest versions of Windows continue to be insecure and flaky, and I can't believe that the majority of global ATMs persist in relying on an unsupported and insecure version of Windows XP. Furthermore, whole governments, education boards and even hospitals continue to entrust their critical systems to similarly outdated systems that the original vendor has now conveniently washed their hands of. OK, Linux isn't 100% secure either, but I can't remember the last time I heard of a Linux-based server being compromised, either by an external hacker or a malicious virus. Our company is one of many fed-up with the licensing stranglehold that Microsoft software has over us all, and we're doing everything we can to change it; not just for our own benefit, but for the integrity and protection of sensitive data, and in turn to protect our customer's vital interests."*

Respondent **EX3** draws attention to the roles and responsibilities of on-line social platform vendors and how the activity of users engaging with their services is logged; often without any awareness on the part of the user[19]. Activity data is often mined and merged with data from the public-domain (voting registers, information from Facebook and LinkedIn profiles etc.) to build master profiles on individuals, detailing shopping and

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[18] *The origins of Facebook, Twitter, LinkedIn etc. can all be traced back to their founding entrepreneurial origins in terms of their founding members, VC funding, and a defined start-up phase.*
[19] *Field Note FN15:14*

web-browsing habits, purchasing patterns, and a whole host of other derivative data, as explained by respondent **EX3**:

RQ3:SC10 #5 EX3	*"We're about to witness a revolution in on-line personal data warehousing. Not many realise what's going on behind the scenes, but the more we engage with Facebook, Amazon, Twitter and other dominant on-line platforms, the more our data is being professionally mined and combined with other datasets obtained from the electoral roll, utility companies, the driving services agency etc. All of them make good money out of selling-on your private data to information aggregators, either directly or indirectly, and this means that adverts can be accurately targeted – some might say 'psychologically optimised' to specifically resonate with your interests and hobbies, without you even realising it."*

Doubt is raised over the ability of organisations that are entrusted with the processing of data to maintain a sufficient degree of ethical awareness, especially when it come to the aggregation, re-packaging and subsequent sale of such data to unknown third parties.

Guidelines relating to an industry-wide code of conduct and general compliance are urgently required, as existing data protection laws (e.g. The 1984 Data Protection Act) significantly predate the advent of any of the presently emerging technologies.

5.3.11   RQ3:SC11 - Ethics & Morals

Ethics & morals ranked third in terms of conceptual dominance among the eleven sub-categories responding to RQ3, and therefore played an important role in determining the core category *Principled praxis.*

The sub-category was dominated by the two eponymous conceptual indicators *Ethics*, and *Morals*, and was closely followed by a third indicator relating to the concept of *Quality*, thus:

Table 5.3.11 *Properties Driving Conceptual Emergence for RQ3:SC11*

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
ethical approach to business; ethical approach; ethical awareness; ethical limits; ethical position; ethical superiority; ethically dubious; ethically sound; unethical; compliance; proper conduct; integrity; abuse of position; decision making; corporate responsibility; corporate and social responsibility; doing the right thing; consequences; mutual agreement; mutual care; mutual respect; community spirit; responsible approach; responsible (x2); individual responsibility	*Ethics (26)*
moral fibre; moral limits; moral superiority; morally dubious; morals; conceal truth; talent poaching; child safeguarding (x2); parental access; parental influence; social consequences; social deficiency	*Morals (13)*
professional practice; accreditation schemes; staff satisfaction; metrics; national accreditation; quality (x2); standards; good conduct; equality	*Quality (10)*

N.B. Shows lead indicators only: see Appendix RQ3:SC11 for full table

The positive and negative aspects of ethical professional practice related not only to the vendors and producers of emerging technologies, but also to how users exploited those same technologies to their own advantage in the creation and ongoing operation of new ventures. Respondent **ST13** attempts to clarify the distinction:

RQ3-SC11 #2 **ST13**	*"You have to appreciate that businesses are organisations that are made by people, and to say that a business has no integrity is the same as saying that the people in charge have no integrity either. The two cannot be separated – everything always comes back to those in the driving seat."*

Others point out that awareness, upkeep and maintenance of ethical and moral standards develops with increasing experience. Respondent **EX6** explains, thus:

RQ3-SC11 #4 **EX6**	*"Knowing when and where to draw the line in situations that could possibly have legal or morally questionable consequences is something that definitely comes with experience, and in the case of smaller firms run by inexperienced management, it's all too easy to take that short cut if things are tight…OK, it may lead to a bit of extra business and money in the short-term, but chances are it will always come back to bite later, wiping out the original gain many times over."*

…suggesting here that firms run by less-experienced management may be more prone to taking short-cuts (see RQ1:SC9 *Cutting corners*) in the operation of their venture(s); thereby raising doubts concerning attitudes towards propriety. However, respondent **EX7** counters by pointing out that larger firms are perhaps more apt to 'lose their way' morally and/or ethically on account of their size, extent, and the diversity of personalities present; contending that the problem may not be as pronounced in smaller firms, as there are fewer employees who tend to know one another, who work closely together, and who share the same values and therefore work to the same standards:

RQ3-SC11 #5 **EX7**	*"Because large businesses have that much more going on in terms of departments, overseas branch offices and what-not, I guess it's easier for them to lose their way once in a while, despite the best of intentions, simply because one half of the firm has no idea what the other half is up to. I don't see this happening In smaller firms, as everybody usually knows what everybody else is up to, and as they have a full picture of what is happening at any one point in time, it becomes harder to get away with the kinds of shenanigans encountered in bigger business."*

Similar to the excerpt from respondent **ST13** at the head of this section, respondent **ST8** links best practice and an ethically sound outlook to the individual alone, regardless of company size or structure:

RQ3-SC11 #10 ST8	*"Responsible decision making is one of the first aspects of proper business conduct that I inherited from my father, who was a factory floor manager at a large machine tools manufacturing company in the Midlands during the post-war decades. For him, hierarchy and structure were the glue that held everything together, and the rigorous execution of one's duties in a responsible and ethically sound manner helped to maintain the overall integrity of the organisation. In modern-day tech enterprise though, hierarchy and structure are all but absent, for the most part, and so we must rely solely on individual responsibility as the standard-bearer of good and proper conduct."*

Here, responsible decision making and a duty to one's employer was once associated with the kind of structure and hierarchy characterised by large, established corporates of the industrial revolution and post-war years. As both structure and hierarchy are typically absent in the contemporary start-up, the narrative suggests that entrepreneurs need to source such qualities from within themselves.

Respondent **EX2** notes that attitudes towards proper conduct are often aligned between competing firms operating in the same sector, where unspoken codes of conduct and practice are tacitly maintained in order to preserve a basic level of decency and respect, against what can sometimes be a very challenging and fiercely competitive backdrop:

RQ3-SC11 #9 EX2	*"Each industry or sector tends to have associated with it a set of unspoken standards and rules that tend to be generally observed. For example, among the tech ventures in Silicon Valley, we undertake not to steal staff from one another, unless by prior mutual agreement. We also agree to work collaboratively on complex problems that either of us would not be able to solve alone. These standards represent what I see as the moral fibre of the Valley, and goes some way to explain why the firms, products and people connected with the area tend to consistently thrive and do so well. We basically look out for one another, albeit against a friendly, yet fiercely competitive backdrop. Sure, there are exceptions, with the occasional bad apple here and there, but they are dealt with as and when they dare to upset the apple cart."*

Mutual respect of this type was not uncommon between competing respondents operating in Silicon Valley, as it was seen to raise the ethical 'bar' of the industry in a particular area, as well as encouraging a healthy outlook towards competition[20].

Concern relating to a lack of ethical and moral awareness exhibited by social media platforms was expressed during subsequent conversations and e-mail exchanges with various respondents[21] : on-line web sites that employ ratings and review systems were vilified for their lack of diligence and propriety; often amounting to an outright abdication of responsibility. The increasing power exerted by these emerging platforms, and their

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[20] *Field Notes FN13:13; FN17:12*
[21] *Field Note FN15:04*

ability to influence and steer the reputation and trust developed over the years by businesses was therefore of increasing concern to respondents, as outlined in the referenced field notes, and as also mentioned in narratives contributing to the sub-categories *Reputation* (RQ3:SC9) and *Trust & respect* (RQ3:SC8).

A number of respondents (e.g. **ST8**, **EX1**) were keen to draw attention to the increasingly unscrupulous activities of large software vendors who make use of ethically dubious tactics to enhance sales of their various gaming platforms to children:

RQ3-SC11 #7 **ST8**	*"I am appalled at the way large software vendors are allowed to get away with shamelessly inciting children in to getting their parents to buy virtual gaming 'points' in order to participate more actively in their virtual platforms. These companies are going to have so much to answer for when these kids grow up socially deficient and unable to function in society."*

The narrative of respondent **ST8** is interesting in that it draws attention not only to the unscrupulous actions of companies that are willingly co-opting children in to garnering increased sales from obliging parents, but how, in the pursuit of corporate profit, the future social and mental health of those same children may also be at risk, given the burgeoning popularity of gaming consoles that are targeted predominantly at the teenage demographic. This is a case of *Control* (RQ1:SC2) in the extreme, and although it does not relate directly to entrepreneurial venture creation, it will inevitably have an impact on entrepreneurially-oriented parents, and therefore represents perhaps the most sinister side of an utter dependence on technology in the form of addictive gaming platforms.

Respondent **EX1** comments further on the way in which large corporates shamelessly tempt younger users at schools and universities with free software, in a bid to instil continued allegiance to that vendor's future products once they reach adulthood; the long-term hope being that they will one day become fully 'paid-up', life-long subscribers (see also RQ3:SC7#8):

RQ3-SC11 #8 **EX1**	*"There is no doubt that the office and productivity solutions offered by a small number of software vendors dominate the market. This is no accident, as they target new users from an early age by giving their software away to schools and colleges, free of charge, knowing full-well that by the time those kids graduate and enter the workplace, the only software they will feel comfortable using will be guess what?"*

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Chapter 6 - Building grounded theory

6.0 Introduction

Chapter 1 introduced the research area of interest, which had been prompted by 20+ years of prior professional engagement with the field, leading to questions concerning the impact of Web 2.0 ICTs on the creation of high-technology ventures and their development during the start-up phase. Notwithstanding the restrictions of a purist GT methodological approach, the literature review of Chapter 2 undertook a comprehensive survey of the scholarly fields that informed the areas of interest, identifying the entrepreneur and emerging ICTs as two relevant agents of change in the contemporary age. Two 'pilot' interviews were commissioned that ultimately formed the starting point for further study, and the basis for additional research questions.

This chapter concerns the building of grounded theory around each research question, which may be viewed as three distinct, yet at the same time very much interconnected theorisations reflective of the distinct strands to inquiry that developed over time. The initial aim of RQ1 was to stimulate and encourage the emergence of novel and existing concepts that were of direct concern to entrepreneurs when operating in domains of 'high velocity' technological change. As hoped, the responses to RQ1 pointed to the emergence of two further areas of concern that exhibited a strong conceptual presence, and which in turn prompted the need for two more research questions: RQ2 and RQ3. RQ2 focussed on how entrepreneurs engage with the decision-making and creative process against a technologically dynamic and diverse background, and RQ3 asks about the ethical and moral dimensions implicit in such decision making, in the midst of such technological dynamism.

RQ1 elicited respondent narratives concerning the entrepreneurial need to make sense of a changing technological world in which new ventures were being formed, sustained and grown. This study focussed specifically on the emergence of high-technology ventures in a high-technology world, as the degree of change and turbulence in such environments could be said to be at a maximum; thereby posing the highest degree of challenge to any individual interacting with it. Accordingly, any person identified as having managed to survive the challenges associated with such environments could potentially represent an excellent source of empirical data in terms of recalled histories and experience relating to

past-and-present operation in the field. This is what led this study to choose the entrepreneur, in the context of the start-up, as its principle unit of analysis.

6.0.1   Building grounded theory

Building grounded theory requires the intuitive incorporation of theoretical memos recorded during the research process with other data. It relies on the ability of the analyst to identify novel connections, structures and associations that exist between the emergent concepts, properties and codes used during the analysis stage, as well as existing theory that may confirm, refute or conflict with existing literature in the area (Charmaz 2006).

Theory may be defined as any coherent description or explanation of observed or experienced phenomena. Charmaz (2014) points out that, although the term 'theory' may be referenced frequently by grounded theorists, few proceed to offer a concrete definition for it, which remains *"slippery in grounded theory discourse"* (p.228), and tends to mirror ambiguities about what theory means, and what it may look like (Abend 2008).

Traditional approaches to developing theory in organizational studies have portrayed only a partial, incomplete view of organizational knowledge, because they have focussed predominantly on a mono-paradigmatic approach (Kuhn 1962). Contemporary understanding in the field, however, suggests that over-reliance on a single paradigm may result in a view too narrow to reflect the multifaceted nature of organizational reality (Burrell & Morgan 1979). Despite the widespread perception that theory building continues to be "*somehow universal and transcendent across disparate paradigms of thought and research*" (Gioia & Pitre 1990: 584), the case remains that different paradigms require different philosophical assumptions, with each resulting in the production of a markedly different way of building and informing theory.

Although Bacharach (1989), van de Ven & Johnson (2006) and Weick (1995) contend that there is no 'right way' to build and develop theory in the field of management, some authors (e.g. Davis & Marquis 2005; Whetten 1989) have drawn on Dubin's (1978) model, which asserts that all good theory should consist of a minimum of four essential elements:

- What specific factors or elements are explained?
- How are these elements related?
- Why do these relationships exist?
- A declaration of limiting boundary conditions (when, where, who etc.)

In addition to the above essential elements contributing to good theory, the degree of cumulative knowledge (Davis & Marquis *ibid.*) which informs the validity and future growth of the theoretical paradigm around which a theory is built is of crucial significance.

6.1   A grounded theory of *sensemaking*

The purpose of RQ1 was to establish a firm foundational footing for the entire study by eliciting normative themes and concepts that would come as no surprise to the informed researcher, but which might provide pointers to further areas of interest or concerns more deeply embedded in the data.
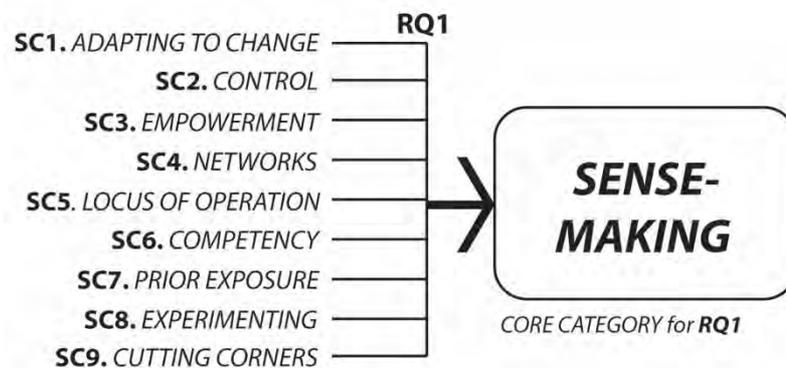
Figure 6.1   *Constituting sub-categories for RQ1*

As the emergent concepts signified by RQ1:SC1-SC9 were already recognised as part of a core discourse relating to entrepreneurship and technological change, it was easy to link one or more of the nine sub-categories to extant theory in either field, such as Weick's (1995) organizational sensemaking; Giddens' (1984) theory of structuration and a structure:agency duality; Bourdieu's notions of Habitus and social capital, and how they are reliant upon a technologically determined narrative; and how entrepreneurial inquiry may be re-framed as a pseudo-scientific pursuit operating within a particular community of practice (Wenger 1998). The fact that these theories were expounded independently as the result of an in-depth grounded analysis of the empirical data demonstrated that the technique could continue to be used to further encourage original theory to emerge.

In terms of the above cited theories it was possible to apply the conceptual essence of sub-categories, either individually by themselves or in combination with others, to independently demonstrate that existing theories continue to be of relevance within contemporary entrepreneurial practice. For example, theories relating to agency and

change were conceptually coded in the narrative excerpts contributing to SC1 – *Adapting to change,* SC2 – *Control* and SC3 – *Empowerment*; with a grounded analysis from a change perspective suggesting that to maintain currency in light of the dynamics of technological change, the theory would need to be reconsidered in line with Caldwell's (2006) critically real, pragmatist advocacy of an agency:change duality, in preference to one less accommodating of change based on agency and structure (see §2.5.1 for discussion).

It is because of the holistic purity exhibited across all expressed categories that GT works at all: as the theory is grounded in the empirical data that produced it, it is not unreasonable to suggest that elements of that same theory must correspondingly run throughout all of the other emergent concepts. It is the power behind such self-referential validation that provides this (GT) methodological approach with the ability to elicit good theory. While other qualitative and quantitative approaches may require additional measures relating to rigour and validity, if grounded theory is conducted properly, then it could be said to be self-validating in terms of the theory it produces.

6.1.1   Revisiting structuration theory

Structuration theory and the notion of a structure-agency duality has been used by researchers studying the effects of technology in a business-to-business context since Giddens (1984), where innovation and shared knowledge were among several of the outcomes studied (Pavlou & Majchrzak 2001).

Because he was concerned with the abstract nature of human and social relations Giddens adopted a post-empiricist frame in advancing his theory of structuration (see Cohen (1986: 128) for notes regarding its philosophical status); thereby leaving the theory open to human-based ontologies and, more importantly, to an acute appreciation of the spatio-temporal dimensions of human life that inevitably underscore the importance of history and prior professional experience, when considered in the context of entrepreneurial agency (Cohen 1986).

Archer (1995) initially paved the way for a separation between structure and agency, proposing a form of dualism (as opposed to duality of structure). She also stressed the importance of temporality in social analysis, and was strongly opposed (Stones 2005) to

structuration theory because the structure-agency duality associated with it denied time and place.

Latour's (1984) actor-network theory (ANT) provided another reason for considering a move away from theories based on the duality of structure, as it grants a certain degree of autonomy to non-human – i.e. technical artefacts – in its formulation of reality. If ANT could be reframed for use in conjunction with a revised form of Giddens's structuration theory that includes an appreciation of temporal change and a move away from an ahistorical account of reality, then it could provide the researcher with a sociological basis for a reality based on human:non-human agency.

Further investigation of the relevant literature reveals that in their formulation of an adaptive structuration theory, DeSanctis & Poole (1994) must have been thinking along similar lines to Archer in terms of a migration away from the structure-agency debate, given the increasing role (agency) that technology was taking on in human affairs. They recognised the need to account for not only the human element, but also the non-human elements of agency, and how change *over time* was now a given, especially when considered in the context of high-velocity technological environments.

While Orlikowski's (1992) work focusses primarily on the larger corporates, it has been found to overlap theoretically in some areas with respect to the cultures of smaller ventures (Stillman 2006) – despite any direct reference to the 'start-up' entity – and demonstrates how people are able to enact structures that shape their use of technology, which they then subsequently go on to employ in their practice (Orlikowski & Iacono 2000), regardless of the structural confines within which they operate.

Although somewhat dated in its original form, structuration theory nevertheless continues to offer a conceptual starting point for the development of new insights in to how structure and agency may be re-framed to accommodate contemporary notions of change which, at the same time, acknowledge the crucial role played by the accumulation of historical capital in group, organizational, and individual contexts. In a bid to move away from the restrictions imposed by dualistic thought, the discussion deals with Caldwell's (2006, 2005) re-framing of Gidden's (1984) original theory, offering at first a deconstruction, and then a reinterpretation of the theory that actively invites *process* and *system* in to the frame for consideration.

6.1.2 Caldwell's agency:change dualism

Caldwell (2006) advises that Giddens' (1984) classic structuration theory, based on an examination of agency and structure, is the natural starting point for an exploration of agency and change (Heracleous & Barrett 2001; Reed 1997; Whittington 1992). Based on Caldwell (2005), a theoretical rationale for a shift from debates concerning agency and structure reformulated along Caldwell's (2006) agency:change construct is considered. A number of differences become apparent with respect to the way organizational analysis and sensemaking may proceed: first, it requires that structure continues to feature as an essential part of the argument, but is reformulated along two strands: structure as *system*, and structure as *process*. Second: it underscores the importance of activities, interactions and change as essential properties of organizations – rather than structure and state – and in so doing prioritizes activity over product, change over persistence, novelty over continuity, and expression over determination (Hernes 2014). Third: the recognition of change as a permanent feature acknowledges the importance of the temporal element that inextricably underscores change. It therefore takes in to account not only the historical record associated with action – moving away from the ahistorical 'snapshot' culture that underpins so many social theories – but also accommodates accrued experience (and therefore learning) by encouraging an all-round, perspectival view (Haynes 2000) upon the processual realisation that everything is in a dynamic state of flux in *becoming*, rather than merely a static state of *being* (Hernes *ibid.*). A greater understanding of the start-up as a generative entity of economic activity in the contemporary age may therefore be achieved by adopting Caldwell's agency:change duality, coupled with a structure reframed along the lines of process and system.

6.1.3 Entrepreneurial sensemaking

Unlike Weick (1995), the theory of sensemaking advanced by Klein *et al.* (2006: 88-92) positively accommodates the start-up phase of venture development, suggesting that, "*it is a set of processes that are initiated when an individual or organization recognizes the inadequacy of their current understanding of events.*" Furthermore, the quoted authors describe it as an umbrella term used to describe efforts at building intelligent systems, presumably in recognition of the increasing role that technology is expected to play in agency. Both descriptions – in terms of process and structure – describe the kind of sensemaking encountered during this study, where the entrepreneurial mindset is seen to engage productively with nine conceptual sub-categories (RQ1:SC1-9) in order to *make sense* of an ever-changing increasingly technical 'high-velocity' environment. Indeed, the

core conceptual category to emerge in response to the first round of grounded theory dealing with issues pertaining to RQ1 is '*Sensemaking*', thereby signifying its foundational importance as an underlying concept that drives entrepreneurial action.

6.1.4 Theorising RQ1:SC3 – *Empowerment*

Much of the academic discourse relating to entrepreneurial empowerment has traditionally focussed on issues of youth, gender and minorities (Goyal & Yadav 2014; Veira 2008; Gill & Ganesh 2007), and agri-empowerment (e.g. Abrogena *et al.* 2013) in the developing world; and although there has been some interest in *employee* and *managerial* empowerment in the context of the [large] organisation (e.g. Boudrias *et al.* 2009), mention is yet to be made of how empowerment may relate to the entrepreneurial individual operating in the context of the contemporary start-up.

Empowerment (RQ1:SC3) is clearly an important factor that contributes to the way in which entrepreneurs *make sen*se of their environment, having emerged as an empirically independent sub-category in response to RQ1. As well as being a theoretical model for describing transformation on individual, social and organizational levels, empowerment denotes a concept around which individuals and groups tend to orient practice (Ulrich 2016) and establish quality within community life (Perkins & Zimmerman 1995), with Rappaport (1981: 119) explaining of it that "*our aim should be to enhance the possibilities for people to control their own lives.*" From these perspectives alone, it should come as no surprise that *Empowerment* features as a prominent conceptual indicator of entrepreneurial sense-making in the contemporary domain.

The entrepreneurial respondents who took part in this study indicated that practice had tended to be oriented around the intersubjective discourses and power dynamics that existed between cofounders, other stakeholders and business associates. However, since the advent of Web 2.0 technologies, the same dynamics tended to be mediated – and even accelerated – by the increased interaction with the 'Web2.0' 'enabling' technologies of an unfolding information economy. Entrepreneurial action, in its various forms could now be said to be increasingly empowered by the instantaneous and transparent interaction offered by remotely-located experts in their field of operation, other entrepreneurs, and specialised knowledge-bases – many of which would have been inaccessible, prior to the advent of Web 2.0. (i.e. before 2004 CE).

Of significant relevance is the relationship between empowerment and change described by Stark (1996: 129) as quoted by Ulrich (*ibid.*), thus:

> the force of such processes lies in the reciprocal dependency and integration of change on the individual, group, and structural levels. Empowerment processes do not run along one of these levels independently, but rather reinforce one another mutually by their interaction.

<div align="right">Stark (1996: 129)</div>

From a philosophical, Kantian perspective, Ulrich (2016: 129) mentioned of entrepreneurial empowerment that "*the golden rule [of empowerment theory] can be stated with a reformulation of Kant's categorical imperative: act only by that maxim which you give yourself, instead of receiving it from others or just subsiding into passivity.*" In making these comments, Ulrich (*ibid.*) is suggesting that empowerment helps to uncover the natural human desire to be emancipated from power and authority, and that it has the capacity to reveal the natural entrepreneurial self in all of us, where, as he further points out "*there are no weaknesses, just suppressed or undeveloped strengths waiting to be made conscious and brought to bear on reality,*" (p.130) who then goes on to suggest that the notion of empowerment "*involves vestiges of Kant's definition of enlightenment as a person's emergence from their self-imposed tutelage.*" (p.125). Here, it becomes evident that an essential part of entrepreneurial sensemaking is to recognise the power that one has – or perhaps more importantly – one does not have; borne of one's *Confidence* (RQ2:SC2) and *Competence* (RQ1:SC6). When one becomes conscious of one's own strengths and the changeability of power relations, this becomes a precondition for changing those very power relations, thereby determining whether one continues to be subject to, or emancipated from them. When considered with respect to the dominion of technological power – or agency – the possibilities take on a more sobering dimension.

6.1.5   Theorising RQ1:SC4 - *Networks*

As Birley (1985) points out, entrepreneurs seek guidance from formal network members - bankers, accountants, lawyers etc. - and informal network members composed of family, friends, business contacts etc. Here, the entrepreneur nurtures and cultivates social capital consisting of strong and weak ties (Granovetter 1973), either of which may be called upon to assist with a particular problematic as-and-when the entrepreneur realises that external assistance is required. Again, calls for such help are driven by issues relating to the *Confidence* (RQ2:SC2) and *Competency* (RQ1:SC6) of respondents, given that it requires an initial degree of confidence to admit (concede?) that help is needed, and then the

humility to admit that one was aware of their limitations and/or lack of skill/competence in a certain area to begin with (see Dunning *et al.* 2003).

In their analysis of previous research focussed on novice entrepreneurs, Shane & Venkataraman (2000) note that those entrepreneurs able to marshal the greatest levels of human and social capital were more likely to find opportunities considered attractive enough to pursue for subsequent commercial consideration. As noted by Singh *et al.* (1999) the entrepreneur's social network helps expand the boundaries of rationality by offering access to knowledge and information not normally possessed by the individual alone, and so is critical to the diversity of the process because it permits access to information and insights about new venture ideas and other opportunities. Consideration of such findings serve to strengthen the underlying thesis that entrepreneurship is very much a social game (Schoonhoven & Romanelli 2001).

Whereas opportunities for exchanging ideas would previously have been limited to 'personal introductions and chance encounters at trade fairs, exhibitions, conferences etc.' (see RQ1:SC4#5), respondents are now able to take advantage of the benefits of participating in virtual communities via on-line networking and the universal accessibility it provides.

It should be remembered that when considering any of the literature published prior to the year 2000, the term *social network* relates solely to networks of individuals who maintained connections via conventional 'non-digital' means. Recent literature relating to the field (e.g. Lea *et al.* 2006) is only just beginning to recognise the impact that technology is having on the formation and propagation of disparately based 'virtual networks', connected via the latest in accessible telecommunications technology. Furthermore, the term 'social network' itself has now taken on a somewhat different meaning, in that it tends to be used interchangeably with 'social media' to refer to the networks driven by digital platforms like Facebook, Twitter, LinkedIn etc.

Contemporary ICTs have played a large part in the development of business networking, with the key conceptual indicator *Network*s (RQ1:SC4) being driven by properties pertaining to the pervasive, global reach offered by contemporary telecommunications technologies and their ability to transcend barriers. Entrepreneurs now demonstrate how they rely on a global network of on-line professional communities, as described in memo entry **M14:01**, and the narrative excerpt provided by respondent **ST13**, thus:

RQ1:SC4 #3 ST13	*"All the experts in a particular field tend to gather in the same 'electronic meeting places', whether it be a Facebook or LinkedIn group, or a web-site forum dedicated entirely to the topic. For example, if I need advice on some obscure aspect of telecoms policy, there are forums out there dedicated entirely to its discussion. In the unlikely event that the people participating in that forum don't know the answer, they will for sure be able to tell you who can. And the best thing of all about it is that it's globally based, completely free, and open 24/7. Ten years ago I would have needed to pay specialist consultants hundreds, if not thousands, for access to the same kind of information."*

The significance of networking and accelerated social connectivity via on-line platforms in terms of knowledge creation, innovation and creativity are only just beginning to be appreciated, meaning that the academic discourse relating to organisational knowledge creation and management - much of which was written during the 1990s, therefore prior to the explosion of Web 2.0 technologies - may need to be reconsidered in light of the dramatic changes being brought to the field by the advent of contemporary digital services.

6.1.6   Responding to effectuation theory

Sarasvathy (2008) focusses on the pragmatics of entrepreneurial expertise in advancing a theory of effectuation. Whereas the theory of effectuation may work well in situations where the established 'expert' entrepreneur is at the helm, the empirical evidence supporting this research, as well as theorists in the field (e.g. Delmar & Shane 2006) contend that start-ups are just as likely to be initiated by novice entrepreneurs as they are by those 'experts' on which effectuation is based.

Table 6.1   *Critique of Sarasvathy's Five Principles*

The *bird-in-hand-principle*	
Effectuation	'Means-driven as opposed to goal-driven action. The emphasis here is on creating something new with existing means, rather than discovering new ways to achieve given goals.' (Sarasvathy 2008: 15)
Response	This principle describes an atemporal 'snapshot' of reality based on one point in time. It ignores the insights and new discoveries that may develop by unfolding *over time* from the creative use of expert sources in a knowledge economy, which are seen to emerge in response to newly-formed social networks in response to *structured inquiry*.
The *affordable-loss* principle	
Effectuation	'Prescribes the commitment in advance to what one is willing to lose, rather than investing in calculations about expected returns to the project.' (Sarasvathy *ibid.*)
Response	Agree when based on effectuation's premise of the *expert* entrepreneur (e.g. RQ3:SC3#3), but the principle excludes the case of the novice entrepreneurs – a phase which most entrepreneurs must survive in order to enjoy later success – fails to take in to account the risk-taking propensity of novice entrepreneurs in the pre-expert stage of development: disregard for risk and failure are an assumed part of the journey, contingent upon later success. The novice entrepreneur simply *goes for it*, and although failure will result in many cases, it is this exposure to repeated failure that permits those who survive to become familiar with the danger signs over time by regularly operating 'at the edge of chaos'. Taking an evolutionary metaphor, it could be likened to Darwin's survival of the fittest.

The *crazy-quilt* principle	
Effectuation	'Involves negotiating with any and all stakeholders who are willing to make actual commitments to the project, without worrying about opportunity costs, or carrying out elaborate competitive analyses.' (Sarasvathy *ibid.*)
Response	Agree, but what kind of framework for structured negotiation is being suggested here?
The *lemonade* principle	
Effectuation	'Suggests acknowledging and appropriating contingency by leveraging surprises rather than trying to avoid them, overcome them, or adapt to them.' (Sarasvathy 2008: 16)
Response	Sarasvathy's lemonade principle is supported: the entrepreneurial respondents taking part in this study positively welcome surprise, or the unexpected; with both serving to add to the diversity and/or initial conditions that fuel creative inquiry. Unlike surprise that is out of context and/or incongruent with expectation, generated against a playful - almost juvenile – backdrop is noted as being especially potent.
The *pilot-in-the-plane* principle	
Effectuation	'Urges reliance on and working with human agency as the prime driver of opportunity rather than limiting entrepreneurial efforts to exploiting exogenous factors such as technological trajectories and socio-economic trends.' (Sarasvathy *ibid.*)
Response	While the presence of technological 'trajectories' are acknowledged, the sociotechnical possibility of dual agency during the co-creation and discovery process of venture creation are ignored, where human agency alone is the prime driver of opportunity.

In contrast to the study that informed effectuation theory, this study also took its empirical input from a cohort of **EX**emplar interviewees broadly equivalent in experience to Sarasvathy's (2008) definition of 'expert' (§3.7.2), but complemented them with a balancing input from a group of less experienced entrepreneurial respondents labelled **ST**artup entrepreneurs. The bold emphasis here refers to the labelling convention used to reference the origin of the narrative excerpts quoted throughout the text (e.g. **ST4**, **EX1** etc.). Whereas effectuation gives primacy to 'expert' entrepreneurs in order to effect its theorisation, the findings of this study demonstrate that non-expert, or so-called novice entrepreneurs are just as crucial when theorising entrepreneurial attributes (discussed further in §6.3.9).

6.1.7 Narrative

Following on from §2.8.5, this study suggests that the need for a guiding narrative may be viewed as a consequence of Kuhn's theory of taxonomic incommensurability, which arises from differences in classificatory schemes (Kuhn 1962). Fields of science divide subject matter in to a taxonomic order of kinds, and associated with each taxonomy is a lexical network represented by a distinct narrative. Technological change brings with it a change to the corresponding lexical network, which in turn leads to a taxonomical realignment of the field, where the terms of the old taxonomies are progressively retired and become non-transferrable over time; thereby prompting a Kuhnian paradigmatic revolution.

The high turnover rate (or 'techno-churn') associated with ever-sophisticated technological progression leaves business operators with a permanent lexical vacuum, where the concepts, words and phrases associated with new technologies must first be acquired before any attempt may be made to sensibly engage with them. Tension arises from a continually emerging '*newness*' of technological '*things*' and '*artifacts*' which, after asserting themselves via diffusion (Lechman 2017; Grübler & Nakicenovic 1991) as indispensable tools of the high-technology trade, must have some form of guiding narrative via which they may be conceptualised and made sense of.

The kinds of problems encountered in a rapidly changing technological, business, and economic environment are of a more complex and demanding nature, where the human creative potential is required to explore the socio-technical problem space in a uniquely reasoned manner. Unless a paradigm-appropriate way of handling such change can be used to create guiding narratives to aid with the decision-making process, the decisions made run the risk of being based on flawed reasoning and being 'shoe-horned' in to past paradigmatic narratives, leading to bad judgment calls and potential failure.

6.1.8   Habitus for the information age

The significance of technological change now becomes apparent in relation to the time and space dimensions associated with Bourdieu's concept of habitus, discussed in §2.5.4. Distinct from the scalar concepts of narrative (see §2.8.5) and the notion of cultural même advanced by Blackmore (1998), a '*habitus of the information age*' is catalysed by the demands of contemporary technologies, where the punctuated disequilibrium they present in the context of high-velocity environments provides the 'challenge-response' stimulus referred to by Navarro (2006) as 'unexpected situations,' what Peirce referred to as 'unexpected surprises,' and what Cope (2001) referred to as 'critical incidents'; each of which provides a basis for the initiation of inquiry (or entrepreneurial learning in Cope's case) and narrative building that lead to creativity, innovation and the eventual generation of new knowledge. The entrepreneur draws on habitus as an original source of fresh narrative, which develops entrepreneurial knowledge (and ultimately, power) in a relentless push-pull relationship with technology (§2.4.1); all of which occurs in response to high-velocity dynamic change in the context of the start-up venture.

Bourdieu's approach is useful for analysing the power dynamics associated with development and social change processes (see Navarro in Eyben *et al.* 2006). It is of direct relevance to this research when attempting to model the processual aspects of entrepreneurial inquiry, as it is one of the ways via which agents exercise power and control over their immediate environment, which in this context, confirms the start-up as 'a business *in becoming*.'

The entrepreneur is popularly recognised as a maverick, risk-taking individual, involved in the establishment and early operation of one or more ventures; and while this may be functionally true in the case of many entrepreneurs – especially if viewed from a trait theory perspective – the potential origins of the image may be traced back to what Navarro (2006) referred to as Bourdieu's notion of 'misrecognition': a term used to "*describe the process of mystification by which the powerful use their symbolic capital[1] to prevent individuals from recognising that their subordination is culturally constructed, rather than 'natural'*" (Eyben *et al.* 2006: 5). In other words, entrepreneurs are apt to lead their [admiring, awe-inspired] audience in to assuming that the attributes traditionally associated with their agency are exhibited by *all entrepreneurs*, *all* of the time; when in fact true entrepreneurs only exhibit such qualities as-and-when required, or as dictated by the situation. In sum, such theorising supports the notion that *anybody* has the capacity to be an entrepreneur (Sarasvathy 2008; Howorth & Tempest 2005).

To illustrate how the aforementioned notion of symbolic capital is exercised entrepreneurially, consider how it may be applied as part of an innovative survival strategy during the start-up years: the inexperienced entrepreneur's ability to maintain a power-base in the face of failure is achieved by portraying an outward impression of success, autonomy, control and a propensity for risk-taking. In other words, many of the clichéd traits that society has traditionally bestowed upon the entrepreneurial personality. No matter what the real underlying situation may be, entrepreneurs are well known for their unabashed levels of self-assurance and misplaced (over-)confidence (Koellinger *et al.* 2007; Bernardo & Welch 2001). Although somewhat disingenuous and deceptive in nature, there appears to be an innocently real purpose behind such levels of self-regard: misrecognition provides not only the entrepreneur, but all those with whom (s)he interacts

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[1] *Symbolic Capital*: the resources available to an individual on the basis of honour, prestige or recognition, and serves as value that one holds within a culture. (Wikipedia, DOR:13FEB16)

with an enduring impression of success at any cost; which, in turn, feeds back to further perpetuate the deception, and hopefully extends the longevity of any developing venture.

One may tentatively suggest, therefore, that survival during early-stage entrepreneurship is operationalised in part via the process outlined above, and serves as a naturally protective mechanism that not only maintains external face, but also serves the purpose of reinforcing a degree of pseudo-confidence within the entrepreneurial self; to the extent that entrepreneurs themselves are supremely assured to the point of an overconfidence relating to their own abilities to succeed (Bernardo & Welch *ibid*; Koellinger *et al. ibid*).

6.1.9   Entrepreneurial wisdom

Referenced previously in §2.8.1, the epistemological roots of wisdom may be traced to Aristotle's concept of phrônesis, but its relevance to contemporary management have only recently been noted by scholars (e.g. Bachmann *et al.* 2018; Dunham & McVea 2008; Kessler & Bailey 2007).

Aligning entrepreneurial wisdom with Kant's notion of practical reason and the categorical imperative gives rise to interesting possibilities for the combination of a practice-based approach to reasoning, informed by the tenets of the entrepreneurial conception of wisdom as advanced by Dunham & McVea (*ibid.*). As a metaphysical concept, wisdom was never implicitly ordained by Kant as an element of practical reasoning, as it tended to be rooted more in the universal good of ethics, justice, virtue and the human will to action (O'neill 1996), but when Aristotle's five intellectual virtues are considered collectively: theoretical reason; science (*epistêmê*); intuitive understanding (*nous*); practical wisdom; and craft expertise, the concept of practical wisdom emerges as a potential ultimate end to satisfy both the ethical and practical requirements of inquiry, and in so doing returns us to Aristotle's original concept of phrônesis, or practical wisdom.

Although entrepreneurial Wisdom is not a new concept, it remains underdeveloped in the literature. Its importance with respect to this study was first outlined in §2.8.1, where wisdom as a general concept was seen to occupy the highest tier of the so-called DIKW knowledge hierarchy (see Figure 2.3). Knowledge could be positioned as a stratified, relativistic concept implicitly tied to various types of learning and inquiry. As suggested by Zeleny (1987), wisdom may not necessarily represent the ultimate tier of the structure,

as the concept of self-aware transcendence working towards a form of self-actualisation is said to play a more fundamental role, addressing both the spiritual needs of being (ontology) and knowledge (epistemology). Indeed, this concurs with Maslow's (1943) hierarchy of needs (see Figure 6.2), which, while not necessarily tied to a precept of knowledge *per se*, could be indicative of the general state to which all human beings aspire, regardless of the underlying epistemological (knowledge) or ontological (needs) basis.
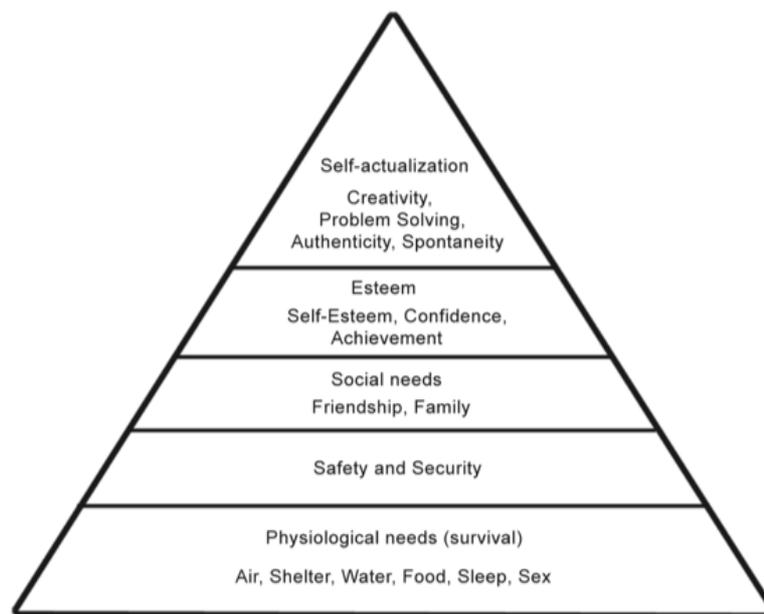
Source: Maslow 1943

Figure 6.2   *Maslow's hierarchy of needs*

Indeed, respondents taking part in this study directly address a number of echelons of Maslow's pyramid when describing the overriding need to survive in the face of adversity (RQ1:SC9#4), and how success was linked to self-esteem and confidence (RQ1:SC6#6); both of which manifest in this study as RQ1-related concerns based on the need to make sense of the world. However, the relevance of Maslow's hierarchy does not end with RQ1: it extends further, as one would expect of a group of GT-conceived conceptual indicators. The pinnacle of Maslow's pyramid, and the missing top-layer of the DIKW pyramid (Figure 2.3) suggested by Zeleny (*ibid.*) are identical, and are concerned with self-actualization, creativity, problem solving, spontaneity etc. The point being made here is that the essence of perfection, or self-actualization lies in the ability to freely create and expertly solve problems: such an ability represents wisdom, and the peak state of human-being according to Maslow and Zeleny.

As Dunham & McVea (2008) point out, being able to link entrepreneurial needs to a conception of entrepreneurial wisdom has benefits for both practitioners and scholars: for scholars, it permits the joint exploration of the ethical dimensions concerning business decision making by social scientists and those concerned with ethics, as wisdom necessarily implies the operationalisation of knowledge via an ethical lens. Furthermore Dees & Starr (1992) point out that many of the decisions made by entrepreneurs are fraught with ethical tensions, given the many moral considerations that arise from entrepreneurial action. Such an approach opens up the possibility for an explicitly creative, aesthetic and adaptive perspective that is well suited to the complex challenges and turbulent change that accompany the contemporary start-up context, and which occupy the peak layers of both the DIKW and Maslow pyramid constructs.

Given that practical reason centres around goal-directed reasoning based on the goals of an active agent, which may be a person or a technical device (such as a robot or software application), this now paves the way for technology to be considered as a viable adjunct to a rational, human-based inquiry, co-dependently enacting a form of adaptive (able to keep pace with technological change), historically-imbued (adapts to the human-agent's aggregate experiential history) form of practical wisdom.

Having identified entrepreneurial, or practical wisdom, as a concept that could offer significant purchase in a world so dominated by one business scandal after another (cf. the corporate scandals of Enron, Barings Bank, MCI WorldCom etc.), how such a concept might be practically operationalised in to every day praxis demands some degree of understanding and input on the part of the entrepreneurial agent, without the requirement for him/her to necessarily have any prior understanding of the philosophical underpinnings.

Whereas Peirce begins by defining pragmatism from his seminal article *How to make our ideas clear* (Peirce 1878) it is useful to compare this with Aristotle's opening sentiments in *Ethics*, stating that his inquiry is concerned with an attempt to develop a better understanding of what our ultimate aims should be. When the notion of practical wisdom is considered from a pragmatic perspective, one realises via the various definitions offered for pragmatism that it is also rooted in a common-sense approach to practice, defined philosophically by the Oxford English Dictionary as "*an approach that evaluates theories or beliefs in terms of the success of their practical application,*" where meaning and belief are rooted in habits of response (Rosenthal 1994). Here, belief, meaning and

habit are invoked by the agent in order to realise a pragmatic dimension, and empirical traces of this may be located in the emergent conceptual indicators responding to RQ2. Indeed RQ2:SC9 *Habits of response*; RQ2:SC10 *Belief & doubt* and the core category of RQ1 *Sense making*, all allude to entrepreneurial practice that is fundamentally pragmatic in nature.

Considering that the decision making inherent in venture creation and business management often entails wide-ranging moral consequences (Dees & Starr 1992), the highly unpredictable and complex (wicked) problem spaces in which entrepreneurs operate (Busenitz & Barney 1997) ensure that such decisions continue to be loaded with ethical tension. Furthermore, when considered from the perspective of an unpredictable high-velocity technological environment (Bourgeois & Eisenhardt 1988; Eisenhardt 1989; Judge & Miller 1991) and when combined with the global reach of contemporary networking technologies, the potential impact of such decisions becomes ever-more pervasive, requiring an increasingly structured approach to inquiry, as demanded by the core category of this investigation, RQ2. A structured approach to inquiry may not be articulated until sense has been made of the operating environment (RQ1 core category). Once sense has been made and inquiry has become structured, a best-practice form of principled praxis (RQ3 core category) may then be considered by application of one or more of the 12 conceptual heuristics driving the category.

The body of cognition-based entrepreneurial research relating to entrepreneurial decision making is recognised and acknowledged (e.g. Dunham *et al.* 2008), but how entrepreneurs address the ethical dimensions of the decisions they make remains poorly covered in the literature. While ethics in entrepreneurship has been discussed in relation to *eco*preneurship (Kirkwood & Walton 2010); capitalism (Singer 2010); humanistic management (Bachmann *et al.* 2017); corporate social responsibility (e.g. Querioz 2015), and corporate business in general (Bowie 2005, 2017), theorising in terms of entrepreneurial agency as part of a wider notion of entrepreneurial wisdom as perceived by this study has yet to receive any attention. It is hoped that the foregoing discussion will help stimulate further discussion on the topic.

6.2   A grounded theory of *structured inquiry*

Figure 6.3 depicts the conceptual make-up of the core category to have emerged in response to RQ2 – *Structured inquiry*. Consisting of some twelve distinct sub-categories (SC1-SC12), the concepts focus on aspects relating to learning, knowledge acquisition and the conditions necessary for structured inquiry from the perspective of the entrepreneurial mind-set. When applied together, they outline the collective conditions upon which an idealised *Structured inquiry* is predicated: in other words, the more rigorously combinations of the sub-concepts can be implemented in the pursuit of inquiry, the more structured the inquiry may become. It should be remembered that a successfully implemented *Structured inquiry* is contingent upon the inquiring agent having already *made sense* of his or her surroundings with respect to the conceptual sub-concepts driving the core category of *Sensemaking* (see Figure 6.1).
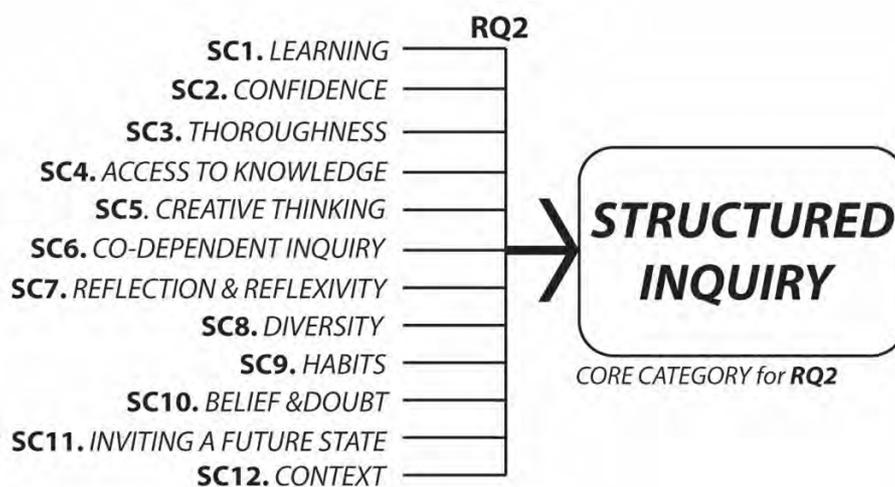
Figure 6.3   *Constituting sub-categories for RQ2*

6.2.1   Technology-mediated entrepreneurial learning

While entrepreneurial learning has received much attention in the literature (see Chapter 2), the impact of contemporary 'Web 2.0' technologies on the field has yet to be included in the debate. This section outlines the research finding in terms of addressing this gap in scholarly knowledge, and discusses the impact of an increasing reliance on technology in the context of contemporary (post-2000 CE) entrepreneurial learning, as evidenced by the extant theory grounded in the empirical data responding to RQ2.

Entrepreneurial learning is perceived as essential for productive participation in markets (Dosi & Malerba 1996; Williams 1998). Whether as an aspiring new entrant or experienced hand, changes in the workflows and procedures associated with any specialised field over time demand that operators must, if their new venture is to survive, partake in some form of ongoing vocational acquisition of new knowledge relating to evolving practice, procedure and technique. This was recognised by respondents as a form of 'passive', yet essential form of learning (RQ2:SC1#1); something with which entrepreneurs engaged (RQ2:SC1#2) as an ongoing, lifelong process, continually needing to be shaped and revised as new experiences unfold (Sullivan 2000).

Prior to the 2000s, traditional non-digital sources of information such as schools, universities, trade fairs, printed matter, inter-personal communications etc. represented standard routes to knowledge acquisition and learning. However, coupled with the ubiquitous uptake of always-on 'smart' devices since 2004/5 and the ability of such devices to connect seamlessly to vast repositories of networked, searchable information, the benefits afforded by accelerated learning (RQ2:SC4) were recognised by respondents as enabling and enhancing (RQ1:SC3) their ability to locate information and other resources quickly, and with ease.

Possessing the confidence (RQ2:SC2#1, #2, #3) to know how to structure a well-formed inquiry, how to choose the appropriate 'keywords' for a targeted search, and knowing where to begin the search process: e.g. search engine, user forum, chat room, social media etc. was recognised as an inhibiting factor for many (RQ2:SC2), as some semblance of starting knowledge was always needed to initiate a search. Not knowing the basic 'terms of the trade' or appropriate guiding *narrative* (see §2.8.5) with respect to a specialist area at once exposed outsiders as novice, putting them at risk of losing face and/or professional reputation in a forum of unforgiving – and often anonymised – experts (see RQ1:SC6#6; RQ2:SC2#3, #5, #6). Although the volume of digitised information 'out there' often presented a problem in itself (RQ2:SC1#5), if the initial search criteria were vague, or narrative relating to a highly specific area remained under-developed, then the chances of a successful outcome to a search would be correspondingly slim, or even worse: meaningless and dangerously misleading.

In such cases, the inquiring agent needs to turn to alternative forms of discovery-based inquiry – namely, inquiry premised on abductively based 'musings' to overcome the initial barrier to information acquisition outlined above. It is this form of investigative

inquiry, which remains quite distinct from other forms of learning, that is suspected of being unique to the idealised entrepreneurial mindset, and which has formed the main thrust of this study.

Such observations also support the thesis that a lack of narrative, or familiarity with the use and application of specialised terminology with respect to a new field continues to place those wishing to enter a new field at a distinct disadvantage, serving to exclude them from the community of practice with which they are trying to engage (Wenger 1998; Kuhn 1962), and for this reason, may explain why, as Politis (2005) points out, many scholars tend to choose experienced entrepreneurs (e.g. Drucker 1985; Sarasvathy 2008) as the primary unit of analysis in support of their research and ensuing theories.

However, as Politis (*ibid.*) concedes, most entrepreneurs do not arrive 'perfectly' formed: time is needed to transform novice, error-prone 'rookies' in to the experienced, less-error-prone veterans of venture creation that so often feature not as exemplar, but as the 'typical entrepreneur' in the majority of academic studies (e.g. Box *et al.* 1993; Lamont 1972; Ronstadt 1988; Sapienza & Grimm 1997).

Although the learning process involved in business and enterprise development was seen as poorly understood (Sullivan 2000), the role that recent technology has played in the efficient transfer of vocational knowledge has not gone unnoticed: respondents celebrate their relatively new-found ability to rapidly acquire new skill(s) by merely watching the inevitable YouTube video(s) on a topic (e.g. RQ1:SC6#1). Should they needed to be supplemented by theory, then any number of 'virtual' universities offer on-line courses (see Memo **M13:08**), with or without a fee, and with or without accreditation, to help close the much-discussed theory-practice gap.

While much of the learning that takes place within the entrepreneurial context is experimental in nature (RQ1:SC8), the arrival of technology as an accelerating adjunct to the contemporary knowledge acquisition process has had wide-reaching implications with respect to existing theory and practice. First, it helps to mitigate Stinchcombe's (1965) *liability of newness* encountered by new entrants to a field. By accelerating the diversity (RQ2:SC8) and availability of multiple pathways to knowledge (RQ2:SC4), new entrants to a specialised field may now become fully conversant with the nomenclature and unique terms that inform the guiding narratives vital to an understanding of new technological systems. However, while such knowledge may be

sufficient to allow the aspiring entrepreneur access to a field for subsequent commercial exploitation, it can only ever be superficial to begin with, and does not confer the type of practical in-depth knowledge that 'brute' exposure to the field over many years of direct operational experience brings.

6.2.2 Learning vs. Inquiry

Although managerial learning generally falls within the wider discussion relating to organizational learning (e.g. Dierkes *et al.* 2001; Easterby-Smith & Lyles 2003; Easterby-Smith *et al.* 1999), it has received relatively little attention in terms of its specific application to entrepreneurship. As Deakins (1999: 23) points out: "*our limited knowledge and understanding of the interaction of learning and the entrepreneurial process remains one of the most neglected areas of entrepreneurial research.*"

Organisational and entrepreneurial learning was discussed in Chapter 2, and although much theoretical work has been undertaken in both areas to date, one must consider the relevance of either to the role of the start-up entrepreneur, who neither works within a traditionally-defined organizational context (see §1.3.2), nor 'learns' according to the collectivist (as opposed to individually-based) theories associated with 'organizational' learning (see §2.2.2).

Although Cope (2001) recognised the distinction between entrepreneurial and organizational learning and the inherent differences between individual and collectivist approaches to learning, neither take in to account the relevance of the temporal factor as it relates to change over time, much less the presence of massively transformative technologies, which were only just beginning to be recognised when Cope was writing.

The majority of defining scholarly work undertaken in these areas occurred prior to the emergence of a Web 2.0 world (i.e. before 2004 CE), and although much of that work remains valid in so much as traditional organizations and modes of learning continue to exist, such theories are gradually succumbing to the forces of a massively interconnected digital economy; the networking effects of which are progressively supplanting long-held beliefs and views relating to organizations and learning.

The findings of this study suggest that an individual, structured approach to inquiry, rather than a concept of 'organizational' learning (discussed in §2.2), is required in order to

respond to the ever-changing demands of business in an information economy, as driven by the technological and human agencies described in §2.5. Outlined in §1.1, survival and short-term growth are the two driving needs that inform much entrepreneurial action during the formative start-up years of a venture. *Learning* (see RQ2:SC1) is seen as a necessity in terms of being able to keep pace with the demands of a changing environmental landscape, dictated mostly by advances in the technology that both enable and accelerate the exploitation of opportunity in the service of business profits (see Memo **M15:16**). In other words, entrepreneurial learning arises as a habitual response (RQ2:SC9) to the need to survive and grow a business.

The empirical data demonstrates that the mutually interrelated domains of content (knowledge) and process (learning) can no longer be associated with the entrepreneur alone, but arise because of the entrepreneur's interaction with change, or rather, the high-velocity environments of change driven by contemporary ICTs. Furthermore, this supports Caldwell's (2006) contention that the debate is no longer driven by the structure and agency debate of Giddens (2004), but is better informed by a theory of agency and *change*; where structure continues to be acknowledged, but is viewed from the perspectives of process and system.

6.2.3   Approaches to inquiry

Entrepreneurial inquiry, as described by the narrative excepts responding to RQ2, was based on twelve emergent sub-categories which, between them, defined the core-category for RQ2. *Structured inquiry*, as elaborated by the respondents taking part in this study, was therefore premised on the entrepreneurial adoption of one or more of the constituting sub-categories when formulating an approach to inquiry. In the normal course of inquiry, respondents would typically rely on a limited spread of sub-categories. However, the more experienced 'exemplar' respondents were seen to rely on a broader spread of conceptual categories when formulating their inquiries, suggesting that the more tools and techniques that could be applied towards a resolution, the better the outcome could be. Accordingly, as more concepts are progressively worked-in to the approach, the more likely it is that an ideal instantiation of *Structured inquiry* will result.

a) Accelerated inquiry and learning

Chapter 2 explained how inquiry could be viewed as a multi-dimensional, investigative approach to learning, where time provides the essential continuity between the stages that eventually lead to wisdom. With the repeated application of knowledge over time, experience is reified in to wisdom, after which the possibilities for self-actualisation are said to appear (Zeleny 1987).

RQ2 questions the effect that contemporary communications technologies are having on normative approaches to inquiry, and therefore the speed with which wisdom – and ultimately self-actualisation – is conferred. Specifically, 'Web 2.0' on-line platforms that facilitate the multi-directional interchange and instant interaction between individuals and other resources were referenced as being enablers and accelerants of the process.

Narrative excerpts confirmed the notion of an accelerated inquiry/learning enabled by post-2004 information systems by enthusing about the way in which knowledge acquisition had been transformed since the arrival of Web 2.0. Not only did it encourage and enable a form of continuous 'passive' learning (RQ2:SC1#1) that had been associated by others as entrepreneurial in nature (RQ2:SC1#2), but in the context of entrepreneurial activity it was seen to facilitate the early recognition and subsequent acquisition of cutting-edge knowledge that could offer a competitive edge.

b) Individual and collective/group inquiry

Respondents **ST10**, **ST13** and **EX2** explained how a collective, 'brainstorming' approach to inquiry was preferable when compared to individual attempts. The various approaches required appropriate situational context (relaxed, convivial atmosphere), the right 'kind' of co-inquirers (non-authoritarian 'boss' or management figures), and a willingness to unabashedly rely upon hunches and/or an intuitive 'gut' instinct in a group setting. Perhaps in a bid to further divorce the proceedings as much as possible from the serious nature of work-oriented meetings, such gatherings would also be characterised by an atmosphere of playful – almost juvenile – fun (see also excerpts RQ2:SC5#2, #8, #9) which tended to lower inhibitions and give a voice to those who would otherwise be intimidated by the strictures associated with conventional office settings.

Contemporary technologies also played a prominent role in enabling the process: smart devices connected to a WiFi Internet hotspot were not only preferable, but represented an indispensable prerequisite for any meeting. Indeed, it was mentioned in e-mail exchanges with respondent **ST10**[2] that the selection of a good brainstorming venue was contingent upon the availability of a sufficiently fast in-house internet connection, as well as free use of power sockets via which their various [smart] devices could be charged.

Peirce and Dewey were both of the opinion that seeking truth and knowledge was not a task for the lone inquirer, but was best served by communities of inquirers (Choo 2016: 10), where the community is open, inclusive and operates on democratic principles. That two of the founding fathers of pragmatism should make such an observation is not only a clear indictment of the pragmatic dimensions that accompany co-dependent inquiry, but the communal aspect associated with it is also reminiscent of Wenger's (1998) *Communities of practice* (see §2.2.3), and the coming together of experts/professionals engaged in an empirical pursuit of problematic situations.

Such communities were identified by Kuhn (1962) as being associated with the emergence of successive scientific revolutions, where the initial differences in worldview and language among community members pertaining to a certain (specialist) field would balance-out over time, resulting in group consensus when advancing a new paradigm. The very openness and diversity (RQ2:SC8) of the communal, group dynamic ensures that the process of inquiry will eventually result in a convergence on what is true, or at least true with respect to the cultural milieu and environmental context of the time.

The respondents taking part in this study exhibited a similar – but not identical – approach to inquiry, where the significance of co-dependency was recognised by the conceptual emergence of *Co-dependent inquiry* (RQ2:SC6) in response to RQ2. Furthermore, respondents referred to the importance of *Experimenting* (RQ1:SC8) as a productive means of trial-and-error in enacting *Structured inquiry* (core category of RQ2).

The way in which inquiring agents are being connected to other like-minded experts to instantaneously form specialist virtual communities is unique to the contemporary ICT/Web 2.0 milieu. Here, on-line digital forums, Twitter, LinkedIn, Facebook, and many more are facilitating the accelerated and enhanced reach of digita*l* social *Networks*

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[2] See Memo entries **M14:14** and **M15:07** (Appendix M)

(RQ2:SC4), able to intelligently match and introduce previously unacquainted global experts to one another. As such groups begin to progressively coalesce over time, it is inevitable that they will – at some point – be partially or wholly responsible for the emergence of new communities of practice driving new paradigms in accordance with Kuhn's (*ibid.*) thesis. Human discovery and creativity at such a globally integrated level has never before been possible, and it is only on account of the combined agencies of entrepreneurial intent and advanced ICT/Web 2.0 accessibility that this is possible at all.

Multi-participant, *Co-dependent inquiry* (RQ2:SC6) was recognised for its ability to draw on the collective expertise possessed by groups of individuals, especially when brainstorming or convened as a planned, interactive group session. On account of its 'combined potential for creativity' (see Memo **M14:29**) the collective approach to inquiry was always deemed preferential to solo inquiry.

It should also be mentioned here that instances of Habermas's *ideal speech situation* and Bohm's *Dialogue* (see §2.7.4) were unwittingly applied by respondents in group situations to ensure that all had a voice. When asked, none had any prior knowledge or awareness of the theories of Habermas or Böhm, and it appears that both techniques may be a natural response deployed by groups of inquirers wanting to escape various power/authority dynamics in closed work situations. When pressed for further information during follow-up discussions (see memo **M15:07**) it transpired that while none of the participants followed the prescribed guidelines relating to the (Böhmian) *dialogue* or (Habermasian) ideal speech situation outlined in §2.7.4, what they described procedurally in terms of their own brainstorming sessions sounded very similar indeed.

The empirical research suggests that when groups of individuals gather with the same creative ends in mind, the productive output from such sessions has the potential to be astonishing (see memo **M14:29**). It seems preferable to approach collective inquiry via two-stages however, as explained in the memo, and as also outlined in the narrative excerpt RQ2:SC5#3. Whether this phenomenon is specific to groups of entrepreneurial participants remains unanswered at this time, however, as the respondents in this study did not comment on the make-up of the groups in which they participated.

c) Cognitive disengagement

When faced with a challenging situation or the need to initiate creative inquiry, respondents frequently engaged with what they referred to as their 'discovery' mode (e.g. RQ2:SC4#4), which involved a 'zen-like' state of abstraction (RQ2:SC5#5) requiring the right 'frame of mind' and 'engagement with a creative mind set' (RQ2:SC5#11): all terms used by respondents to refer to a state of dream-like, cognitive disengagement. Here, they explained how creativity was best encouraged when they did not think about it: hence, by not dwelling on an issue, but by allowing issues to 'dwell in the back of the mind', a 'vacuum' of potential seemed to arise, otherwise referred to as a 'space that needed to be filled' (RQ2:SC5#1). The phenomenon was contingent upon the subject being disengaged from active thought processes (RQ2:SC5#10), and was often encountered when engaged in repetitive, automatic, or *habitual* tasks that required little attention or concentration. For example, when walking, driving, or in the period just after waking or preceding sleep.

d) The power of diversity

Upholding a habitual culture of diversity ensures that inquiry remains current, free from dogmatic ossification, and immune to 'business as usual' in terms of its initial starting conditions. In other words, when combined with a critically reflexive outlook, diversity provides that essential perturbation, or disturbance, to the status-quo needed to encourage emergent creative phenomenon. It prevents the same questions from being asked of the same problems, forcing the inquiring agent to reformulate the way(s) in which questions are framed from a variety of alternative approaches. One respondent described it thus:

RQ2:SC4 #17 EX4	*"Solutions are no longer based on one single source of information: the more diverse the information source, the more surprising the yield in terms of creative solution. For example, users rely on smart phone technology to access Facebook and Twitter via a wireless connection to gather responses from expert user groups; key-words are mined from those expert responses to form a new search engine 'metasearch'. You then take those results and present them to your team - chew over with your colleagues. Now, just think about how many sources – human and non-human - that you have relied upon here."*

The category RQ2:SC4 – *Access to information* – corresponds to two further concepts linked to recent advances in ICTs and the massively-networked information systems able to facilitate the exchange of information between disparate sets of users: i) It demonstrates that *Diversity* (RQ2:SC8) is a concept to be considered not only in terms of the diversity of available information sources, but also diversity in terms of the global expertise that

is now available when considering a particular problem; and ii) It also informs RQ1:SC4 – *Networks* in terms of the global reach that business networks are now experiencing.

Referred to by several respondents (see for example RQ2:SC8#3; RQ2:SC5#3) as a powerful catalyst for productive, creative inquiry, the process is initiated by gathering a group of relevant keywords, or forming a representative proposition from a hypothetical hunch or suspicion concerning a topic of interest. The keywords form the input for a search engine query and are used to form 'novice' questions for submission to a specialist user group or forum on a social media platform (e.g. Twitter, Facebook user group). A multitude of responses based on search algorithms plus the considered 'expertise' of remote experts may then be elicited from a potentially global cohort of 'expert' followers monitoring the relevant on-line forums and discussion boards

The above scenario represents an instantiation of Churchman's (1971) Leibnizian '*fact net*', where the known inputs to an inquiring system are cast as widely as possible to a disparate yet diverse audience. Whereas Churchman expressed concern regarding the severe limitations associated with fact nets based on 1970s computing power, he was nevertheless able to presciently anticipate its potential with respect to the massively-interconnected information systems that he thought might be available after the turn of the century.

e) Appreciative inquiry

It was suggested by Cooperrider & Srivastva (1987: 129-169) that the overuse of traditional problem-solving methods in the pursuit of inquiry impeded normative paths to social improvement, and what was needed were methods of inquiry that would help generate new ideas and models that accepted relentless change and chaos as *given*, rather than making attempts to retrospectively adapt to change. This gave rise to the notion of *appreciative inquiry* as a model that endeavours to include all stakeholders in a set of processes leading to self-determined (reflexive) change.

As described by Bushe (2013: 89-113), appreciative inquiry:

> …advocates collective inquiry into the best of what is, in order to imagine what could be, followed by collective design of a desired future state that is compelling and thus, does not requires the use of incentives, coercion or persuasion for planned changes to occur.

In Appreciative Inquiry, we take a different perspective. When we define a situation as a 'problem,' it means that we have an image of how that situation ought to be – how we'd like it to be. Appreciative Inquiry suggests that, by focusing on an image of health and wholeness, the organization's energy moves to make the image real. Indeed, the seed of the solution are in the images, and therefore it is not unusual to see a system shift directions 'at the speed of imagination!'

Bushe (2013: 89-113)

A number of insightful parallels may be drawn here. First: appreciative inquiry differs in that it only recognises human agency in the construction of organization. While the emergent concepts here do indeed point to the creation, maintenance and change of organization by conversation (narrative), the model may need to be updated to reflect changes in the role that technology has played since the original research concerning appreciative inquiry was conducted in the late 1980s and 1990s. Such change would include an appreciation for the concept of i) the organizational status of the start-up as organizational in the 'becoming'; and ii) constant change and a corresponding reflexivity in approaches to inquiry, as suggested by this research.

The second insight draws on the similarities noticed between appreciative inquiry and Vickers' (1968) concept of the appreciative *system*, where the appreciative system attempts to differentiate the study of human systems from [non-human] systems in their natural state. Here, a conceptual progression may be established between a person-centric notion of inquiry and one that paves the way for a *systems-centric* path to models of organization; thereby admitting that non-human agency may also play a relevant part in appreciation and inquiry. Brocklesby (2007: 160) stresses the systemic nature of the appreciative system thus: "*Rarely when someone makes a statement or formulates a proposition about an event or situation, does the statement 'come out of the blue'. Nearly always it is grounded in some greater whole. Vickers uses the term 'appreciative system' to describe this greater whole.*"

f) Habitual action in the pursuit of knowledge

Habitual action in the approach to, and execution of inquiry was present not only as an emergent conceptual indicator (RQ2:SC9) responding to RQ2, but also appeared repeatedly as a precursor to best practice inquiry and forced diversity via the concepts of *Thoroughness* (RQ2:SC3#4, #5), *Reflection & Reflexivity* (RQ2:SC7#4) and *Context* (RQ2:SC12#1); referred to variously as 'pressing the reset button' or 'starting over' in a bid to invite enhanced diversity, escape the 'status quo', and prompt new modes of perspectival thinking.

By repeatedly forcing a fresh set of 'initial conditions', any meaningful balance is temporarily 'perturbed', or 'shook-up' (see Memo **M16:01**) in order to challenge any settled dogmatic beliefs, or stubborn adherence to old beliefs. The entrepreneurial mindset is therefore engaged in a cycle of creative destruction at the cognitive level. The role of Web 2.0 technologies in this cycle now becomes clear: they offer accelerated access not only to local, but also disparately located sources of knowledge and expertise that may assist with the resolution of an inquiry.

Parallels may be drawn here with chaos and complexity theory (cf. §2.4.1 and Memo **M16:01**), in that the habitual perturbance of initial conditions is what ultimately leads to the creative turn. Here, the entrepreneur is seen to be inviting chaos by deliberately unsettling the status-quo – or balance – in terms of its contextual sensitivity. Once chaos has been invited via the addition of some perturbation, it is then the task of the entrepreneurial mindset to recover the system from a disharmonious state, back to one of harmony, or stasis. This is what Peirce was referring to when describing the settlement of belief as being a response to 'doubt': doubt is the troublesome (nagging) perturbation, and its neutralisation via structured inquiry is the restorative action.

6.2.4   The process of inquiry

a) Abductive musing, critical incidents & unexpected surprises

Few entrepreneurs embark on the path to venture creation without a certain level of prior 'entrepreneurial preparedness' (Harvey & Evans 1995), and although prior experience relating to business acumen and a specialised field may be helpful, success never comes without the need to endure 'painful' learning events (Snell 1992). The enduring significance of these critical incidents was recognised empirically in *Prior exposure* (RQ1:SC7) and *Learning* (RQ2:SC1). The approach to venture formation should not be underestimated, as both form part of an important trigger mechanism seen to stimulate *Creative thinking* (RQ2:SC5) in the lead up to *Co-dependent inquiry* (RQ2:SC6).

Revisiting Peirce's definition of abduction:

> The surprising fact, C, is observed.
> But, if H were true, C would be a matter of course, hence
> there is reason to suspect that H is true.
>
>   (EP 2:231)

Notions of the 'unexpected' or 'unanticipated' surprise occur frequently during the coding of RQ2, where respondents were essentially describing the emergence of pre-abductive hypotheses. Here, a 'surprising fact' is brought to the attention of, or 'observed' by the subject (Peirce EP 2:231). The possibility of the 'surprise' as being a potential contending hypothesis in the formulation of a new idea is then considered. Note that this does not concern all surprise situations, but only those that emerge when the subject is in the correct situational and temporal contexts, as outlined in RQ2:SC5#1, #10, and §5.4.1.

b) Retroductive inference as creative heuristic

Chapter 2 introduced the three modes of reasoning, or logical inference, traditionally associated with inquiry: deduction, induction and abduction. Although abduction as a distinct form of logical inference is variously referred to as abductive reasoning, abductive inference, retroductive abduction, or simply *retroduction*, retroduction proper has associated with it broader properties that further distinguish it from abduction, and which have implications for the type of reasoning and inference explored by this study. Accordingly, retroduction should never be equated, or confused with, mere abduction.

As pointed out by Chiasson (2005), Peirce considered his theory of abduction as essential to, and even an overarching part of, his theory of pragmatism, suggesting that it represented '*nothing else than the question of the logic of abduction*' (CP 5.196). While abduction refers to a distinct form of logical inference, retroduction describes the *processual* approach to inferential reasoning that encompasses abduction, induction, deduction and a cyclically recursive temporal element. Furthermore, retroduction cannot be considered without reference to the relational patterns that exist between the three basic forms of inference, and so cannot be equated solely with abduction.

Chiasson suggests that abduction is defined by the cycle of steps shown in Table 6.2:

Table 6.2   *The abductive cycle*

1. **Bring a new idea (or hypothesis) up from the region where "all things swim" in the continuum by means of abduction (beginning with an aesthetic inference, which by following the "form" of abduction in Peirce's critic, becomes a logical inference);**
2. **Use deduction to explicate and demonstrate aspects of that idea;**
3. **Use induction to evaluate and secure that idea (however temporarily).**

<div align="right">Chiasson (2005)</div>

Retroduction is suggested by Chiasson (*ibid.*) as referring to the entire abductive-deductive-inductive cycle shown in Table 6.3, reserving the term *abduction* to specifically refer to its distinctive type of inference.

Table 6.3   *The retroductive cycle*

1.	**A surprising fact is noticed.**
2.	**An aesthetic (unfettered) exploration of qualities and relationships is made.**
3.	**Abductive reasoning is applied to make a guess that could explain the surprising fact.**
4.	**Deductive reasoning is applied to explicate the guess in readiness for testing.**
5.	**When ready, inductive reasoning is applied to test and evaluate the guess.**
6.	**Abduction or deduction is used to interpret that evaluation (or new information is produced) and the cycle begins again until a hypothesis (or "conditional purpose") has been fully engendered and is ready for formal explication and testing.**

<div align="right">Chiasson (2005)</div>

6.2.5 Inquiring heuristics

a) Negative conceptualisation

Respondents **ST11** and **EX2** made reference to a particular approach to inquiry that unwittingly relied upon a (Hegelian) dialectical approach to resolution, but from a negative starting point. Subsequent discussions with both respondents (Memo **M14:08**) confirmed that neither had had any prior training or exposure to philosophical thinking of any kind, and so the technique could be said to have arisen intuitively. '*Knowing where to start*' had been referred to by respondents (e.g. RQ1:SC6#2) as a common barrier to initiating productive inquiry, and in order to address this issue, similar – but not identical – techniques had been developed in response: by premising the starting point on what *not* to do, they had unwittingly invoked a hybridised version of Adorno's (1966) *Negative Dialectic*, where something positive could be achieved by means of negation.

In this respect, the entrepreneurs had realised that they were able to capitalise on the mistakes and errors of their past by exploiting the inverse aspects of historic failure(s), in the hope that the technique would at least yield some semblance of positivity, advantage or benefit. Clearly, more experienced entrepreneurs were able to draw on ever-larger stocks of 'failure', all of which contributed towards enhanced creativity and learning when applied to the resolution of future problems. When considered in a group context where entrepreneurial minds are able to collectively apply such techniques, and especially

when combined with other techniques described in this section, a powerful heuristic for creative inquiry is seen to emerge.

There is an argument here to suggest that this is simply an alternative explanation for experience reflectively applied in the face of past failure, or even a form of introspective reflexivity, which also emerged as a sub-category (RQ2:SC7), but this does not align with the evidence: both respondents claim to actively take an opposite viewpoint to the negative aspects of what they are considering, drawing not only on their own past failures, but also on other events that are known to have resulted in failure. In essence, it appears to be a purposeful exercise in 'failure bricolage' (see §2.5.5 discussion on bricolage).

In the narrative excerpts provided by RQ2:SC5#8 and #11, the respondents are clearly making use of 'home-grown' heuristics to aid inquiry unwittingly based on a form of *Negative Dialectic*; an alternative form of dialectic proposed by Adorno (1966) based on the Hegelian dialectic, and before that, the Platonic notion of achieving something positive by means of its negation. Here, 'truth' may be ascertained via the realisation that things incorporate their own negation, and via such a recognition, the parts may be assimilated to form something greater. As opposed to Hegel's synthetic triad of thesis → antithesis → synthesis, the negative dialectic, as explained by Adorno, is the negative form that seeks to free traditional platonic dialectics from such affirmative traits, without reducing its determinacy (Adorno 1966: xix).

As pointed out by Jarvis (1998) negative dialectics attempt to advance a kind of 'philosophical materialism' that is both historical and critical, yet able to avoid dogmatism; suggesting that Adorno's eponymous title on the subject is merely a 'metacritique' of idealist philosophy constructed from Kantian and Hegelian schools (O'Connor 2004; Jarvis 1998: 148-74).

b) Pitching opposites / bisociation

Koestler (1964) cites a similar dialectical tension as fundamental progenitor to the creative process in his attempt to develop a general theory of human creativity. Referring to the creative talent of the comedian and how humour is able to evoke sudden laughter, he maintains that the essence of creativity lies in *"the perceiving of a situation or idea, L in two self-consistent but habitually incompatible frames of reference, M1 and M2."* (Koestler 1964: 35). Invention and discovery share a common pattern referred to as

bisociation, as distinct from mere *association*. He addresses the processes leading to discovery, invention, imagination and creativity, and proposes an elaborate general theory of inquiry, which immediately draws strong parallels with the creative turn of the entrepreneur. Here, previously unrelated 'habitually incompatible' elements of experience or thought combine to form a new matrix of meaning by way of processes involving comparison, abstraction, categorization, analogy and metaphor. Koestler (*ibid.*) further noted that 'bisociative' breakthroughs tend to be experienced during times when conscious effort is focused not on the goal or problem, but during the intervening periods of relaxation, such as sleep or meditation, where rational thought is abandoned, and novel concepts and ideas tend to emerge spontaneously.
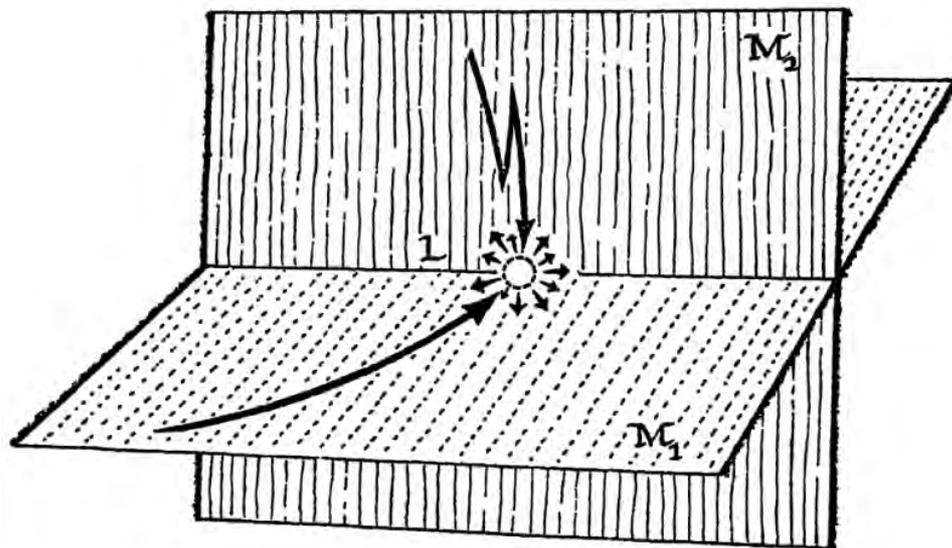
Source: Koestler (1964: 35)

Figure 6.4   *Koestler's representation of bisociation*

c) Concept shifting

Well defined problems usually present inquirers with an easy solution pathway, whereas the unstructured, unpredictability of today's business environment tends to give rise to ill-defined problems, lacking in structure, and requiring what Checkland (1981) referred to as 'ill-defined problem solving'. Rittel & Weber (1973) had previously referred to such problems as 'wicked', and Ackoff (1978) referred to them as 'messy problem solving'. As pointed out by Ulrich (2003) a critical approach to inquiry is required when addressing these types of problems, where assumptions from multiple sources and perspectives are

used reflectively to generate new ideas and even further questions in pursuit of one or more solutions.

Discussions alluding to co-dependent and group decision-making, or brainstorming, demonstrate the application of traditional consensus-based approaches to problem solving, or approaches that are built on a rationalist foundation. In such scenarios, consensus between participants is sought when not only formulating the original problem space, but also in determining how resources are to be deployed and marshalled to produce multiple possible solutions. In traditional brainstorming sessions an impasse is reached once all efforts have been exhausted (Eden 1992), and this is the point at which the problem is deemed too difficult to solve.

However, entrepreneurial collectives seem to engage in a different type of group dynamic at this point: whereas their corporate counterparts may deem a problem finished, if not solved, entrepreneurs appear to deploy a more critical attitude to conceptual formation, dispensing with conventional boundaries, ideologies and values (Foote *et al.* 2006), and deploying techniques akin to what Houghton & Tuffley (2015) described as 'concept shifting'; perhaps as a way of varying the problem context in response to conceptual variation (see Midgley *et al.* 1998). Such concept shifting permits the speculative invitation of future scenarios (cf. RQ2:SC11 – *Inviting a future state*), premised on what appear to be less-than-rational starting points. Such irrationality would never be allowed in the laboratory, and so represents yet another distinguishing feature between scientific inquiry and entrepreneurial based reasoning/inference.

A comparative review of Ackoff's work on problem solving (e.g. Ackoff 1993, 1999) suggests that respondents may be engaging here with the same kind of balancing used when a lack of guiding narrative is encountered (see §2.3.1). As mentioned by Houghton & Tuffley (*ibid.*: 284) in explaining Ackoff: "*problems are caused by tensions between conflicting interpretations and actions and the resultant ambiguity. He recommended an approach where you could focus on those tensions, dissolve them, and the problem would no longer be significant.*"

d) *Contextually optimised settings*

In the lead-up to decision making, *Context* (RQ2:SC12) was found to play a significant role in guiding many of the processes involved in entrepreneurial inquiry, thereby

underlying the structured approach to decision making as suggested by the core category for RQ2. Furthermore, when considered in terms of its importance across all three research questions, the sub-category ranked eighth out of 32 total conceptual indicators, suggesting that it may be of significant importance in terms of its contribution to entrepreneurial inference.

As noted by McKeever *et al.* (2014), context is recognised as a critical factor when explaining the situatedness of entrepreneurial process. The importance of context (RQ2:SC12) in relation to how inquiry and entrepreneurial processes are enacted was also stressed by respondents who cited the need for a constant recognition, awareness and understanding of how change (temporal, environmental, technological, cultural etc.) had the power to influence progress and influence outcomes; and that an awareness and recognition of such unpredictability was vital to success. The importance of context has previously been recognised by others too, in terms of place (Granovetter 1985; Steyaert & Katz 2004) and its social situatedness (Cope 2005; Fligstein 2001). Table 5.2.12 suggests that a balanced contextual view was achieved by an outwardly creative disposition coupled with an appreciation of change, driven by a reflective outlook. In other words, entrepreneurial inquiry could be said to be an inherently critical type of creative inquiry, underscored by an appreciation of the need for a reflexively recursive improvement over time. Again, the importance of a historical context is highlighted, where inclusion of the historical record is noted as playing an increasingly critical role in defining entrepreneurial action.

Being surrounded by 'the right kind of people,' in 'the right kind of place' (RQ2:SC5#6, #12) and being amenable to 'unrestricted, abstract thought' (RQ2:SC5#11) alludes to the relevance of what McKeever (2014) refers to as 'contextual situatedness.' For some respondents, optimal conditions for structured inquiry required engagement with so-called 'modes of discovery' contingent upon an appropriate situational context combined with a 'disengaged' state of mind. The exact contextual 'mix' – and how it was achieved – differed from one respondent to the next, but in each case resulted in the ability to engage with creative discovery, or what Peirce described as 'musement'.

Mathias *et al.* (2015) further point out that context has also been shown to be highly significant to the imprinting process outlined by Johnson (2007), and is evidenced in this study via a direct conceptual links with the category RQ2:SC12 (*Context*). Here, the link between historical exposure and the nature of entrepreneurial inquiry is also established,

as RQ2:SC12 is a conceptual indicator driving the core category of *Structured Inquiry*. The link may be further developed when one considers the relevance of *Context* as exhibited by other codes pertinent to RQ2.

On analysis of the constituent properties driving the emergent codes for RQ2, *Context* is coded 80 times, representing 8.5% of the conceptual expressions driving the core category for RQ2 (*Structured inquiry*), and ranking fifth in terms of its importance for the category (see Appendix S2). Context, in the forms elicited here, is therefore a contributing factor to the successful formation of structured inquiry.

e) Counterfactual propositions
(See relevant excerpts RQ2:SC11#1, #3, #4, #8, #9, #11)

The narrative excerpts cited above provide evidence of counterfactual thinking, which is an abductively based heuristic used in the formation of structured inquiry. Counterfactuals are the consideration of what 'might have been' and are concerned with thoughts about alternatives to past events, actions, or states (Byrne 2005; Roese 1997). In other words, by considering what might have been, had the initial choice(s) been different, an alternative outcome may have ensued.

The counterfactual resembles an abductive approach to inquiry, where the process begins with a suspicion regarding the state of things (Swedberg 2014), but instead of venturing a hypothetical (via hypothesis), an element that is considered crucial to the existing state of affairs is removed and an alternate world that differs in one key aspect is postulated.

As Epstude & Roese (2008) point out, the mental models behind counterfactual thinking have been shown to form the basic building blocks of creative reasoning, and how particular pieces of information may be associated in order to form new inferences. (Feeney & Handley 2006; Byrne 2005, 2002, 1997; Byrne & McEleney 2000).

f) Temporal shuttling and shifting between perspectives
(See RQ2:SC11#2, #5, #8, #10, #11)

Temporal shuttling, or being able to cognitively 'time-shift' between perspectives was a commonly used tool for envisaging future states as part of a structured approach to inquiry. Based very much on the need to think perspectively (Haynes 2000), and closely allied to

Reflection & reflexivity (RQ2:SC7), both techniques serve to imagine future scenarios based on past experience and events. Perspectival thinking entails the successive shifting from past to present, to past again, in order to invite spontaneous emergent revelations. The concept of *temporal shuttling* was outlined as a technique used by respondents to envisage or invite future states. Indeed, *Inviting a future state* (RQ2:SC11) had emerged independently as a sub-category in response to RQ2, and therefore contributed directly to the formation of the core category, *Structured inquiry. Temporal shuttling* demands that the present is temporarily suspended, or bracketed, while the subject transcends his or her own subjective here-and-now in order to imagine how the world might be at some future point. Respondent **ST12** (excerpt RQ2:SC11#7) applied the technique as a means of financial forecasting, where he operated his business *as if* six months ahead of time. In so doing, he claimed to always have a six month 'window' of opportunity in the present to mitigate any unforeseen circumstances that had would not even happen for at least six months; thereby providing a safety net for proactive, timely, remedial intervention.

6.2.6   Kantian and Singerian inquirers

Churchman (1971: 189-191) maintains that two premises underscore Singerian inquiry: the first declares the series of steps that must be followed in order to resolve any incongruities that exist in and among the members of a given inquiring community. The second concerns a stratagem of *agreement* (Churchman 1971: 199) needed to address any potential lack of agreement which may arise for any number of reasons, such as differences between individual and collective worldviews, cultural background, and training. Where explanatory models or solutions are deemed inadequate, new variables may be 'swept-in' to quench any incongruities or inconsistencies.

Parallels may now be drawn between entrepreneurial inquiry, as characterised by the aggregate sub-categories expressing RQ2, and the Kantian/Singerian inquiring system models proposed by Churchman, as two of his five inquiring systems, originally introduced in §2.9.6, and outlined in Tables 2.6 and 2.7.

The contemporary high-tech start-up venture, as defined in this study, may be aligned with Churchman's (*ibid.*) typology of inquiring organisations as either a Kantian or Singerian inquiring system, depending upon the start-up's position in its life-cycle. Where entrepreneurial experience and prior exposure are sufficiently low as to invite a high likelihood of premature mortality, the start-up begins life by exhibiting all the

characteristics of a Kantian inquiring organization (see Tables 2.6 and 2.7). In contrast with the established (corporate) Singerian inquirer, the Kantian *start-up* begins as a blank slate*,* depending on the initial spark(s) of entrepreneurial intuition that abductively 'jump-start' the inquiring system in to action. The start-up begins life by exhibiting all the characteristics of a Kantian start-up, characterised thus:

- Organizational memory is minimal, held as loosely tethered tacit and explicit knowledge drawn from early exposure, past employment, and academic training

- Structure (legal, business, management) is almost entirely absent

- Learning is initially restricted to a 'scan' of limited, existing knowledge, and depends on the ability to initiate further inquiry by the exploitation of hunches, spontaneous sparks of intuition, skill in framing questions, selecting search keywords etc.

- The learning orientation of the venture is specialised, but otherwise without form or structure

- The learning sources are pragmatic yet semantic in nature. i.e. Enthusiastic but inexperienced: A well intentioned lack of common sense combined with a lack of business acumen

Only once the venture has moved-out of the start-up phase does it begin to exhibit properties of a Singerian inquiring system (Tables 2.6 and 2.7).

To summarise the above points, the inexperienced founders possess generative ideas and intuitions of which they are fully aware, but lack sufficient heuristics to operationalise them during the start-up phase, either from a technical, or a business perspective. It is for these reasons that during the Kantian stage of inquiry the venture is at its most vulnerable.

6.2.7 Revisiting *The Fifth Discipline*

Senge's (1990) *The Fifth Discipline* is revisited by offering an alternative interpretation based on the findings of this study, and considers how the original model may be re-cast in to Churchman's (1971) typology of *inquiring* organizations (see §2.9.6); namely, the *Kantian* inquirer and the *Singerian inquirer.* The model still adopts systems thinking as its 'fifth discipline', but the triad of *Sensemaking* (RQ1), *Structured Inquiry* (RQ2) and *Principled Praxis* (RQ3) arising from this research are offered in substitution for – but do not necessarily replace – the other disciplines of *personal mastery, mental models, team learning* and *shared vision*. Indeed, vestiges of the four original constituting disciplines may be readily identified across all 32 of the conceptually elaborated properties informing the core categories responding to the three RQs. For example, **mental models** may be

traced directly to several sub-categories responding to RQ2, such as SC5 (*Creative thinking*), SC7 (*Reflection & reflexivity*) and SC11 (*Inviting a future state*). Similarly, **personal mastery** is found in sub-categories spanning all three RQs, namely: RQ1:SC3 (*Empowerment*); RQ2:SC3 (*Thoroughness*) and RQ3:SC1 (*Doing the right thing*). **Team learning** is evidenced by RQ2:SC1 (*Learning*), RQ2:SC5 (*Creative thinking*) and RQ2:SC6 (*Co-dependent inquiry*); and finally, elements of **shared vision** are exhibited by the properties driving many of the sub-categories, but are mostly encapsulated within RQ2:SC11 *(Inviting a future state)* when coupled with RQ2:SC6 (*Co-dependent inquiry*).

Furthermore, where the three core categories of *Sensemaking*, *Structured inquiry* and *Principled praxis* have found correspondence with Peirce's categories of firstness, secondness and thirdness (see §6.3.5), the pragmatism that was previously absent in Senge's four constituting disciplines may now be said to be included via the in-built qualities inherent with RQ1, RQ2 and RQ3; therefore providing a conceptual fit with Peirce's concept of the categories: the foundational basis for reality on which (his version of) pragmatism was originally conceived.

The implications for such theorising are that Senge's (1990) seminal work may continue to offer currency in the contemporary era when considered in conjunction with a Peircean take on reality, as dictated by his triad of categories. In other words, the 1990's reality in which *The Fifth Discipline* was originally situated may be adjusted to reflect a reality based on chaos, change, and complexity by realigning the five 'disciplines' in line with contemporary needs. Indeed, in realising the creeping anachronisation of his original theory, it is possible that the additional one hundred or so pages added to the second edition of the book (Senge 2006) constituted an attempt at such an update, although it did so without any reference to, or realization of, any underlying connection with Peirce's original philosophy. The findings of this study therefore highlight the continued relevance of Senge's work when viewed adaptively via the lens of a Peircean categorical reality, in support of its potential ongoing utility as an inquiring heuristic.

6.3   A grounded theory of *Principled praxis*

The third and final grounded theory emerges in response to RQ3 and informs the core category *Principled praxis*. Building on the existence of the two preceding rounds of theory it is cumulative in nature; being informed not only by the eleven-constituting conceptual sub-categories that contribute directly towards its definition but being also contingent on the contributions of the 12 and 9 sub-categories informing *Structured inquiry* (RQ2) and *Sensemaking* (RQ1) respectively.

In other words, *Principled praxis* cannot exist – or be operationalised – unless informed by, and contingent upon, a *structured* approach to *inquiry*, which in turn is underscored by the foundational contingency of an inquiring agent that is able to *make sense* (RQ1) of a world characterised by uncertainty and technological change. In this respect *Principled praxis* may be described not only as the core emergent category responding to RQ3, but also as the 'master' category responding to the aggregate concerns of the whole research endeavour, as cumulatively demanded by all three research questions. It could be said to represent a denouement of the three-staged grounded theory process upon which the entire study is based.
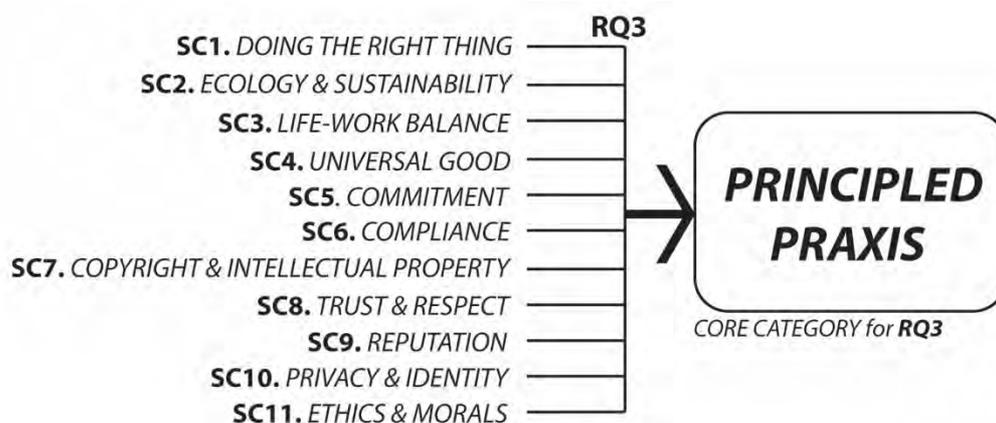
Figure 6.5   *Constituting sub-categories for RQ3*

Figure 6.5 outlines the eleven distinct conceptual sub-categories driving the core category of *Principled praxis*. The holistic relationship seen to exist between the sub-categories responding to RQ1 and RQ2 is now extended to include RQ3, whose constituting sub-categories not only exhibit strong conceptual allegiance between each other, but also show strong interdependencies and affiliation with the sub-categories that inform RQ1 and RQ2 as well. 'Superpositioned' conceptual structures like this, likened to Russian

nesting (Matyroshka) dolls or nested Chinese boxes, have previously been identified as essential for the management of complexity, and specifically, problem solving in business contexts via recursive action (Schiemenz 2002; Schwaninger 2000; Beer 1972). As pointed out by Simon (1973: 27) *"...they provide the most viable form for any system of even moderate complexity,"* and so offer a reassuring vindication of the holistic, systems-based nature of the type of inquiry outlined throughout this study.

Such interdependence is not accidental: it arises as a direct consequence of the constant comparison method characteristic of GTM (see §3.24.1), where the '*constant comparison and interchange of indicators*' typical of successive rounds of analysis progressively eliminates any remaining conceptual redundancy, leaving in its wake a 'conceptually tight' response to each research question. In the absence of additional data, the inability to detect any further conceptual overlap signifies a successfully concluded 'theoretical saturation' (Charmaz 2014: 214), thereby indicating the end of the analysis stage, and the beginning of theory building.

The eleven sub-categories expressed in response to RQ3 are explored through the philosophical lenses of Immanuel Kant and Charles Sanders Peirce, and when combined with input from the analysis of Chapter 5 and the memo data (Appendix M), guide the elaboration of a substantive theory centred around the moral and ethical tenets required of a *Principled praxis*. For example, *Doing the right thing* (RQ3:SC1), *Universal good* (RQ3:SC4) and *Commitment* (RQ3:SC5) together suggest that taking guidance from Kant's categorical imperative (§6.3.3) may lead to improved ethical and moral conduct in future managerial decision making.

The remaining sections of this chapter outlines just some of the possibilities that may arise from the constructive combination of the sub-categories informing RQ3. It should be remembered that the 21 sub-categories associated with RQ1 and RQ2 are already implicitly incorporated in to anything expressed by RQ3 by this stage, meaning that any concerns with respect to sensemaking (RQ1) or the structure of inquiry (RQ2) have already been addressed. What remains from this point forward is to ensure that any resulting action is as principled as possible.

6.3.1   Kantian ethics

The sub-category RQ3:SC11 *Ethics & morals* represents perhaps one of the most deeply embedded conceptual categories to have emerged from this study, and as an emergent sub-category of RQ3, could be said to represent one of the eleven essential components of *Principled praxis*. Its negative roots were expressed early on in the study via the RQ1 antonymous sub-category RQ1:SC9 *Cutting corners*, which explained how much entrepreneurial action was characterised by various forms of undocumented white-collar crime and petty misdemeanour. This, to say the very least, was an early indicator of the occult moral and ethical concerns embedded more deeply within the narrative.

On closer inspection, it comes as no surprise that the majority of sub-categories driving the core category for RQ3 *Principled Praxis* are in some way mutually synonymous, and pertain directly to the moral and ethical dimensions of practice in the context of business ownership and management in a technologically saturated world. For example. *Commitment* (SC5) is complementary to *Compliance* (SC6), as *Doing the right thing* (SC1) is complementary to *Compliance* (SC6), *Universal good* (SC4) and *Ethics and morals* (SC11). In fact, all sub-categories appear mutually synonymous or overlapping to the extent that, as the analysis stage began to reach theoretical saturation, there was a great temptation to merge say *Trust & respect* (SC8) with *Reputation* (SC9). Indeed, the two may well have been merged on account of their conceptual closeness. However, not to have drawn the line at this stage would have resulted in the whole set of sub-categories collapsing in to the core-category; a problem that has been critically reflected upon in §4.6.1 – *Conceptual overlap*.

The sub-categories of RQ1 describe the ultimate fallibility of the human agent and its attempts at making sense of an otherwise increasingly complex world. Accordingly, the sub-categories of RQ1 provide a 'snapshot' picture of the situation as respondents perceived their world at the time of the interview; RQ2 goes some way towards normalising the response to technology and change by indicating the need for a structured approach to inquiry; and RQ3 offers a picture of the world as it could (ought?) to be, if the inquiry were to be structured along the lines of RQ2 and as principled as the emergent indicators offered by RQ3 would allow.

Specifically, notions of the *Universal good* (SC4) and *Doing the right thing* (SC7) are suggestive of the need for further analysis along the lines of Kant's philosophy, and how it may relate to a *Principled praxis* in the execution of venture creation and management.

6.3.2   Kant's deontic logic and the '*is-ought*' dichotomy

Building a bridge between the strict rigours of logic and the fields of ethics and morality, *deontic logic*, or the logic of *duty*, is the formal study of the normative concepts of obligation, permission, and prohibition, with Jeremy Bentham defining it as *"the knowledge of what is right and proper"* (Bentham & Bowring 1834: 21). This section focuses briefly on the practical intuitions of a Kantian deontology, how it relates to the sub-categories responding to RQ3, and how it ultimately contributes to and informs the core category of *Principled praxis*.

A normative philosophy of morals concerns itself with three questions centred around theories of duty, value and virtue:

- What is it for something to be one's moral *duty*?
- How is one to assess the relative goodness or value of situations?
- What are the moral virtues and vices?

Deontology, or the study of *moral duty* is concerned with what agents *ought* morally to do. Here again, the is/ought dichotomy – previously highlighted by Ulrich (1987) as part of a critical boundary condition (involving 12 is/ought questions – see Table 2.5) applied as a systems approach to decision making – is referenced in the definition of a normative moral philosophy. It asserts that what *is* done compared to what *ought* to be, or *should* be done is a crucial distinction recognised simultaneously by the philosophic and systems outlooks.

First articulated by Scottish philosopher David Hume (1739), who stated that many claims are made about what *ought* to be on the basis of statements about what *is*, he discovered that there was always a difference between positive statements (about what is) and prescriptive – or normative – statements, about what *ought* to be. He identified the distinction as being crucial to an ethical theory and/or moral epistemology. However, critics assert that the validity of any ought statements are dubious at best, as all items of knowledge are either based on logic or observation. As *ought* statements cannot be known either logically or empirically, one must conclude that there cannot be any moral knowledge; a statement which forces one to proceed along a traditionally positivist

narrative, or accept that a moral epistemology may exist independently in its own right, as suggested by the moral and ethical philosophies of Kant and Peirce. In support of this, ethical naturalists contend that moral truth does exist, and does so whenever goal-directed behaviour is analysed.

Without any prior formal training or interest in philosophy, several respondents elicited narratives (e.g. RQ2:SC3#4; RQ2:SC8#1; RQ3:SC1#6) exhibiting dimensional properties relating to duty, obligation, permission and prohibition; all of which pointed towards the possibility of an entrepreneurially privileged recognition of the distinction between *is* and *ought*. Represented conceptually by the sub-categories RQ3:SC1 *Doing the right thing* and RQ3:SC4 *Universal good*, awareness of the distinction between knowing what 'is' (actually) being done, compared to what 'ought' to be done (out of a sense of moral/ethical duty) in the course of venture creation was of concern, especially when legally, morally, or ethically dubious activities were recounted, as referenced in RQ1:SC9 *Cutting corners* and other narrative excerpts related to RQ3 (e.g. RQ3:SC4#7; RQ3:SC6#1, #2).

Kant argued that in order to act in a morally 'right' way, one must reason from a sense of duty combined with the will to '*be good*' (Kant: GMeMo). Similar sentiments were expressed during the conceptual emergence of RQ3:SC1 *Doing the right thing* and RQ3:SC4 *Universal good*; and to a lesser extent in the remaining sub-categories responding to RQ3. The constituting narrative excerpts demonstrated an ability among respondents to distinguish between *is* and *ought*, regardless of the course of action *actually* taken. If entrepreneurs were acting out of a sense of duty to their company, in the interest of their family's continued well-being and survival, then would Kant have permitted or forgiven the 'petty misdemeanours' described in the narrative excerpts of RQ1:SC9, RQ3:SC6, SC7, SC10 and SC11? Although Kant admits that good may also arise 'by accident' from actions that were intended to do harm, and likewise, bad consequences may similarly arise from well-intended actions; it was having the *will* to act out of a respect for the moral law that matters most (Kant *ibid.*), and only when obliged by duty to do so. Such scenarios raise interesting questions regarding Kant's outlook regarding the moral law and what *should* or *ought* to be done when confronted with difficult situations. In a bid to deal with such matters, he proceeded to introduce the concept of the *categorical imperative*, which is the subject of the next section.

To summarise: the distinction between *is* and *ought* may be deployed as a useful ontological heuristic to contrast between two distinct states of reality in a rationally bound systems context; thereby highlighting any potential deficiencies in the '*is*'. The '*is*' reflects the situation as it appears to be, whereas the '*ought*' is a value-, morally- and ethically- laden *potential* reality that would satisfy the demands of Peirce's pragmatic maxim and Kant's [first] categorical imperative. Although it is unrealistically ideal and unattainable in reality, the *ought* may be perceived as (one of many) idealized solutions commonly (universally) accepted by the majority as being the most ethically, morally and legitimate option. The *ought* therefore aspires to the most truth-like of outcomes, and although never fully attainable, represents a potential benchmark or ultimate goal to which all managers, practitioners - and even entrepreneurs - *should* aspire.

6.3.3 Kant's categorical imperative & sociopreneuship

Perhaps because of the vagueness of its label, the first sub-category to respond to RQ3 - '*Doing the right thing*' was indicative of a broad-ranging attitude towards the moral good and acting out of a sense of duty; both of which correspond closely with the central tenets of a Kantian moral philosophy, and of course, Kant's concept of the *categorical imperative*, which, in its first formulation states:

> Act only according to that maxim whereby you can, at the same time,
> will that it should become a universal law.
>
> Kant (GMeMo)

Further to the discussions in §2.1.2 and §7.6.1 relating to social entrepreneurship and *sociopreneurship*, RQ3 elicited several sub-categories indicating a trend towards a mainstream recognition of the ecological, ethical and moralistic dimensions of the phenomenon; specifically: RQ3:SC1 (*Doing the right thing*); RQ3:SC3 (*Ecology & Sustainability*); RQ3:SC4 (*Universal good*) and RQ3:SC11 (*Ethics & morals*).

While entrepreneurial action has traditionally been associated with the generation of profit, Raghavan (2012: para.6) has described this 'new breed' of entrepreneur as *"self-motivated and self-propelled individuals with a social conscience and social commitment who are impelled by an irresistible urge to fulfil a social need or remedy a social ill by applying the same principles of creativity, innovation and experimentation as are relevant to entrepreneurship in general, with voluntarism as the driving force."*

The potential relevance of Kant's categorical imperative, and to a lesser extent, Peirce's pragmatic maxim (see next section) should not be underestimated here: first, with regard to the Kantian view on the morality of duty, Kant argues that the good will is one that acts from duty in accordance with the universal moral law, where one is obliged to act in accordance with the law that autonomous humans are freely imbued with. And so here, the empirical data expressing the independently emergent concepts of *Universal good* (SC4), *Doing the right thing* (SC1), and several other sub-categories as they responded to RQ3, may be indicative of a Kantian turn of thought embedded within entrepreneurial action, and specific to *Principled praxis* (core category, RQ3). Raghavan's (*ibid.*) description pertaining to a 'new breed' of entrepreneur, when considered in conjunction with the definitions offered for entrepreneurial orientation (cf. §2.1.1) and social entrepreneurship (cf. §2.1.2) exhibit close consonance; a consonance that may be suggestive of a potential role for Kantian and Peircean philosophy in helping to improve upon and expand the definition of social entrepreneurship, especially along ethical and moralistic lines.

Such action results from an innately human aspect of rational agency, where agency is now tempered, and to some degree mediated, by increased interaction with the information systems borne of advancing (Web 2.0) technologies: see RQ1:SC2 – *Control* in conjunction with RQ1:SC3 – *Empowerment*. It can be identified specifically with respect to entrepreneurial action because entrepreneurs in volatile, high-technology settings are more likely to engage with such technologies as part of their approach to inquiry, as widely evidenced by the data analysis of Chapter 5. Furthermore, when compared to professional scientists as a similar group of inquiring agents, the moral and ethical standards of science are already pre-ordained within the ordinances, expectations and general canons of science; built-in to the professional practice known as 'scientific research'. Accordingly, there is no need for entrepreneurs to consciously invoke their unique mode of inference; it responds freely (unlike the constrained scientist) to the needs of the environment, as-and-when required.

To critically reflect on the foregoing paragraphs one might argue that such countenance could be located within the narratives provided by *any* cohort of like-minded individuals, but one must consider the question: what alternative cohort of individuals – apart from professional scientists – could possibly be identified as being generatively responsible for the future prosperity of whole nation economies?

6.3.4   Peirce's pragmatism and the pragmatic maxim

It has now been established that a well-structured inquiry will, by definition, be characterised by a pragmatically informed abductive-retroductive approach to inquiry; but how does pragmatism sit with the moral and ethical requirements associated with the *Principled praxis* demanded of RQ3? Ethical pragmatists like John Dewey observed that some societies were apt to progress morally and ethically in much the same way that they had attained progress in science, where the norms, principles and moral criteria are likely to improve as a result of a structured, scientific-like approach to inquiry. In recognition of this association, a theory of *pragmatic ethics* began to emerge in the literature (LaFollette 2000; Light & Katz 1996; Buchholz & Rosenthal 1996), where the attitudes and approaches to discovery and learning could be linked to pragmatism, assuming that the inquiry was conducted retroductively.

Norms arise from the efforts of morally and ethically inclined agents acting together to selectively instil better norms for the local and general good; always aspiring towards – yet never reaching - a *Universal good* (RQ3:SC4). Peirce referred to this as the '*fixation of habits*' (CP 5.430), a concept similarly expressed by the respondents of this study in the conceptual sub-category *Habits* (RQ2:SC9), who saw it as a convergence of true beliefs and a 'right' norm (CP 1.108). *Habits* therefore help to differentiate from the zero-sum games espoused by Darwinian evolutionary notions of 'doing the right thing' (Cohen 2016; Vincent *et al.* 2011), to a more Lamarckian[3] process that emphasises mutual co-operation, consensus and negotiation. Again, the synergistic benefits that arise from a collective, communal approach are seen as preferential to the solitary actions of the lone individual.

Parallels with scientific practice and the processes of inquiry as they relate to scientific experimentalism are noted (see §7.2.4), where reliability, verifiability and accuracy are seen to increase with sample size. When evaluating entrepreneurial inference from a scientific perspective however, the increased sample size that confers additional validity is now accommodated at an expanding rate by the wide diversity of global expertise made accessible by contemporary telecommunications and information systems. Although scientists may also avail themselves of these techniques, the positivistic strictures that protect the quality of their evidence (i.e. no hearsay or anecdotal evidence; all prior

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[3]*Lamarckian: or Lamarckian inheritance – a form of 'soft inheritance', where an organism is able to pass off characteristics acquired during its lifetime to its offspring.*

evidence must be peer-reviewed etc.) when coupled with a lack of abductive discovery (i.e. abductive guesswork via musement), stands to prevent any fruitful benefits being drawn from the so-called 'wisdom of the crowds.'

6.3.5 Peirce's categories: a triadic approach to pragmatism

In his 1868 foundational paper outlining an idea for pragmatism (Peirce 1878), Peirce described the categories as adjuncts to reasoning aimed at resolving equivocation and ambiguity. The categories act as a step-wise 'cleansing' heuristic for assessing reality, which, according to Peirce, indicate 'three grades of clearness', and which led the discussion in a subsequent essay entitled "*How to make our ideas clear*" (Peirce 1878). The categories attempt to classify reality by beginning with a vague notion that alludes to something, referred to as its *firstness*, which is then reified in to consciousness by *secondness*, and then actualised as something real by its *thirdness*.

In order to transcend the limitations imposed on reality by dualistic conceptions associated with modernity (CP 1.355), such as the Cartesian opposition between *res extensa* and *res cogitans*, and the Hegelian dialectic of thesis and antithesis, Peirce's categories offer an alternative to the binary tensions inherent in such dyadic schemes, where reality is constrained by way of a contraposition of ideas. Consequently, in the majority of his writings, Peirce was apt to consider all aspects of reality from a triadic – as opposed to dyadic – perspective, where the significance of triadic groups to decision making became critical to Peirce's pragmatic ideation of reality.

As noted by Fontrodona (2002: 53), Peirce readily acknowledged the influence of Aristotle (CP 2.384, 2.445 n.1, 5.43), Kant (CP 1.300) and Hegel (CP 1.368, 5.43, 5.436) in his formulation of the categories, and so the concept is not without a good degree of philosophical pedigree.

The categories were first described somewhat elliptically by Peirce, thus:

> The first is that whose being is simply in itself, not referring to anything nor lying behind anything. The second is that which is what it is by force of something to which it is second. The third is that which is what it is owing to things between which it mediates and which it brings into relation to each other.
>
> (CP 2.356)

Firstness is a sign of potential, until it is energised or otherwise intrudes on consciousness; at which point the object is made apparent via interpretation. This process represents a transition of the sign to a new reality: that of *thirdness.*

The category of *firstness* is represented by the idea of the phenomenon as it is, independent of time and any relation. It is characterised by a condition of unmediated, unreflexive access, and may be related to the entrepreneurial feeling or need to settle a belief that remains incongruent with existing beliefs, or which itself is unsettling (see §2.7.2); it is experience without reaction, and cause without effect. It is expressed as a speculative feeling of ideas, chance and pure possibility (CP 1.25, 1.420-422; 8.267) qualified by a fleeting, almost transient sense of vagueness accompanied by a distinct lack of clarity.

The absence of quality, form and structure in *firstness* is characterised by what one respondent (RQ2:SC5#1) unwittingly refers to via a vacuum analogy: "*allowing that space to be filled with whatever happens to drift along*" – in other words, a vacuum of creative potential that needed to be filled. Peirce himself alluded to it as "'*that space from whence all things dwell,*" (Chiasson 2001) when referring to the vacuous void associated with *firstness*.

Secondness relates to inquiry that is mediated but not yet reflexive, where experience and the reaction it incites, and the cause and effect it incites, are seen to proceed without any reflection on either the reaction or the effect. It represents the push-pull 'mediated' exchange of ideas, facts and actuality that may be correlated to a reification, or crystallisation of potential in to a singular 'this'. In other words, it is the juncture at which the possibility of *the real* arises, and is witnessed during the very same push-pull interaction between human beings and information systems, as part of a deterministic view of technology (see §2.4.1).

Thirdness is characterised by the type of perspectival thinking referred to in interview excerpts (e.g. RQ2:SC2#2; RQ2:SC7#2; RQ2:SC11#10), borne of habits, laws and necessity (Haynes 2000). In *thirdness*, one begins to contemplate the category by thinking about it, analysing it, and using it to gain experience, so that new patterns, connections, relationships, and habits may begin to emerge. The ideas and insights that emerge from this process are representations in themselves of the category's thirdness. It is at this point that new knowledge appears, purposes are fulfilled, and new narrative is constructed;

contributing to the general body of universal human knowledge and a greater understanding of the environment in which we live.

Potter (1997) suggests that thirdness has three properties: i) As a mediator, it mediates between firstness and secondness, i.e. between pure possibility and actual fact; ii) it is general: possessing features of – but not identical to – both extremes; and iii) it must refer to the future. From a temporal perspective, *firstness* is the present (what is possible); *secondness* is the past (what is fact); and *thirdness* is the future, referring to general rules that govern future events. Once again, the significance of the historical record, as well as an appreciation of the spatio-temporal dimensions is highlighted in Peirce's categories when considering their focus on past-present-future perspectives.

The insights of Charles Peirce to this study became increasingly relevant as theory embedded in the narrative began to emerge, especially with relation to so many of the concepts responding to RQ2 and RQ3. How Peirce's categories [of reality] seemed to relate directly to the way in which human beings are recursively interacting with information systems to co-create a social reality was revealing, to say the least.

Table 6.4 offers a selection of examples of triadic groupings exhibiting *firstness*, *secondness* and *thirdness*, drawn from a variety of conceptual categories.

Table 6.4   *Examples of Firstness, Secondness, and Thirdness*

	Firstness	*Secondness*	*Thirdness*
1	first	second	third
2	monad	dyad	triad
3	point	line	triangle
4	being	existence	external
5	chaos	order	structure
6	present	past	future
7	inheres	adheres	coheres
8	sensation	reaction	convergence
9	independent	relative	mediating
10	internal	external	conceptual
11	possibility	fact	law
12	feeling	effort	habit
13	terms	propositions	inferences
14	what is possible	what is actual	what is necessary
15	what may	what can	what ought
16	*sensemaking*	*structured inquiry*	*principled praxis*

Although this study set-out to uncover theory grounded in the narrative empirical data provided by the respondents taking part, that such data would eventually yield a correspondence with Peirce's categories at the core category level – i.e. the *firstness*,

secondness and *thirdness* exhibited by *sensemaking*, *structured inquiry*, and *principled praxis* (cf. row 16, Table 6.4) respectively – immediately suggests a connection between a triadic reality and entrepreneurial action; and therefore between pragmatism itself and entrepreneurial action.

Furthermore, that the data itself naturally pointed to a triadic was not only testament to the pragmatic integrity of *entrepreneurial inference* and its contributing core categories, but could also suggest that the practical adoption of entrepreneurial inference may indeed be a correct pathway to an ethically and morally informed praxis of pragmatic reasoning.

6.3.6   Data protection, privacy and identity

Many of the sub-categories responding to RQ3 were defined by negatively expressed narratives, pointing to a *lack* of regard where propriety and the common good was concerned. In recognition of the deficiency, respondents called for an increased level of moral and ethical awareness, not only among their entrepreneurial peers, but also from those involved in the creation and management of business at all levels; pointing out that the start-up entrepreneur of today will in many cases progress to become the [corporate] executive of tomorrow (Djerf-Pierre & Weibull 2011). Once again, the importance of temporal differentiation as an essential ingredient to the critical analysis is highlighted.

If entrepreneurs are recognised as the primary agents behind economic growth (Schumpeter 1934, 1942; Wennekers & Thurik 1999), and are readily disclosing their willingness to engage in ethically dubious activities (e.g. RQ1:SC9; RQ3:SC11) as part of the entrepreneurial imperative to survive, then this may suggest that such practices have become somewhat normalised; accepted and enacted as an assumed aspect of corporate culture. Certainly, the popular evidence may lend some credibility to this thesis when the fates of Enron, MCI-Worldcom, Lehman brothers and Barings bank are considered (see memo **M15:04**). Although wholly corporate in nature, each of these entities – or the foundational entities that subsequently merged with others to form the larger corporation – would have started life as the musings (certainly in the Peircean sense of 'musing') of a small number of entrepreneurial individuals who had spotted a gap or opportunity in the market for new financial or telecoms services.

The entrepreneurial respondents contributing to this study raise four main areas of concern relating to the protection of data, individuals and their assets:

- Protection of personal, commercial, and other sensitive data;
- The safeguarding of children, with respect to:
  - the use of aggressively targeted marketing tactics
  - the short- and long-term impact of social media platforms
- Impropriety in financial and statutory matters

Breaches of data integrity and security are reported frequently (see Memos **M13:09**; **M13:18**), where highly sensitive information is routinely compromised, betraying the confidence placed by users in the guardians - and guardianship - of their data. Davies (1997) points out that the majority of published literature on data privacy concentrates on protecting certain *types* of data, without any concern for what *individuals* regard as private or sensitive, with Adams & Sasse (1999a; 1999b: xx) contending that *"it is vital to identify user's perceptions in order to predict their reaction to what does and does not constitute an invasion of privacy."* In their empirical modelling of user perceptions of privacy in multimedia environments Adams & Sasse (2001) also point out that most invasions of privacy are not intentional but happen because systems designers fail to anticipate how personal data might be used, by whom, and how this might subsequently affect future users. This supports calls from authors (e.g. Bellotti & Seilen 1993) for the designers of such systems – often entrepreneurially oriented software developers – to adopt a temporally flexible attitude to future planning when it comes to considering the long-term moral and ethical impact of the products and services they are [now] developing.

6.3.7   Responsible communications in a digital age

Traditional modes of intersubjective communication between entrepreneurs, such as the casual face-to-face meeting convened in the relaxed settings of a pub, bar, café or restaurant, were contrasted with the recent emergence of technology-mediated modes of communication dominated by the 'electronic memo' culture perpetuated by smart phones, tablets, e-mails, and social media (e.g. Twitter, Facebook, Instagram); not to mention other, less-interactive modes of on-line communication in the form of discussion forums and user groups, via which users tend to exchange ideas and information on a more passive, asynchronous basis.

Although it was acknowledged that face-to-face communication was now also possible (FaceTime, Skype etc.) in the contemporary digital age, the 'personal touch' of each other's physical presence remained lacking in such media. The lack of direct, human interaction was similar to the feeling of detachment expressed by workers who had transitioned from a traditional office-based working environment to a home-based 'teleworking' situation. Although this did not detract from the overall benefits offered by such globally-pervasive, instantaneous means of face-to-face communication, the narrative offered by respondent **ST13** provides an interesting insight in to how the new media are generally perceived. While initially suspected of being somewhat off-topic and representing the anecdotal recollections of better days gone-by, the excerpt was about to be dismissed as an empirical artefact of the interview, but after reviewing a number of conceptual memos in relation to the respondent's interview, it became evident that such comments were being made for a reason: they served to highlight a perceived move away from once highly personal, value-laden interactions, where each party had made a concerted effort (to say, attend a meeting, trade fair or conference), to the soulless, digital interactions now driving emerging trends; where nuance, feeling and emotion were muted or wholly absent. In effect, social-media platforms, and the communications technologies from which they were derived, were in the process of sponsoring a wholesale transition from the personal to the impersonal, as confirmed by Burke *et al.* (2011).

While the personal touch may have been perceived as lacking, the wider impact of this phenomenon was not lost on other entrepreneurs contributing to this study, who were also calling for a restoration of values, face and identity when confronted with the proliferation of often-anonymised, impersonal digital interactions. Concern was seen to revert from the subjective experiences of respondents in their productive and gainful use of social media towards business ends, back to a wider concern for the potential negative impact of such technologies on the innocence of their own children. As most-all respondents were parents, this was seen as an inevitable consequence of the research that could not be ignored as off-topic, or in some way irrelevant, as the potentially long-term effects of these vacuous interactions are now being recognised for their future impact on the personal and social-interaction skills of youngsters; the unintended consequences of which are still to be fully recognised by the (often corporate) purveyors of such platforms; let alone the wider academic community.

Such parental concern was not restricted to social media platforms alone, but extended to the proliferation of on-line 'multi-user' gaming platforms, with examples of youngsters stealing credit card details from parents, and/or coercing them in to the purchase of 'virtual' add-ons and 'points' to enhance an otherwise virtual avatar, whose existence was recognised only in cyberspace. All represent the dark-side of exploitative, targeted marketing in a massively inter-connected network of users.

It was therefore deemed to be incumbent on the [entrepreneurial] developers advocating the wholesale uptake of these products by many millions of users, to realise that very serious consequences are attached to the daily use of their products, especially where children are concerned. When the so-called spectre of anonymised 'cyber-bullying' is also taken in to account, the harmful emotional side effects of digital social media and other entrepreneurially-inspired platforms leave much to be desired.

6.3.8 Safeguarding: an entrepreneurial responsibility?

The safeguarding of children was repeatedly raised as a point of concern in narratives responding to issues of technological change, and so must form part of the contemporary discourse relating to entrepreneurial action in a knowledge economy. Child safeguarding is typically associated with on-line 'cyber' bullying, sexual predators, pornography and domestic abuse (Dombrowski *et al.* 2007; Brandon *et al.* 1999), but rarely is the technology that enables these activities perceived as something from which children should be protected (Wartella & Jennings 2000). Indeed, it is seen more for the positive role it plays in filtering pornography (e.g. Ho & Watters 2004), identifying bullies, and tracking down predators, but is less recognised for the roles that social media and other communications platforms play in perpetuating such crimes to begin with. It could be said that the unsavoury aspects relating to contemporary communications platforms represent an example of the unintended consequences to have emerged from complex, adaptive systems borne of entrepreneurial creativity and innovation while operating at the edge of chaos (Carlisle & McMillan 2006; Waldrop 1993).

Some respondents (RQ1:SC1#3; RQ3:SC5#6; RQ3:SC6#3) noted that social media was only part of a much larger problem: that of the creeping spectre of mental and emotional addiction to or dependence on 'smart' 'always-on' technologies that virtually tether individuals to one another; particularly adolescents. One only needs to observe passengers on a train or bus, and those walking along the high street to notice the

unnatural, abject fixation to these devices. As mentioned earlier, the future implications for social and mental well-being after prolonged, continuous exposure to such devices must be questioned. Again, the burden of responsibility for this must surely lie with those who produce these devices, and the software applications that run on them.

Recalling the need for entrepreners to restore balance to otherwise disharmonious situations (see §2.1), it is incumbent on the purveyors of these technologies, i.e. those entrepreneurially *minded* agents (whether entre/intra/socio-preneur, manager or corporate executive) involved in the creation and commissioning of Web 2.0 media platforms, to be fully cognizant of the future possible impact of their products and services as they adapt and change in response to evolving technologies; especially with respect to the safeguarding of children and others identified as vulnerable by society. Rather than applying *post hoc* fixes once a target user population has been reached, or other commercial metrics [profit, demographic] have been satisfied, serious consideration should be given to the possibility and impact of undesirable consequences at all stages of the product life-cycle; thereby requiring an ongoing holistically reflexive critique able to accommodate and respond to the inevitable change in technology over time.

As demonstrated by this research, if the acting agents are first of all able to *make sense* (core category, RQ1) of the ever-changing [technological] environment in which they are operating, they may proceed to *Invite a future state* (RQ2:SC11) via a critically recursive attitude of *Reflection & reflexivity* (RQ2:SC7), to assist with the formulation of *Structured inquiry* (core category, RQ2) which, if implemented correctly via the heuristic guidance offered by CST/CSH/TSI (see §2.9.2) stands to yield a form of *Principled praxis* (core category, RQ3) predicated on many of the sub-categories responding to RQ3 (e.g. SC1 – *Doing the right thing*; SC4 – *Universal good*; SC8 - *Trust & respect*). Note that the above scenario makes use of certain sub-categories in terms of their relevance to a specific problematic, whereas other situations might adopt a wider or narrower set of categories in response to the conceptual diversity demanded by the complexity of the problem.

6.3.9   Towards a theory of entrepreneurial virtue

Gilder (1992) proposed three essential 'virtues' of entrepreneurship: *giving*, *humility*, and *commitment*. This study identified directly with the third of these virtues, which emerged in response to RQ3 as SC5 – *Commitment*. That the concept should have emerged in response to a research question that ultimately informed the core category of *Principled praxis* was testament to the role played by the concept in highlighting *virtuous* entrepreneurial action; not only in Gilder's view, but also from the collective view of the entrepreneurial respondents contributing to this study. Finding early correspondence with concepts of virtue that had been identified elsewhere could therefore indicate that the moral standards inherent in virtuous living were emergent features of idealised entrepreneurial action; a claim that will be investigated in the remaining paragraphs of this chapter.

Whereas neither of Gilder's other virtues exhibited a direct conceptual correspondence, *giving* was found to be embedded within the contributing narratives driving RQ3:SC1 – *Doing the right thing*; RQ3:SC3 – *Life-work balance*, and RQ3:SC4 – *Universal good*, where the three sub-categories SC1, SC3 and SC4 could have legitimately been consolidated to form a new, aggregate sub-category RQ3:SCx – *Giving* (see §4.6.3 for an account of the concerns relating to unwarranted conceptual reduction/merger). Indeed, during the analysis stage, merging the aforementioned sub-categories in to a new category labelled *righteous giving* was considered, but as with other candidates considered for conceptual merger (refer again to §4.6.3), the resulting 'master' concept would have been too broadly based and general in scope, offering little in terms of useful meaning or content, should the subsequent theorising have demanded it.

Three sub-categories identified as the embodiment of Gilder's virtuous *giving* (RQ3:SC1, SC3 and SC4) highlight the tendency of entrepreneurs to positively invest in themselves, their co-workers and families, their business(es), and other stakeholders (customers, suppliers, advisors etc.) who, when working together, are positioned to ensure the continued viability of the venture. Gilder (*ibid.*) neatly encapsulates the virtue of giving, thus:

> [Entrepreneurs] give themselves, their time, their wealth, their sleep; they give it year after year, reinvesting every profit, mortgaging every property. They leverage their lives to live their … belief in a redemptive idea. And their long outpouring of belief and faith and funds and sacrifices, seemingly wasted and lost in the maws and middens of the world economy, somehow mysteriously coheres and collects. Beyond the horizons of calculation or prophecy, at last the mountain moves; and there unfurls a great returning tide of vindication that overflows all plans and expectations.
>
> Gilder (1992:308)

It is possible to relate Gilder's experience not only to the respondent narratives contributing to this study, but also to the personal experience of the author. Several memo entries (**M14:22**; **M15:03; M15:06**) resonate with respondent narratives and Gilder's commentary when eliciting their experiences related to *giving*, most notably where respondent **EX5** and Gilder made reference to the sacrifice of personal effects (cf. narrative excerpt: RQ3-SC3#4 from **EX5**) in 'reinvesting every profit' and 'mortgaging every property,' thereby exhibiting some commonality across three areas of personal altruism during the course of an entrepreneurial life.

Giving may therefore be perceived virtuously, as it represents a form of selfless sacrifice, or personal leverage, enacted at the expense of the agent's own personal (time, wealth, sleep, health) and financial (profitability) resources (see Gilder, above); predicated on the belief that such risks to one's own health, fortune and reputation may one day pay-off and be worth it, although there is no rational reason why this should be the case. Accordingly, Gilder's quotation on the virtuosity of *giving* suggests that entrepreneurial demands are met non-rationally/metaphysically in terms of a 'mysterious coherence and collection,' (cf. Gilder quotation, above) indicating that some other-worldly, unknown forces may be at play; but further analysis of the text reveals that he is simply referring to nothing more than luck (also noted in Spinoza *et al.* (1997)), and that many of the risks taken by early career or inexperienced entrepreneurs actually result in failure: an obvious point that, seems to have been overlooked by Gilder, but does make sense if his commentary is directed solely towards the life of the experienced entrepreneur.

The virtue *humility* was coded on seven occasions and emerged in response to RQ2, contributing to the conceptual indicator RQ2:SC3 – *Confidence*. That humility should be an indicating property of entrepreneurial confidence comes as no surprise here, as a certain degree of modesty and diffidence is required – even essential – when confronted with the new processes, procedures and understanding demanded of contemporary information systems.

While some empirical consonance has been identified with Gilder's views relating to the virtues of entrepreneurship, his comments and claims ignore the varying levels and degrees of experience possessed by typical – if not the majority of – entrepreneurs. Like Sarasvathy (2008) and Drucker (1985), their discourse tends to focus on 'exemplar respondents' who have perhaps reached the pinnacle of their professional career, where a certain level of expertise developed over many years is assumed as given. Of course, by this stage of the entrepreneurial life cycle, frequent failure has become all but a distant memory, and if it does occur, does so much less frequently than it would have done during the early 'inexperienced' years.

Contemporary discourse in the field therefore continues to assign primacy to the 'ready-made' experienced entrepreneur defined by an ahistorical, atemporal 'snapshot' of his/her current status, with no recognition of the often-treacherous prior paths taken in order to reach their presently enjoyed status/abilities. While there may be nothing wrong with focussing on the final product, this type of entrepreneur is only representative of one form of highly developed agency and may well be in the minority; thereby raising questions as to the efficacy and possible validity of theories that focus solely on the experienced entrepreneur as the primary unit of inquiry. In other words, such theorising may be making the mistake of offering an over-idealised, unrealistic impression of normative entrepreneurial action.

Much like Sarasvathy's (*ibid.*) theory of effectuation, assumptions based on an almost myopic view that assumes a static entrepreneurial skill-set, where all entrepreneurs are viewed as highly experienced: the majority of them simply do not align with this profile. Little mention is made of the lived years of *in*experience and failed ventures encountered in the build-up to their current status; nor is any reference made to the less experienced novice, who co-exists and operates alongside experienced high-flyers, aspiring to the levels of success enjoyed by those who have reached the top; yet, who in the meantime must still be prepared to virtuously forego many of the benefits of life as part of the 'baptism of fire' that must be endured prior to [entrepreneurial] success.

In summary, past failures and challenges continue to be either marginalised or ignored as essential prerequisites to entrepreneurial experience. The crucial role they play *over time* in developing the strength of character required of the expert entrepreneur to resiliently respond to (and subsequently counteract) failure continue to be overlooked and under-reported, therefore leaving a gap in discourse relating to the role of failure in success.

Chapter 7 - Discussion and Conclusions

7.0   Introduction

This chapter offers a summary of the research findings and any conclusions that may be drawn from them. The chapter consists of the following main sections:

7.1	Summary of theory for RQ1, RQ2, RQ3
7.2	Contribution to theory
7.3	Contribution to practice
7.4	Implications for the findings of this research
7.5	Reflections and omissions
7.6	Further work
7.7	Autobiographical reflection
7.8	Concluding words

7.1   Summarising theory for RQ1, RQ2, and RQ3

The entrepreneurial response to inquiry and decision making when faced with unpredictability and change in high-velocity technological environments emerged as the focal point of this study. How the entrepreneurial mindset dealt with change in such settings was captured by three distinct rounds of analysis and theory generation, as part of a comprehensive grounded theory approach. The findings are informed by the three responding core categories of *Sensemaking*, *Structured inquiry* and *Principled praxis*.

The significance of the three categories lies in their foundational ability to inform and validate a triadic version of reality, which this study articulates via the group of constituent concepts driving each category: *Sensemaking* establishes the initial cognitive 'stirrings' of the potential for an idea via what Peirce referred to as its *firstness* (cf. §6.3.5); *secondness* offers form, function and structure to the concept of inquiry on which entrepreneurial inference is built; and *thirdness* brings clarity to a truth-like concensus by forcing the realisation of any ethical and moral dimensions in the pursuit of wholeness, via *principled praxis.*. The Peircean categories of *firstness*, *secondness* and *thirdness* therefore not only assign gradations of reality to the theoretical findings of the research, but implicit in their elaboration is also a form of validation that directly links the empirical data itself with the methodological approach deployed. In other words, everything is as *real* as it can be from a research design perspective.

A summary of the emergent theory as it relates to each of the core categories is addressed by the sub-sections that follow.

7.1.1 RQ1 - Sensemaking

Sensemaking emerged in response to RQ1 and explained how respondents applied various sense-making techniques to their daily work routine in order to not only make sense of the changing technological world around them, but also to ensure survival (and subsequent thrival) of their venture, and to satisfy their basic human needs (see §6.1.9 for Maslow discussion).

Sensemaking was initially theorised by considering entrepreneurial inquiry in terms of Giddens' (1984) sociological theory of structuration. Echoing calls by Archer (1995) regarding the need to escape from a reality informed by dualisms, Caldwell (2006) demonstrated that Giddens' notion of agency-structure as part of his earlier theory of structuration (1984) was insufficient for dealing with contemporary realities increasingly based on change, and so advanced his revision according to a processual view, which gave primacy to aspects of change related to time and space. In so doing, he escaped the confines of a dualistic outlook by reconceptualising Giddens' original theory away from an agency-structure dualism, towards one of agency and change, mediated by a revised form of structure consisting of two strands: structure as *systems*, and structure as *process*.

Drawing inspiration from Caldwell's perspective, change could now be viewed processually as something intricately linked to history, environment and context; and the start-up entity – despite the initial difficulties encountered when trying to align it with old-world definitions – could now be reconceptualised as a 'pre-organisational' entity in the *becoming*, where past organizational notions of structure premised on fixed, static and unchanging entities could be viewed as fluid, changing – and even *virtual* – entities. Clearly, Caldwell's recasting of Giddens' theory accommodated the needs of this research very well.

The sociological theories of Bourdieu were then applied in terms of the practicalities of sensemaking, and how sense could be made of the system of dispositions that structure social fields. Bourdieu's notion of *habitus* bridged the gap between the social and the technical, based on the ability of human habits to reproduce the structures around them. If humans were increasingly surrounded by technology, then this could form the basis for a contemporary societal reproduction based on emerging (Web 2.0) technologies. The

gaps in understanding between the old and new habits demanded of emerging technologies were met by the concept of the guiding narrative, which consisted of the narratives maintained both tacitly and explicitly needed to understand and productively embrace newly emergent technological artefacts.

The implications relating to sensemaking in terms of its practical outcome now become apparent. The research has demonstrated that to reach a habitual state of principled praxis, where entrepreneurial inference forms an integral part of the inquiring process, sense must first of all be made in an otherwise alien operating environment characterised by constant change. Technology and the entrepreneur are uniquely placed to achieve this by co-creating new realities, reconstructing gaps, and restoring 'sense' in understanding via the push-pull dynamic that exists between the two driving agencies represented by the [human] entrepreneur and [non-human] emerging technologies respectively (§2.4.1). This arises not only from the entrepreneurial need to survive, but also from the need to save face and preserve reputation via the notion of miscrecognition (§6.1.8). Perhaps more importantly however, the entrepreneur is driven by his or her desire to bridge the ever-present gap that exists between belief and doubt; ever-present because technology is always changing the boundaries contoured by belief as it advances. By acting reflexively in a bid to challenge and ultimately supplant doubt, belief – in an otherwise doubt-filled setting (i.e. will this technology ever work? Who is/are the guarantors of success?) – eventually dominates and quenches doubt via the guiding narrative of an expertly-accrued social capital. The narrative needed to productively engage with new technologies must be constantly modified so as to allow others to maintain pace and levels of understanding as change occurs.

7.1.2 RQ2 – Structured inquiry

Structured inquiry emerged not only in response to RQ2, but also as part of a systemic endeavour that was premised, and contingent upon, the conceptual indicators driving its predecessor, RQ1. Once sense had been made (RQ1), inquiry becomes increasingly structured as the various conceptual indicators informing RQ2 are deployed in pursuit of increased knowledge and understanding. For example, respondent narratives indicated that various heuristics based on *co-dependent* (RQ2:SC6), *creative thinking* (RQ2:SC5) could be combined with *diversity* (RQ2:SC8) and *context* (RQ2:SC12) to facilitate brainstorming sessions in the relaxed and convivial atmosphere offered by, say, a local restaurant; similarly, *learning* (RQ2:SC1), *confidence* (RQ2:SC2), *thoroughness*

(RQ2:SC3) and *access to knowledge* (RQ2:SC4) could act towards the discovery of new inquiring platforms used as1 future sources of information and expert knowledge.

Irrespective of the conceptual combinations applied, the empirical data demonstrates that such heuristic tools are in active use by contemporary entrepreneurs, but not all heuristics are in use by all entrepreneurs, all of the time. When considered together, the resulting conclusions drawn from RQ1 and RQ2 indicate that once sense has been made of a problematic (wicked/messy) situation, and once as many as possible of the inquiring concepts indicated by RQ2:SC1-SC12 have been deployed, then this could be said to represent a near-perfect instantiation of *structured* inquiry; 'near' perfect, because a fully implemented complement of conceptual indicators represents an idealised vision of inquiry, which, while unattainable in reality, does lead to the consideration of [Kantian] universals in terms of what *could* be done vs. what *ought* to be done. This in turn leads to the general domain of RQ3: the realisation of *principled praxis*.

Being able to establish coherent and structured inquiry as part of an approach to problem-solving is predicated, as evidenced by §7.1.1, on 'sense' having first been made. Sensemaking provides a conceptual and cognitive bridge between inquiry, learning and the production of knowledge. While the implications for a rigidly established sense of *sense* are very much foundational and remain somewhat hidden in terms of their actual contribution to theory and practice, sensemaking nevertheless serves to establish coherence and clarity as a founding prerequisite to the progression of inquiry. In so doing, it acts like a conceptual 'filter' to practical reason; a crucial precursor to abductively-led structured inquiry, and therefore pragmatic understanding. What's more, as grounded theory supported the emergence of conceptual indicators seen to arise as a direct consequence of the empirical evidence, the reliability and validity of the natural link between *sensemaking* and *structured inquiry* could be established; thereby providing a direct path to the final stage of conceptual emergence: *principled praxis*.

7.1.3 RQ3 - Principled praxis

Principled praxis represented the third core category to emerge in response to the conceptual indicators responding to RQ3. Because of the synergistic 'nested' relationship that exists between the three responding categories, *Principled praxis* could be said to represent, and be contingent upon, all of the sub-categories informing RQ1, RQ2 and RQ3, and so represents the purest form of principled action.

Principled praxis is itself a theorised notion arising directly from the narrative data and relates to the capacity for moral and ethical action as part of a theoretically idealised entrepreneurial mindset. It is also informed theoretically by selected aspects of the expansive moral philosophy of Kant and the pragmatist philosophy of Peirce in the context of business decision making; in particular, the kind of decisions made by entrepreneurs: foundational decisions around which the very generation of new ventures (micro), and the economic future (macro) are built.

The foundational significance of an appreciation for Kantian ethics and Peircean pragmatics in the context of business inquiry is that identification with these philosophers in particular has ensured that entrepreneurial inquiry, if so guided, remains sensitive to the historical roots of the inquiring agent, while at the same time permits an ongoing relevance to contemporary problems as they unfold in a technologically indeterminate age. Such a process orientation, when moderated by a systemic approach is very much characteristic of Peirce's definition of pragmatism, which he perceived to arise directly from the habitual application of abduction, via the musings inherent in the retroductive cycle. Abduction has been shown to be the primary means of entrepreneurial discovery, and so, according to Peirce, it stands to reason that any derivative action will also be pragmatic in nature.

The conclusions drawn by this study encourage business inquiry to adopt not only a Peircean pragmatism rooted in a triadic reality of the categories – via the empirically informed (triadic) categories of *Sensemaking*, *Structured inquiry* and *Principled praxis* - but to also encourage a Kantian take on morality, where the fulfilment of duty according to the categorical imperative is determined by the universal, *collective* will to duty. Furthermore, the categorical imperative encourages an observation of deontological (duty-based) action biased in favour of the *ought* rather than the *is*; resulting in action that can only ever aspire to perfection, or truth. Although it is accepted that neither reality or complete truth can ever truly be ascertained, it is at the very least incumbent on those knowledge workers in positions of increasing power (e.g. hi-tech entrepreneurs, software developers), to undertake that their actions are sufficiently responsible and ethical so as to protect the future interests of those consumers who stand to use their products: products that may ultimately exert control upon a significant portion of their users' lives (e.g. Facebook, Instagram, Twitter etc.).

Similar to Korsgaard's (1996) view of Kant, this study rejects the picture of Kantian ethics as a cold prescription of Victorian morality based on duty and the universal will to good; rather, it is seen as a useful resource for addressing not only the metaphysical aspects of morality (by recognising and admitting the vagaries and possibility of human irrationality), but more importantly, as a means for tackling the wicked problems that arise from the sociotechnical power dynamics associated with agency and change in contemporary, high-technology business settings.

Being able to instantiate some form of principled praxis provides the inquiring agent with a form of inquiring framework composed of between 1 and n conceptual drivers, where n is the number of conceptual indicators relevant to each RQ (i.e. for RQ1, $n = 9$) that may be 'called-off' in the pursuit of inquiry. The total number of conceptual indicators across all three RQs is $9+12+11 = 32$ (see Figure 4.2 in Chapter 4), and as the number applied towards the resolution of inquiry tends towards 32, so does the likelihood of an inquiry based on true entrepreneurial inference (via principled practice) arise.

7.2   Contribution to theory

7.2.1   Abductively-led entrepreneurial inference

Implicit in Peirce's definition of abduction (§2.6.2), abductively-led inquiry encourages a pragmatic, common sense approach to problem solving. Furthermore, the recursive application of abduction as part of a *retroductive* cycle (see §6.2.4(b)) has been shown empirically to feature as a regular characteristic of entrepreneurial inquiry, and could therefore be said to distinguish it from normative scientism. Additionally, because of the semantic and historical connections between abduction and Peirce's formulation of pragmatism, the entrepreneur may also be said to be acting pragmatically when engaged in abductively-led inquiry. Consequently, inquiry based increasingly on retroductive abduction will result in increasingly pragmatic outcomes.

The implications for abductively-led inquiry are profound: it at once gives rise to the novel concept of a unique form of inference that appears to be identified with those [non-scientists] engaged in creative discovery, where the normative canons of scientific (positivist) discovery are accommodated, but enhanced with an unfettered approach to the kind of abductively-led inquiry outlined in this thesis. It is interesting to note that, in stating this, such inquiry may be adopted by any person(s) – not just entrepreneurs –

wishing to adopt an entrepreneurial 'mindset', which resonates with the claims of Kuratko (2005) and Sarasvathy *et al.* (2015: 227) that "*anybody can become an entrepreneur.*"

7.2.2   The entrepreneurial settlement of belief

The empirical evidence demonstrates that the early (pre-)stages of inquiry may be characterised by attempts to make sense of, or clarify something that causes disharmony, or instils a state of doubt. Peirce described reaction to this as the settlement of belief (§2.7.2), which may be related to the need to restore harmony to unbalanced situations, or as a means of staving-off creeping entropic forces (§2.4.1). In entrepreneurial situations, disharmony has been shown to arise in the absence of a guiding narrative with respect to a particular specialised topic, or where a gap exists in knowledge or the market. Missing narrative prevents sense from being made of unfamiliar technologies, techniques, practices and processes, thereby preventing productive participation in further discovery associated with a particular community of practice.

While not unique to the entrepreneurial mindset, the settlement of belief when considered in the domain of entrepreneurial inquiry and decision making supports the notion of abductively-led inference (see §7.2.1) as a dominating theme in Peircean abductive logic. Furthermore, it confirms the theoretical link between Peirce's definition of pragmatism, entrepreneurial decision making and the retroductive cycle (cf. §2.6.2 and §7.2.5)

7.2.3   Creative inquiry

As part of the journey towards structured inquiry (core category, RQ2), one or more of the 'modes of discovery' outlined in §7.3.1 are applied to engage with a process of creative inquiry. The environment and general setting (context) are crucial to productive engagement with this stage of the creative process. At the individual level it occurs spontaneously during periods of semi-engaged consciousness, where a 'zen-like' state of passive engagement with the world allow the cognitive 'gaps' to be filled with abductive musement. A degree of forethought regarding the 'ideal setting' is required at the collective level, where participants should strive to express their thoughts and feelings in the kind of communal, convivial atmosphere often encountered in coffee shops or bars: settings that are as far removed as possible from the strictures of traditional office settings and any associated power/authority dynamic. Respondents recalled their best collective sessions as being characterised by an almost impish, juvenile attitude towards discovery, where outrageous speculation often yielded fruitful avenues for further investigation;

suggesting that the occasional adoption of child-like tendencies may be of benefit to creative inquiry. By maintaining a critically reflective and reflexive outlook immersed in fun, the ability to 'invite future states' (RQ2: SC11) as a means of modelling future events was recognised as a hallmark of good inquiry. The recursively applied cognitive process by which a person makes sense of an idea by assimilating it to the body of ideas he or she already possesses was what Peirce referred to as *apperception*.

7.2.4   The entrepreneur as scientist

The empirical evidence presented by this study demonstrates that the entrepreneurial approach to inquiry is premised on the four methodical stages of inquiry outlined by Bertilsson (2009: 86), and which correspond to the three modes of logical inference: abduction, deduction and induction; viz.: i) hypothesis construction; ii) the prediction of what effects will ensure upon the action of a hypothesis, and iii) the experimental testing of effects, which will yield new hypotheses to feed a new retroductive cycle. As discussed earlier in this section, abduction and retroduction are quite different in that the former represents a distinct form of logical inference, and the latter, an overarching logical method of reflexively-mediated recursive inquiry, consisting of abduction, deduction and induction.

In her concluding remarks regarding free thought and action as the actualisation of human potential, Brown (1987: 292) makes the following observation regarding her analogy between scientific and entrepreneurial discovery processes: "*In both scientific and entrepreneurial realms, the highest good manifests itself in that vital and dynamic discovery process by which human progress is made. The argument for both free scientific and entrepreneurial inquiry is the same: he who admits the validity of one cannot deny it to the other.*" What Bronowski (1956) once said of the scientific discovery process, therefore, holds with equal force for that competitive discovery process that is the market order, of which the entrepreneur is caretaker and custodian:

> Science is not a mechanism but a human progress, and not a set of findings but the search for them….Science at last respects the scientist more than his theories; for by its nature it must prize the search above the discovery, and the thinking (and with it the thinker) above the thought. In the society of scientists each man, by the process of exploring for the truth, has earned a dignity more profound than his doctrine.
>
> Bronowski (1956: 63-64)

Could it be the case that retroductive inquiry is a unique aspect of the kind of discovery-led inquiring action undertaken by entrepreneurs? Do all entrepreneurs approach inquiry in the same way when in active 'discovery' mode? The preceding paragraphs explain how scientific inquiry is a strictly hypothetico-deductive endeavour; a form of reasoning that proceeds by the formulation of a hypothesis, which is then tested against observed, empirical data for falsification. In other words, it applies inductive reasoning in the formation of hypotheses and theories, and deductive reasoning to test them in specific situations.

Scientists do what scientists do, according to the expectations of their peers, the empirical evidence before them, and the canons of the scientific method. I contend that entrepreneurs, however, are quite different: while they also engage in normative scientific inquiry, unlike their white-coat colleagues, they thrive on what can only be described as an 'abductive adventure', 'musing' to a much greater extent for inspiration to catalyse as many of the cognitive heuristics summarised in Table 7.1 as possible. When historically-accrued knowledge in the form of professional experience is combined (cf. §2.5.4 and §6.1.8 regarding habitus and social capital) with the habitual application of a reflective/reflexively directed critical inquiry, the future may be confidently invited to give a practically reasonable idea of what is likely to work (in terms of product, service etc.) in a scenario that has yet to unfold.

While scientists may be fully cognisant of their scientific aims and endeavours, successful entrepreneurs rely less on the [prescriptive] techniques associated with the logical inference and inquiry that drives the closed, controlled laboratory setting, and more on a common sense (pragmatic) instantiation of what *could be* via retroductive abduction; in other words, an eminently pragmatic approach, free from the strictures of positivistic scientific rigour as dictated by the presence of 'science' and 'the academy', and in a much less-controlled, almost accidental approach.

The term 'entrepreneur as scientist' does not seek to equate entrepreneurs with scientists in terms of their respective approaches to discovery, but highlights the common aspects that exist between the types of inference used. In other words, while both deploy deduction, induction and indeed abduction as part of their creativity, the term serves to highlight the biased tendency of scientists to base their inquiries more on the hypothetico-deductive model, whereas the entrepreneur is more apt to engage with an abductively-led form of retroductive inference, as suggested by the findings of this study. The

implications for this suggest that two forms of discovery may be elicited, both of which are quite distinct from each another: *scientific discovery*, and *entrepreneurial inference*.

7.2.5 Entrepreneurial ethics

This study appears to be unique in terms of its work aligning the novel concept of *entrepreneurial inference*, as an empirically informed exemplar, with aspects of the Kantian and Peircean schools of philosophy. Consequently:

> i. The study demonstrates that the entrepreneurial mindset naturally exhibits elements of Kantian practical reasoning via the categorical imperative;
>
> and
>
> ii. The study demonstrates that the entrepreneurial mindset naturally exhibits elements of Peirce's categories, and therefore corresponds directly to the pragmatic maxim.

With respect to (i) the 'golden rule' of biblical origin, which was subsequently appropriated by Kant in the formulation of his first categorical imperative, is detected conceptually within the empirical narrative excerpts, suggesting that it is something that entrepreneurs are apt to engage with. Although it is clearly not the exclusive preserve of entrepreneurs, its presence stands to support an ethical and moralistic approach to decision making as part of a wider principled praxis. With respect to (ii), the study demonstrates that Peirce's categories of *firstness*, *secondness* and *thirdness* are evident in entrepreneurial action, meaning that the entrepreneurial perception of reality exhibits consonance with Peirce's own measure of reality. This suggests that entrepreneurs may perceive reality more like Peirce (i.e. pragmatically), along *triadic* rather than *dualistic, dyadic* lines; thereby adding an additional dimension to the perception of what appears to be real. The claim that entrepreneurs act more pragmatically is also supported directly by the empirical evidence demonstrating that abduction is the primary means of discovery amongst entrepreneurs. According to Peirce, abduction *is* pragmatism, and so the conclusion here must be that decision makers act pragmatically (albeit, in a Peircean sense) when engaging with an idealised entrepreneurial mindset.

In terms of the implications for theory, statements (i) and (ii) above suggest that the finding of this research align with two foundational concepts developed within the philosophies of Kant and Peirce, both of which exhibit direct consonance with aspects from each philosophical school. Both represent an original contribution to entrepreneurial research, and it is hoped that future studies may be undertaken that expand further on the practical and theoretical implications of the adoption of a Kantian/Peircean philosophy.

7.3   Contribution to practice

The findings of this research suggest that entrepreneurial activity is part of a balance-restoring measure that enhances sensemaking via the creation of new guiding narratives. Furthermore, entrepreneurial action may be seen as a cognitive response to reducing disorder in a system via the neutralisation of entropic forces, or *negentropy*, where the establishment of belief in the settlement of doubt is the driving force.

While notions of the '*entrepreneur as scientist*' are not new, this research shows that entrepreneurial *inquiry* is very much rooted in the canons of the scientific method, with the exception that the degree of abductive inference deployed by the entrepreneur is shown empirically to be substantial, and of prime importance. This appears to be in contrast to the approach of professional scientists, where any [documented] use of abduction is very much suppressed as part of the positivism implicit in a controlled scientific domain.

The effect that 'prior exposure' to business/technology (RQ1:SC7) has on determining later entrepreneurial acumen is confirmed (e.g. McCann 2017; Miralles *et al.* 2016; Zapkau, *et al.* 2015), but even the most recent theory is in need of update in view of the impact that Web 2.0 is having on all of those who engage with its technologies.

7.3.1   A summary of inquiring heuristics

The findings of this study with respect to the inquiring heuristics discussed as part of the theory building endeavours of Chapter 6 are represented here in table form. Accordingly, Table 7.1 depicts twelve unique inquiring heuristics that may be applied alone or in combination towards the resolution of messy/wicked problems. None of the individual theorisations here are new, and the relevant theoretical inspiration is declared accordingly. However, all have nevertheless been indicated empirically as part of the analytical output of this research, and so are original in terms of their intended application.

While the individual entries in the table alone do not constitute a novel contribution to practice, together, they represent a novel and highly versatile take on new modes of inquiry when combined to tackle the kinds of 'wicked' and 'messy' problematics associated with change and unpredictability.

Table 7.1   *A summary of inquiring heuristics*

	Heuristic Description	Theoretically Inspired by	Empirically Supported by
1	***Cultivate a critically reflexive approach to inquiry:*** Continually questioning the current state of knowledge ensures that reality keeps pace with space and time, and derivative truths remains temporally relevant. Dogma is rejected. <u>Relevant</u> experience and skills are acknowledged; outdated material is discarded. Mistakes and errors are positively embraced.	Ulrich, Ormerod	RQ1:SC7, SC8 RQ2:SC1 RQ2:SC3 RQ2:SC7
2	***Actively Co-create with human and non-human agency:*** Potential for successful inquiry is maximised in collective, group settings. Abductive musement (guessing) remains the preserve of the individual. Better expressed by 'the inductive stage of the retroductive cycle is best enacted in group settings.' Power dynamics are kept in check via Ideal speech situations (see 5).	Giddens, Latour, Foucault	RQ1:SC1-4 RQ2:SC1-12
3	***Optimise context and setting for action:*** Creative inquiry is best enacted away from the office, laboratory or other formal setting. Individual discovery is optimised during passive cognitive states (daydreaming, walking, driving etc.). Collective/group activity is best accommodated in casual settings that permit impish, 'child-like' behaviour as an adjunct to the most creative turns of discovery and innovation. Must be free from sources of coercive power and authority figures.	Pettigrew, Köestler	RQ1:SC5 RQ2:SC12
4	***Communicative Action via Habermasian Ideal speech situation or Böhmian 'dialogue':*** Follow the guidelines for satisfying an ideal speech situation, as laid down by Böhm and Habermas. Allows free speech, free of coercive power dynamics and oppressive authority.	Böhm, Habermas	Basis for Future Research
5	***Diversify approaches to inquiry:*** Maintain a cognitive toolbox of exemplar-led inquiring heuristics, many of which are derived from other entries in this table. Draw on as many as possible as the problem space dictates. Remember that correct framing of the question is paramount and that there is always more than one solution.	Köestler	RQ2:SC8 RQ2:SC4 RQ2:SC6
6	***Select/create an appropriate inquiring system:*** to facilitate organizational learning and knowledge generation, become familiar with the tenets of not only Churchman's five inquiring systems, but formulate new ones in response to the type of inquiry underway, similar to Haynes' conception of a 'sixth' 'Heideggerian' inquiring system (see §2.9.6) in the development of intuition as a guiding organizational principle.	Churchman, Haynes	Basis for Future Research
7	***Develop the habit of abductive 'musement':*** Engaging with a state of productive 'musement' stimulates the realisation of Peircean *firstness,* which may lead to the emergence of *secondness* (cf. point 9, this table) with a view to abductively encouraging a state of *thirdness.* Applied critically as part of an overarching retroductive cycle, creativity and innovation will follow.	Peirce, Chiasson	RQ1:SC8 RQ2:SC9 RQ2:SC11
8	***Act apperceptively:*** Adopt the Peircean habit of making sense of ideas by incorporating them in to the body of existing ideas, accrued via co-created (expertly sourced) narrative and accrued social capital.	Peirce	RQ1:SC7
9	***Check ontological integrity***: is the inquiry characterised by a state of *firstness*, *secondness* or *thirdness*? If firstness only is suspected (this is all firstness ever can be), then continue with abductive 'musings' until secondness begins to form. If firstness and secondness are known, does the secondness logically stem from its firstness? Does a credible thirdness emerge from the firstness and secondness to form a valid triad? If all three are known, do they represent a logically sound triad? (see Table 6.4 for examples)	Peirce	RQ2:SC5 RQ2:SC10

10	***Apply the categorical imperative***: Is action in accordance with what *ought* to be happening, according to how others in the community of practice would collectively perceive the situation? Are actions driven by a moral sense of duty?	Kant, Deontological Ethics	RQ1:SC9 RQ3:SC1 RQ3:SC4
11	***Consider the pragmatic maxim***: Ensure clarity of apprehension with practical reasoning via application of the pragmatic maxim: "*Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object.*"	Peirce (CP5.2), Kant	RQ3:SC4 RQ3:SC6
12	***Apply the CSH '12 questions' ladder***: (see §2.9.4) By qualifying stakeholder status, ensuring emancipation from power dynamics, and critically declaring boundaries, the problem becomes less 'wicked' and more 'well-defined'.	Ulrich	RQ3:SC3

Although it would be unreasonable to expect decision makers – whether managers, senior executive or entrepreneurs – to become familiar with the philosophies of Kant, Peirce, or Churchman, it may be possible to advance a form of loosely-guided framework based on such heuristic combinations, which it is hoped might go some way towards improving management decision making and inquiry when dealing with wicked problem sets.

7.4   Implications for the findings of this research

In terms of its theoretical findings, this study appears to support the argument for a reconsideration of structuration theory advanced by Giddens in 1984. If the revisions followed by Caldwell (2006) are adopted, then the original theory stands to take on processual dimensions of adaptability and change; therefore, bringing structuration in to the twenty-first century, characterised by an unpredictability and change that the previous (mechanistically-based) theory based on a dualistic theory of reality could never handle (Caldwell 2006; Archer 1995). This study has applied Caldwell's formulation to entrepreneurial agency in a defined context of change, and therefore represents a novel theorisation of his work.

This study offers suggestive evidence for the possibility of an ethically guided, principled form of entrepreneurial inference, as it has been shown empirically to already exist – albeit in a fragmented fashion – embedded within the normative actions of the respondent entrepreneurs contributing to this research. For this reason, the notion of an 'idealised entrepreneurial mindset' was pursued. If this could somehow be operationalised – in part, but as fully and as practically possible – then it may lead to a more principled form of praxis among those managers who choose to adopt the tenets of entrepreneurial inference, as laid out by this study.

Furthermore, the relevance of contemporary ICTs with advanced information systems, in conjunction with Web 2.0 technologies may be seen as a real-time instantiation of both Kant's categorical imperative and Peirce's pragmatic maxim. By submitting one's inquiry to a digitally gathered global (universal) collective of experts via Facebook, Twitter, on-line discussion groups, specialist user forums etc…it is not unreasonable to suggest that the global reach and interconnectivity offered by such systems is representative of what Kant and Peirce foresaw as an idealised notion of 'the universal.' Furthermore, if such advances have only been witnessed since the mid noughties (2005-2010 CE), then the prospects that a presently emerging (Web 3.0?) paradigm based on *Big Data* and the *Internet of Things* may have in store for us should be approached with extreme caution.

Furthermore, if the findings of this study are correct, then the future implications for privacy, identity protection, and the general safeguarding of personal and other sensitive data are profound. What's more, so-called 'runaway' technological agency may lead to situations where technology begins to impress an adverse impact upon the social and mental faculties of some of the more vulnerable members of society. Unfortunately, signs of this are already evident amongst those exhibiting obsessive attention to such platforms (e.g. Ersoy 2019), leading one to question the lack of propriety and ethical awareness possessed by the purveyors of such products; no doubt as part of their relentless drive towards enhanced profit and shareholder value.

The philosophy of Peirce contributes first of all to knowledge discovery and growth via his work on logical inference and the abductive process of retroduction. Second, his specific formulation of pragmatism, habit, truth and the aims of inquiry as they inform reality are explored through the prism of the pragmatic maxim; permitting experience and reality to be classified via his 'taxonomy of reality' using the categories of *firstness*, *secondness* and *thirdness*. Implicit in the pragmatism and categorical reality of Peirce are the principled maxims of Kant, which arise as an inevitable consequence of abductively-led inquiry. When taken together, a morally and ethically pure outcome arises as a result of the exercise of what this study has elected to name *principled praxis.*

7.5   Reflections and Omissions

This section discusses the difficulties experienced during the research process, explaining how they were dealt with, or how they might ideally be addressed in the future. The problems, their effects, and their possible resolutions are all addressed where possible.

7.5.1   A limited take on pragmatism

The schools of philosophical thought referred to throughout this study were based on the European (Kant) and American Pragmatist (Peirce) schools; scholarly areas of interest represented by a vast body of existing work. As evidenced by the work of Churchman (1971), other European philosophical 'greats' (Locke, Leibnitz, Hegel etc.) were also used to elicit various modes or styles of inquiry. However, the form of pragmatism used for this study was drawn mostly from Peirce's formulation, with only passing reference to Dewey or James (§2.10.2). Notwithstanding the differences outlined between the various forms of pragmatism in §2.10.2, it would be an interesting exercise to offer a comparative account of these differing formulations – and their respective implications for this research – not only with respect to Peircean *pragmaticism*[1], but also the pragmatics of Dewey, James and perhaps Richard Rorty; a contemporary philosopher noted for his work on an alternative form of pragmatism referred to as *neopragmatism*, and which diverges significantly from the classical forms addressed here. It is worth remembering that the philosophers referred to during this study authored their works some 150+ years ago, and by not accommodating more recent contributors to the field, one wonders to what extent the conclusions reached here may have been affected.

While the author stands by the contemporary relevance of Peircean and Kantian thought, especially with respect to the conclusions drawn by this study, it is clear that future work in the area could avoid any anachronisms inherent in the current analysis via the adoption of a more critically real (Bhaskar) philosophy, thereby leading to a more situation- and time- appropriate take on pragmatism (James, Dewey) and/or neopragmatism (Rorty).

7.5.2   Problems encountered during data collection and analysis

A number of problems were encountered during the data collection stage. Issues connected with the conceptual elaboration of concepts have already been detailed separately in §4.6, as it was felt that such reflections formed an integral part of Chapter 4

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[1] *Pragmaticism: A term adopted by Peirce to distinguish his version from those of others.*

and contributed towards a better understanding of the processes involved in the conceptualisation and dimensionalisation of narrative data.

Issues were also encountered concerning the method of data collection during interviews. The most prevalent of these was the failure to obtain an audio recording of all interview sessions (2 of the 15 participants did not permit audio recordings); instead, forcing me to rely solely on the notes made during the interview, and any post-sessional recollections in the form of field notes and subsequent memos. This may not have been such a problem after all, however, as Glaser (2013) advises against tape-recording interviews, claiming that they stand to prevent original conceptual thought; recommending that only general notes and field notes should be taken during early contact sessions. This view is in stark contrast to Charmaz (2014), who recommends that line-by-line analysis of the data is an absolute necessity for good grounded theory. Furthermore, DiCicco-Bloom & Crabtree (2006: 318) point out that tape-recorded data can be "*a source of danger for those who are taped, because recorded data is incontrovertible,*" and there can be no guarantees that it has not been destroyed immediately after transcription.

7.5.3 Representation Bias

With one exception, all respondents contributing to this study belonged to the middle-class, white, male demographic. A sampling approach based on representation or quota, rather than convenience (Saunders *et al.* 2012: 261) may have addressed this imbalance, but much resistance was faced when trying to secure interviews with the convenience cohort, let alone an evenly targeted group. Accordingly, the author concedes that the study does not fairly represent the viewpoints of individuals belonging to communities that are otherwise different from the group interviewed.

In exploring the demographics, personality traits and earnings of entrepreneurs, one of the key findings of Levine & Rubinstein (2017) concluded that entrepreneurs were 'disproportionately white, male, and highly educated'. A cursory glance at the respondent profiles (Appendix A) confirms the dominance of the latter two attributes, while as author, I can personally vouch for the former, with respect to the dominant ethnicity of respondents who took part in this study.

7.6   Further Work

7.6.1 Improving sociopreneurship

In recent years, widely-reported impropriety and scandal in a number of high-profile 'not-for-profit' or 'third sector' organizations has served to highlight the absence of principled praxis (Nicholls 2009) in terms of the activities of the managers and social entrepreneurs – or *sociopreneurs* (see discussion in §2.1.2) – that direct such organizations. The lack of ethical and moral propriety underlines the need for urgent improvement in the area.

Although the existence of entrepreneurial activity in the charity sector is questioned (Dees 2012, 2007) and the notion of the 'socio-entrepreneur' has yet to be fully developed (Martin & Osberg 2007; Peredo & McLean 2006), to adopt some of the idealised entrepreneurial values that have been the focus of this study may go some way towards improving the tarnished reputation of the sector. If philosophically-informed modes of inquiry, mediated by contemporary communications technologies that enforce a transparent and publicly accountable discourse could feature centrally in the governance of such institutions, it may be possible to evolve managerial action in accordance with a universal 'good will' as dictated, and as expected, by [the relevant collectives within] society, and the philosophical schools of thought that have been shown to support them.

Furthermore, when combined with standards frameworks that encourage a deeper appreciation for, and understanding of, the growing phenomenon of socio-preneurship (Santos 2012), the role that Web 2.0 technologies may play in supporting the widespread adoption of principled praxis represents an exciting possibility in the field of socio-entrepreneurial ethics, where further work focusing particularly on the third sector could yield significant benefits.

7.6.2 Improved practice via a digital engagement framework

The empirical data gathered during this study could be used towards the development of an integrated digital framework for managers and entrepreneurs alike: a heuristic tool that would guide those engaged in generative business practices to adopt a principled approach to praxis.

Similar frameworks have already been successfully implemented in the cultural industries and arts sectors (e.g. Visser & Richardson 2013), where it has been recognised that more needs to be done regarding a heightened appreciation of the roles and responsibilities

accompanying the use and implementation of technology. However, unlike this study, none appear to have taken their inspiration from philosophy and/or a systems perspective.

The possibility for a digital/technical-engagement framework, where problem situations are approached from philosophically and systems informed theory, therefore offers distinct options for further investigation. Embodied within the framework could be Peircean techniques applied by way of the categories (*firstness, secondness, thirdness*) and the pragmatic maxim to inform and mediate the practical reality of a situation, while Kant's categorical imperative could be applied in determination of the moral, ethical and duty-bound aspects of such practice. Problems would be approached systemically via a comprehensive boundary critique (see §2.9.4), followed by an assessment of relevant and appropriate stakeholders via the application of Ulrich's (1983) *Critical Systems Heuristics* and his 12-question formulation (see Table 2.5 and §2.9.4).

7.6.3 Archers' concept of morphogenesis

Developing an understanding of entrepreneurial inference via a critically real approach remains challenging, because the definition of critical realism remains somewhat elusive (cf. §3.4.1 for discussion). Based on a critical realist ontology however, Archer (2013 [1979], 1995) advanced the concept of a 'Morphogenetic/Morphostatic' framework as an analytic heuristic for breaking-up processes that occur over time in to distinct phases. Unlike Caldwell (2006), Archer's approach combines structure with action (Porpora 2013; Archer 2010), rather than structure with change (Caldwell) or structure with agency (Giddens), and so offers a compelling alternative to the re-framing of Giddens' original structuration theory.

The kind of technological advances associated with accessibility and digitization that have been widely referenced in this study appear to be well-suited to the concept, as they form the early beginnings of what Archer (2013) refers to as a 'cultural archive'; an archive that allows access to an inconceivably expansive digital human corpus, the likes of which could never have been imagined prior to the turn of the century. As Archer (2017: back cover) summarises: "*As the content expands, more will explore, developing new complementary compatibilities, whose development will foster yet further opportunities. If more people can do more of what they do best, these represent stepping stones towards the 'good life' for more of them.*"

To paraphrase Archer's (2017: 3) summary of what a morphogenetic society might entail, three pertinent points were made in anticipation of how such a society may arise, referring directly to three central points covered by this thesis: 'change', 'structure', and the *synergistic* possibility for new opportunity via principled praxis:

1. When 'change' begins to prevail over mechanisms that restore 'stasis';

2. As such change begins to dominate, there is a shift away from the competitive situational logic of modernity. Instead, a new logic of *opportunity* based on enhanced novelty and innovation arises;

3. *Structure* and *Culture* both become morphogenetic and synergetic with each other. Synergy grows because the pool of 'complementary compatibilities' is enlarged as ever more novel items are added to the structural and cultural domains.

<div align="right">Archer (2017: 3)</div>

While Archer's theories are beyond the scope of this study, they represent an ideal starting point for future work wanting to expand on the findings uncovered here, especially where a critically real approach to the study of morphogenesis is anticipated.

7.6.4 Other future work

Other work in the area may seek to include an assessment and comparison of agents' uses and application of abductive approaches to inquiry. i.e. the degree to which the so-called 'discovery-mode' is applied. While this study has focussed solely on entrepreneurial inquiry in the turbulent and unpredictable setting of the high-technology start-up venture, it would be a useful exercise to gather empirical data from other decision-making agents situated in alternative operating environments. For example, data gathered from a cohort of scientists working in a controlled laboratory setting – or a team of regularly employed (non-entrepreneurial) managers – could be applied towards a grounded study of inquiry, where modes of inference are compared and contrasted for differences in their respective approaches. In so doing, a typology of inquiry may arise that could further enhance the future application of a theoretically-informed digital enhancement framework, where decision makers may experiment with and fine-tune alternative approach to problems, based on the ideals suggested by the framework.

7.7   Autobiographical reflection

The study contained in this volume is the result of an enormous undertaking which has proved to be a valuable learning experience. Before it began some eight years ago, I had no understanding of the nature of research, or the importance of methodology and the philosophical underpinnings that contribute to its definition. While research is often frustrating and tedious, it can also be tremendously rewarding, especially when (as in this case) real theory begins to emerge that makes sense in real world practice.

This study has contributed significantly towards my theoretical understanding of the field in which I have worked for many years. It has provided insight for new ideas, techniques and inspiration that I will take back to the work place and apply in practice; partly as practitioner, and partly as consultant. I have been able to reassess my own professional values in terms of the moral integrity and ethical responsibility needed in the software and telecommunications industries, and hope to position myself to widely transmit the need for a general disposition of *Principled praxis*, as indicated by the results of the research contained herewith.

7.8   Concluding words

This study has touched on an extremely complex, interactive and interdependent set of relationships that exist between individuals, business, and technology. Whereas previous studies focussed on the dynamism between individuals and businesses underscored by Giddens' (1994) structuration theory and the notion of an agency-structure duality, the 'Web 2.0' (see §1.3.4) environment of the post 2000s has prompted an unavoidable three-way alliance maintained between individuals, technology, and the social (and more recently, *digital*) networks they (co-)create, inter-operating side-by-side against an ever-expanding and changing technological backdrop.

In order to progress amidst the unpredictability and turbulence characterised by ceaseless change and renewal, an idealised view of entrepreneurial action characterised by the three identified core categories of this study may be adopted to make sense of and come to terms with the demands of an ever-evolving economy that uses information as currency. This involves the appreciation not only of other human agents but also the on-going recognition of the dynamism of a massively interconnected, 'always-on' network of co-dependent human and technological agencies, working together to discover newly emergent aspects of reality in the world.

Those able to engage holistically with the kind of idealised entrepreneurial mind-set outlined in this study, as it relates to the conceptual indicators driving *sensemaking* and *structured inquiry*, may be better positioned to recognise, respond, and adapt to the ever-changing nature of systems and processes once dominated by the structural concerns of a now-expired industrial revolution, with a renewed sense of *principled praxis*.

When writing the concluding remarks for this research, it occurred to me that, although the number of research questions happened to be three – which was neither pre-planned or expected prior to the beginning of the study (see §1.2) – the emergent core categories for each of the three RQs seemed to be suggestive of a triadic group following Peirce's categories of what constitutes 'reality'. Was this merely coincidental, or had the sheer *grounded* reality of the situation dictated that the research questions would be sufficient to drive the study (and perhaps therefore, any other similarly constructed grounded theory?), each of which in turn could be clearly shown to exhibit degrees of *firstness*, *secondness* and *thirdness*; thereby, according to Peirce at least, indicating that the research questions posed here are indeed reflective of something very *real.*

As observed by Drucker (1959: 246) in his paper entitled *Long-range Planning: Challenge to Management Science*:

> …entrepreneurial decisions must be fundamentally expedient decisions. It is not only impossible to know all the contingent effects of a decision, even for the shortest time period ahead. The very attempt to know them would lead to complete paralysis. But the determination what should be considered and what should be ignored, is in itself a difficult and consequential decision. We need knowledge to make it - I might say that we need a theory of entrepreneurial inference.
>
> Drucker (1959: 246)

It appears that Drucker presciently foresaw the need for some form of *entrepreneurial inference* many years prior to the advent of the technologies that are now driving the knowledge economy. Despite sixty years having elapsed since the publication of this statement, a cursory check with Google Scholar (September 2017) returned just one result for the search term "*entrepreneurial inference*": a solitary link referencing back to the original use of the term in Drucker's 1959 paper. Perhaps the time has now come to establish some level of discourse around entrepreneurial inference, and if this study can in any way assist with that, then it has achieved at least one of its main objectives.

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INTERVIEWEE STATISTICS

Unique Respondents	**15**
Distinct Interview Sessions	**19**
UK-based respondents	**10**
US-based respondents	**5**
Total Current Active Ventures	**22**
Total Past Ventures (excl. current)	**84**
Total start-up life-cycles (past and present)	**106**
Combined Entrepreneurial Experience (years)	**158**
Total Coded Incidents	**292**

Transcript Reference Prefixes

EXx   'Exemplar' Interviewee (Multiple past start-ups, now corporate exec.)
STx   'Start-up' Interviewee (Engaged with start-up(s) at time of interview)

N.B. THE PROFILE BELOW REFERS TO THE RESEARCHER'S OWN BACKGROUND AND EXPERIENCE. UNLIKE THE REMAINING 15 PROFILES, NO NARRATIVE DATA OR CODED INCIDENTS ARE ASSOCIATED WITH THIS PROFILE

Transcript Reference	**EX0/ST0**
Presently based in	UK
Active Entrepreneurial Years	20
Entrepreneur/Entity Type	PORTFOLIO / IDE*
Current Active Ventures	2 (All UK)
Past Ventures	8 (1-USA)
Education	BSc (Physics)
Previous Experience	Telecoms (3 yrs)
Parental Influence	M: Pharmacist; F: Electronics Engineer
First Venture Funding	£20K: '3Fs' Funding
Self-identifies as	CTO / FOUNDER
Sector	TELECOMS/SOFTWARE DEVELOPMENT
Coded Incidents	N/A

'IDE' – Innovation Driven Enterprise

Transcript Reference	**EX1**
Presently based in	UK
Active Entrepreneurial Years	20
Entrepreneur/Entity Type	PORTFOLIO / IDE
Current Active Ventures	3 (All UK)
Past Ventures	8 (2-Canada; 4-USA; 2-Australia)
Education	BSc MSc MBA PhD (Physics)
Previous Experience	Software Sales (2 yrs)
Parental Influence	M: Teacher; F: Univ.Professor (Tech.)
First Venture Funding	£20K: Parents
Self-identifies as	CTO / FOUNDER
Sector	SOFTWARE DEVELOPMENT
Coded Incidents* 7:6:7 (20) (i.e. **7**x RQ1: **6**x RQ2: **7**x RQ3) → Total 20	1-1-16; 1-6-6; 1-4-4; 1-8-9; 1-9-1; 1-2-7; 1-3-7; 2-11-4; 2-4-9; 2-3-6; 2-1-5; 2-11-7; 3-11-8; 3-9-5; 3-8-1; 3-6-1; 3-4-3; 3-3-3; 3-1-4; 2-12-1

Transcript Reference	**EX2**
Presently based in	USA (Previously UK-based)
Active Entrepreneurial Years	15
Type of Entrepreneur	SERIAL / IDE
Current Active Ventures	1
Past Ventures	3 (1-USA; 2-UK)
Education	BSc MSc PhD (UK – Elec. Engineering)
Previous Experience	Telecoms Service Development (4yrs)
Parental Influence	M: Programmer; F: Programmer
First Venture Funding	£4K: 'soft' loan from Parents
Self-identifies as	FOUNDER
Sector	DATA STORAGE & NETWORK APPLIANCES
Coded Incidents 5-9-7* (21)	1-1-14; 1-7-1; 2-4-8; 1-4-5; 1-3-3; 2-11-11; 1-9-3; 2-1-3; 2-5-6; 2-6-15; 2-11-5; 3-9-2; 3-8-2; 3-6-6; 3-11-9; 3-3-1; 3-2-9; 3-1-2; 2-12-2; 2-8-1; 2-5-11; 3-9-8

Follows Format 'RQ—SC—#'. E.g. '3-1-4' refers to the fourth narrative excerpt coded to Sub-Category 1 (SC1) for Research Question 3 (RQ3). Many excerpts contribute to each Open Code.

Transcript Reference	EX3
Presently based in	USA
Active Entrepreneurial Years	12
Type of Entrepreneur	PORTFOLIO / IDE
Current Active Ventures	4
Past Ventures	7 (6-USA; 1-France)
Education	BS CPA (Accounting)
Previous Experience	Accountant (6 yrs); Tech Support (4 yrs)
Parental Influence	M: Bookkeeper; F: Accountant
First Venture Funding	$25K: Share of family inheritance
Self-identifies as	CTO / FOUNDER
Sector	SOFTWARE DEVELOPMENT
Coded Incidents 7-8-5 (20)	1-6-2; 1-5-10; 1-4-6; 1-2-9; 1-3-5; 1-3-4; 1-8-3; 2-9-2; 2-4-1; 2-2-6; 2-4-14; 2-1-2; 2-5-9; 2-6-16; 3-10-5; 3-8-4; 3-6-5; 3-3-6; 3-1-3; 2-8-2

Transcript Reference	EX4
Presently based in	USA
Active Entrepreneurial Years	10
Type of Entrepreneur	PORTFOLIO / IDE
Current Active Ventures	2
Past Ventures	4 (All USA)
Education	BS (Computer Science)
Previous Experience	Internet Company (4 yrs)
Parental Influence	None declared
First Venture Funding	$30K – Friends and ex-colleagues
Self-identifies as	CTO / FOUNDER
Sector	INTERNET & SOFTWARE CONSULTANTS
Coded Incidents 4-10-5 (19)	1-6-1; 1-5-9; 1-4-1; 1-2-10; 2-7-8; 2-9-6; 2-4-2; 2-2-4; 2-1-1; 2-4-17; 2-6-17; 2-6-13; 3-9-1; 3-7-1; 3-4-7; 3-2-8; 3-10-7; 2-12-6; 2-10-1

Transcript Reference	**EX5**
Presently based in	USA
Active Entrepreneurial Years	15
Type of Entrepreneur	SERIAL / IDE
Current Active Ventures	1
Past Ventures	8 (2 – Malaysia; 6 – USA)
Education	BS MBA
Previous Experience	None declared
Parental Influence	M & F: Pharma Entrepreneurs
First Venture Funding	$100K: Family friends
Self-identifies as	CTO / FOUNDER
Sector	INTERNET APPLIANCES
Coded Incidents 6-10-6 (22)	1-1-3; 1-5-6; 1-6-7; 1-3-6; 1-8-4; 2-11-15; 2-7-1; 2-8-3; 2-5-4; 2-4-6; 2-6-9; 2-2-1; 2-6-10; 2-11-10; 3-11-3; 3-7-2; 3-6-7; 3-5-5; 3-3-4; 3-1-5; 2-9-8; 1-9-5

Transcript Reference	**EX6**
Presently based in	UK
Active Entrepreneurial Years	12
Type of Entrepreneur	PORTFOLIO / IDE
Current Active Ventures	3
Past Ventures	5 (4 – UK; 1 – USA)
Education	BSc MSc MBA (Elec.Eng. + Marketing)
Previous Experience	Electronics Engineer (6 yrs)
Parental Influence	M: Shopkeeper; F: Mining Engineer
First Venture Funding	£10-12K: Personal savings
Self-identifies as	CTO / FOUNDER
Sector	SOFTWARE DEVELOPMENT
Coded Incidents 5-9-6 (20)	1-7-2; 1-1-9; 1-6-9; 1-5-8; 1-2-1; 2-6-2; 2-6-5; 2-7-6; 2-4-7; 2-5-5; 2-1-4; 2-6-8; 2-4-12; 3-11-4; 3-7-6; 3-6-4; 3-5-8; 3-4-2; 3-2-5

Transcript Reference	**EX7**
Presently based in	UK
Active Entrepreneurial Years	15
Type of Entrepreneur	PORTFOLIO / IDE
Current Active Ventures	2
Past Ventures	10 (9 – UK; 1 – Canada)
Education	BSc MSc (Information Science)
Previous Experience	Patent Lawyer (5 yrs)
Parental Influence	M: Lawyer; F: Teacher
First Venture Funding	£25K: Savings from previous employ salary
Self-identifies as	FOUNDING MEMBER
Sector	STORAGE
Coded Incidents 6-8-6 (20)	1-1-15;1-2-6; 1-1-2; 1-6-8; 1-5-4; 3-4-8; 1-1-7; 2-11-3; 2-6-1; 2-7-2; 2-2-2; 2-6-3; 2-4-18; 3-11-5; 3-9-4; 3-7-7; 3-4-6; 3-2-4; 2-10-6; 2-1-9

Transcript Reference	**ST8**
Presently based in	UK
Active Entrepreneurial Years	9
Type of Entrepreneur	PORTFOLIO / IDE
Current Active Ventures	3
Past Ventures	8 (2 – UK; 6 – USA)
Education	MEng PhD (Control Systems)
Previous Experience	Tech.lead – Data storage (8 yrs)
Parental Influence	F: Tool Manufacturing
First Venture Funding	£12K: Inheritance
Self-identifies as	CTO / FOUNDER
Sector	NETWORK APPLIANCES
Coded Incidents 5-8-6 (19)	1-5-2; 1-4-7; 1-9-4; 1-1-6; 1-2-2; 2-9-1; 2-11-12; 2-3-3; 2-2-3; 2-4-10; 3-11-7; 3-11-10; 3-7-3; 3-5-7; 3-4-1; 3-1-8; 2-12-8; 2-10-5; 2-8-4

Transcript Reference	**ST9**
Presently based in	UK
Active Entrepreneurial Years	8
Type of Entrepreneur	PORTFOLIO / IDE
Current Active Ventures	3
Past Ventures	11 (All UK)
Education	BEng. CiMA (Engineering + Accountancy)
Previous Experience	Engineering (10 yrs)
Parental Influence	M: Accountant; F: Electrical Engineer
First Venture Funding	£500: own savings
Self-identifies as	CTO
Sector	PRODUCT DEVELOPMENT
Coded Incidents 8-8-3 (19)	1-1-12; 1-7-4; 1-2-5; 1-8-1; 1-5-7; 1-1-4; 1-1-8; 1-9-5; 2-6-6; 2-7-5; 2-5-1; 2-3-2; 2-7-4; 2-11-13; 3-8-5; 3-7-8; 3-2-6; 2-12-4; 2-10-2

Transcript Reference	**ST10**
Presently based in	UK
Active Entrepreneurial Years	4
Type of Entrepreneur	NOVICE / IDE
Current Active Ventures	1
Past Ventures	1 (UK)
Education	BSc (Software Engineering)
Previous Experience	Ethical Hacker (2 yrs); Gamer (5 yrs)
Parental Influence	F: Systems Analyst/Programmer
First Venture Funding	£10K: Own savings
Self-identifies as	MD
Sector	MOBILE APP DEVELOPMENT
Coded Incidents 6-8-5 (19)	1-5-1; 1-1-1; 1-2-11; 1-6-4; 1-8-8; 2-9-5; 1-7-6; 2-9-3; 2-5-7; 2-6-4; 2-11-2; 3-5-4; 3-9-6; 3-8-10; 3-5-3; 3-1-6; 2-10-3; 2-8-5; 2-5-10

Transcript Reference	**ST11**
Presently based in	UK
Active Entrepreneurial Years	7
Type of Entrepreneur	PORTFOLIO / IDE
Current Active Ventures	2
Past Ventures	4 (All UK)
Education	BSc MBA (S/w Engineering,Marketing)
Previous Experience	Teaching (3 yrs); Technical Sales (2 yrs)
Parental Influence	M: Teacher; F: Head Teacher
First Venture Funding	£40K: Own funds + Friends/family
Self-identifies as	CTO / FOUNDER
Sector	DATA NETWORKS
Coded Incidents 4-10-5 (19)	1-7-5; 1-5-3; 1-6-5; 1-8-6; 2-9-4; 2-7-3; 2-3-5; 2-1-6; 2-5-8; 2-6-7; 2-4-16; 2-6-11; 2-11-9; 3-10-6; 3-6-2; 3-4-5; 3-1-9; 3-2-7; 2-5-12

Transcript Reference	**ST12**
Presently based in	UK
Active Entrepreneurial Years	8
Type of Entrepreneur	SERIAL / IDE
Current Active Ventures	1
Past Ventures	6 (5 – UK; 1 – Germany)
Education	BSc MSc MBA (Chemistry, Marketing)
Previous Experience	Chemist (5 yrs)
Parental Influence	M: Programmer; F: Programmer
First Venture Funding	Zero
Self-identifies as	"Chief Pot washer, bin-emptier & dogsbody"
Sector	NETWORK APPLIANCES
Coded Incidents 5-6-10 (21)	3-3-5; 2-2-5; 2-4-5; 2-11-8; 2-4-4; 2-4-11; 1-3-1; 1-9-2; 1-4-2; 1-1-11; 1-5-5; 2-11-6; 3-11-6; 3-10-3; 3-9-3; 3-8-8; 3-8-7; 3-2-1; 3-2-3; 3-1-1; 3-10-4

Transcript Reference	**ST13**
Presently based in	UK
Active Entrepreneurial Years	3
Type of Entrepreneur	NOVICE / IDE
Current Active Ventures	1
Past Ventures	2 (Both UK)
Education	MEng. (Mechanical Engineering)
Previous Experience	Admin.Assistant (2yrs); Tech.Sales(1yr)
Parental Influence	F: Self-employed (Book keeper)
First Venture Funding	£3k: Parental funding
Self-identifies as	MD
Sector	FIRMWARE[1] DEVELOPMENT
Coded Incidents 5-6-8 (18)	3-8-3; 2-6-12; 2-5-3; 2-1-8; 2-11-14; 2-11-1; 2-4-15; 1-1-10; 1-4-3; 1-6-3; 1-2-3; 3-11-2; 3-10-2; 3-8-9; 3-4-4; 3-2-2; 3-11-1; 3-1-7; 1-8-5

Transcript Reference	**ST14**
Presently based in	UK
Active Entrepreneurial Years	3
Type of Entrepreneur	NOVICE / IDE
Current Active Ventures	1
Past Ventures	1 (UK)
Education	BSc (Computer Science)
Previous Experience	Telecoms Support (2 yrs)
Parental Influence	None Declared
First Venture Funding	c.£10K: Own funds + Friends/Family
Self-identifies as	MD
Sector	SOFTWARE DEVELOPER
Coded Incidents 5-8-5 (18)	1-1-5; 1-2-4; 1-7-3; 1-8-2; 1-8-7; 2-12-3; 2-10-4; 2-8-7; 2-1-7; 2-4-3; 2-4-13; 2-5-2; 2-12-5; 3-6-3; 3-7-5; 3-5-1; 3-10-1; 3-10-8

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[1] *Firmware: Control software hard-wired internally in to devices, used to control and drive operation.*

Transcript Reference	**ST15**
Presently based in	UK
Active Entrepreneurial Years	5
Type of Entrepreneur	SERIAL / IDE
Current Active Ventures	1
Past Ventures	2 (Both UK)
Education	MSc (Computer Science)
Previous Experience	Technical Sales (2 yrs)
Parental Influence	M: Teacher; F: Teacher
First Venture Funding	c.£8K: Own savings + Student loan
Self-identifies as	MD
Sector	SOFTWARE DEVELOPER
Coded Incidents 4-8-6 (18)	1-1-13; 1-1-17; 1-2-8; 1-3-2; 2-3-1; 2-3-4; 2-6-14; 2-7-7; 2-9-7; 2-12-7; 2-10-7; 2-8-6; 3-3-2; 3-5-2; 3-7-4; 3-8-6; 3-9-7; 3-5-6

Respondent Consent Form   **Appendix E**

Consent Form

Dear [participant]

Invitation to Participate in a Postgraduate Research Study
Management School – University of Sheffield

This is a research project being conducted by Paul Sweeny, a postgraduate research student at The University of Sheffield. The academic supervisors allocated to the project are Professor Andrew B Tylecote and Dr John P Kawałek.

You are invited to participate in this research project because you have been identified as an established entrepreneur who has survived the challenges associated with the creation and management of one or more start-up ventures, particularly during periods characterised by substantial technological change.

The procedure involves completing a short paper questionnaire that will take approximately 10 minutes. You will then be asked to participate in one or more face-to-face interviews with the researcher, at a time and place convenient to you. All responses you provided – written and verbal - will be confidential. We do not collect identifying information such as your name, email address or anything else that may lead directly or indirectly back to source.

The questionnaire asks about your past and present entrepreneurial experience, and includes some questions about your family, your education and work history. The subsequent interview session(s) will focus on your perception of technological change and its effect (if any) on your ability to be creative, make decisions and gain knowledge and insight relevant to the survival and growth of venture(s), and what ethical or moral considerations were given, if any.

We endeavour at all times to keep our information confidential. All data is stored in a password protected electronic format. To help protect your confidentiality further, our records will not contain any information that could personally identify, or link back to you. The results of this study will be used for scholarly purposes only, and may be shared with others with a scholarly interest in the material.

This research has been reviewed according to University IRB procedures for research involving human subjects.

By signing the declaration below, you indicate that:

- you have ready the above information
- you voluntarily agree to participate
- you are at least 18 years of age

Your participation in the study is voluntary. If you do not wish to participate, please decline participation in writing via e-mail to p.sweeny@sheffield.ac.uk

If you have any questions about the research study, please contact Paul Sweeny at:
p.sweeny@sheffield.ac.uk

PARTICIPANT SIGNATURE   **RESEARCHER SIGNATURE**

Signed _____   Signed _____

Date   _____   Date   _____

SELECTED FIELD NOTE ENTRIES FROM 2013-2016

FN13:13

(paraphrased tel.con with storage exec.)
In the storage industry we tend to all know each other, and even though we are technically in competition, we do look out for one another. We have an unspoken set of rules, where we don't poach or steal staff, we openly share ideas but always acknowledge the original source; we always seek permission before speaking to one of the engineers of another firm, to ensure transparency etc…This all works both ways, too – and it works pretty darned well.

FN14:10

(tel. con with senior tech. executive)
That well-known saying tells us that 'nature abhors a vacuum', and this becomes so apparent when you're trying to get the old creative juices flowing. It's one of the things I discovered how to do at meditation classes many years ago, when trying to counteract the stress I was experiencing at work at the time. You were encouraged to create a space – or a kind of voice – in your mind, and stop anything from entering. Half the time, you would be fighting-off what they referred to as your 'internal chatter box', but after a while, even this stopped. And once your mind had become completely clear, you would periodically get a flash of an idea, or some notion of a concept that seemed to pop up from nowhere.

FN14:14

It's easy to understand a new piece of tech hardware once you've been shown how to use it, but what if it's the latest, cutting or bleeding edge piece of kit that's just been released? Who really wants to read the manual? Does anybody actually read the manual? I go to the tech forums and usually end up speaking to the engineers who built the thing for a quick-start guide, usually via e-mail. I speak with other members of their team too, who will give me practical bits of advice – not the dry stuff that's in the manuals, but real, practical bits of advice that get you up-and-running. Where they use special terminology, it's usually the case that you're already familiar with the concept, but you know it as something else; so you have to get a kind of mini-translation thing going on in your head at first….

FN14:18

Experienced entrepreneurs seem to have a special 'take' on doing the right thing, at the right time, and in the right place. They have an acute awareness of the importance of acting in context, and how everything inevitably changes with time. Suspect this has developed after years of having to 're-invent' themselves after repeated failure, or the pressure of adapting to a changing business landscape.

FN14:31

Diversity appears to be a key component of successful decision making, as respondents make frequent reference to its application in all areas when deliberating over business situations: diversity of information source/system; technological platform; working environment; colleagues; skills etc….many more could be added to the list. Point is this: it appears that as more diversity is added in to the 'decision-making' mix, that mix of increasingly unlikely alliances – i.e. things and people that would never usually co-operate in normative life – when uncompromisingly forced together as part of a decision-making process, yield equally diverse and consequently superbly creative and innovative outputs. Churchman's (1971) Leibnizian inquiring system comes to mind here, where the inputs derived of a construed 'fact net' form the best possible inputs to the well-functioning [Leibnizian] inquiring system.

FN15:01

(summary of discussion with internet provider exec.)

This always on broadband thing is a relatively new thing, remember? I know that right up until 2000 I was using dial-up modems over my home telephone line to get on to the net – this was what they called 'narrowband', or just 'dial-up' access, and it was restricted to 56Kb per second. Remember how those early web pages used to build up on your screen one line at a time, and how excruciating that was? Then came along ADSL, which heralded the beginning of the 'always on' broadband era…I think this was about the year 2000, or maybe a little before: all of a sudden, you were on-line all the time, and you didn't need to worry about how many minutes (at so many cents per minute) you were being charged to stay connected… for a flat monthly fee of $40 (I think it was?) you were connected, all the time…this was when things started to get really good in terms of what the internet could do.

FN15:04

(e-mail exchange with tech. company executive)

I hope these social media guys know what they're doing with the privacy side of things, because the laws are tightening up everywhere. In every jurisdiction now there are often conflicting laws about who and what can remain private, and who has the right to be forgotten etc. It's a legal minefield on the reviews and ratings front too: if a customer can prove that they have lost business because we allowed fake reviews on to our site, then where do we stand? How can we possibly police every review that is left, and how would we even go about checking its authenticity?

FN15:12

Frequent mention of changing attitudes towards sustainability and a concern for future generations. All interviewees had families, and the realisation that their business activities now could have very real consequences for their children and grandchildren is forcing a degree of introspection. Some had already acted positively by ensuring that their products followed a defined life cycle, ending in responsible recycling (according to a defined European directive) or made arrangements for their products to enjoy a second life in underdeveloped or developing nations.

FN15:13

(Tel.con with respondent ST15)

Being your own boss requires a certain kind of individual. I know so many that have gone to the wall because they didn't appreciate how much harder it is working for yourself. If you're on your own, who will look after you customers when you're away? And…something else they don't tell you: forget about sick pay and holiday pay: if you're not working, the money doesn't come in – as simple as that. So, it's not as good as others make out, this self-employed business. If you can't get the balance right to begin with, then you're probably better off working a standard nine to five. At least then, you'll get your paid holidays, sick leave, and all the other benefits of working a regular job.

FN15:14

This talk about *BigData* has implications for personal privacy also: the cheaper storage solutions become, the bigger these databases will become, and the higher likelihood is out there for more and more of your personal data to be stored. This is what big data is all about: it's concerned with the collection, collation and cross-referencing of what amounts to your personal data: shopping habits; type of soap you use; your typical holiday destinations etc. etc… this is going on without you even knowing about it. It's common knowledge in the industry that Facebook and others trace your browsing habits, and then sell-on the data to the highest paying third party bidder. One day those guys are gonna (sic.) get in to trouble for it, but how else do they make money? It's pretty much their only source of income.

FN15:18

I dread the regular security updates from Microsoft and other vendors They probably take up 25% of the time I should be spending troubleshooting more pressing problems. I'm not alone here – almost everyone I know personally and on-line deplores the number of hours wasted babysitting upgrades – it's just unacceptable.

FN15:28

Time is a key differentiator of entrepreneurial success – separating out those with- and without experience. Clearly experienced entrepreneurs cannot exist unless they can readily identify with their inexperienced former 'self', and so the 'baptism of fire' so characteristically associated with entrepreneurial action during the start-up years must be peppered with repeated failures, let-downs, near-misses and overt risk taking, purely in order to reach the latter stages of entrepreneurial 'statehood' - assuming that the agent survives the brutality of the process, that is – and many do not, as evidenced by the statistics.

Again, this is a viewpoint that is tied implicitly *to* time, *for* time, and *over* time, and is a purely temporal indicator. Precisely the kind of indicators that are overlooked when researchers are busy focussing on trait, economic or other aspects of entrepreneurship – the fatal flaw with this type of research is that it freezes the entrepreneur in time, ignoring change in environment, technology, culture, narrative etc…

FN15:32

Once the beginnings of a 'need' starts to gather momentum - which is usually indicated by its refusal to disappear during dialogue - a crucial next step is to check with on-line sources such as Google, US/EU patent databases, and other specialist forums to see whether any competing product already exists that fits – but doesn't necessarily fill – the identified gap, and to what extent. You can bet every time that there will a handful of similar ideas already out there, and it is on realising this that most competitors give up…but for us, this is where the next step comes in: that of differentiating what we're about to develop from what's already in circulation. This is where we devolve creativity out to individual minds. To do this, the proposal is circulated to the rest of the group, where all are invited to spend about a week developing their own innovations that focus around the concept. No matter how avant-garde or zany, all insights are welcome at this stage. What's also quite interesting is that no-one person is in charge of directing the process, it's as if a group dynamic, propelled by the potential of the idea itself - takes-on an impetus of its own here – something that I have always been fascinated by, but never quite understood.

After about a week we all agree to meet – usually after work – in a bar or restaurant to spend an informal evening casually exploring each other's take on the idea. At this stage, nothing has been formalised, but it's usually obvious that one or two of the ideas are beginning to emerge as favourites, and which ones have been rejected for one reason or another. By the end of the session, we usually have a good feel for the form and features of the new product. We then write-up a spec for the new product at work, and pass it back to the group for any amendments or 'tweaks'. The final design is then prototyped and sent out to a few die-hard beta testers (usually staff members and existing loyal customers). We invite final suggestions from the beta community, and if it's a general 'thumbs-up', we look in to production, as well as user acceptance testing and final release schedules. This is how it works for us for more or all new developments. The technology is absolutely fundamental to the process, as it serves as an instant cross-check to existing global patents – existing patents that could otherwise kill us dead in the water, in these days of trigger-happy lawyers – especially if you're up against the big Silicon Valley players, who file patents by the thousands precisely to stop small guys like us getting in on the action.

Finally, I should say something about the size of companies: the above formula works for us as a small tech company composed of 6-8 employees at any one time. I doubt that if we were any bigger, the same approach would work, as corporate attitudes begin to creep in, and managers tend to get in the way of creativity. I've been employed by big corporates in the past, as you know, and so feel qualified to comment on this difference.

FN16:04

The latest set of buzzwords in the industry are 'cloud', 'IoT' and 'BigData'. I've worked on a few 'big data' projects in 'the cloud' – sounds impressive? Not really – it just means that the massive sets of data – the so-called 'big' data containing millions upon millions of records – are hosted across many hundreds of servers located in different countries around the world. Doing it this way means that the data set is almost indestructible, and that the data can be manipulated by somebody sat on a beach in some tropical resort…no need to be anywhere near the actual data, so long as you have a good internet connection. The Internet of Things is something that I do not personally have any experience of, but as far as I know, has something to do with the net-enablement of everyday devices….so, for example if your fridge runs low on milk and cheese, it 'knows' to add some in to your next on-line shopping basket, or even better, orders it there-and-then directly from the grocery store.

FN16:10

Automation will never replace the intuitive insight of those working in the professions. Despite the huge amounts of automation on our accounting side, we will always use an accountant to guide us through the various mazes of changing statutory law, and recommend legal short-cuts to mitigating our tax liability etc….what kind of computer would ever be able to do that, tell me?

FN16:11

We faced a tax audit a few months back, and at first we were assuming that we could just pass the ledgers to the auditor and leave them in a room by themselves. Had we done that, we would have been in big trouble. Fortunately, our accountant was able to sit in on the session, and point out, for example, that the company cars were always parked outside the office at night, and were not used for anything other than business purposes by staff. Good thing that she was there, because the auditor was about to levy a charge on each car, on the 'assumption' that staff were using the cars for personal use a certain percentage of the time. This kind of internal knowledge is something that no computer could ever provide – it involved thinking between the lines and being able to artfully – and legally – dodge the inbound challenges that most companies face most of the time.

FN17:12

Sure, we're all competing for the big prize of an IPO and retiring at the age of 40 as a billionaire…but, that is quite rare – even here in the valley. So long as we all make money and stay in business, that's all that matters. To make sure that this is always the case, we have regular socials with our customers, but also invite our nearest and dearest competitors – how crazy is that? Well, that degree of openness has paid off time and time agin in terms of the levels of trust we enjoy with our competitors: we share information on suppliers – good and bad – and also customers, if say, we need a hand fulfilling an order…the other guys wouldn't think twice about sending ten members of their crew over to help us pack a big order.

M13:08

Speaking with a fellow business owner in the tech industry who mentioned that she now pursues university-level credits from globally-renowned universities like MIT, Harvard etc…all of which are digitising the course contents of some of their most popular course and, for a small fee, or no fee at all, are making their content available on line. This includes lecture videos, course notes, quiz papers, as well as an assessed element if she wants the actual credits. They're referring to this phenomenon as 'MOOCs' – Massive On-line Open Courses – and so far, she's studied for credits in internet marketing, web design and other vocationally useful courses. Could this spell the end for the traditional university, as we know it?

M13:09

The protection of personal and highly confidential information is questioned, with some respondents claiming that the guardianship of such data should not be left to profit-making [software] corporations – as is the case for the majority of public and private bodies handling our data - and that open source operating systems and software should be used in preference, as they provide the most resilient means of protection that have so far proved themselves consistently over time. The integrity of large vendors was questioned in such situations, where they have been seen to engage in strategic 'hook and bait' tactics by offering free licensing for an initial number of years, and then locking customers in to onerous subscription contracts once they are fully dependent on their solution.

M13:18

Hardly a week goes by without the report of some database compromise, where hundreds of thousands or millions of highly confidential personal records containing health, financial and other sensitive data are stolen. No system can ever be 100% secure, and so responsibility lies with the users of systems as well as the developers, surely? Just as users must be encouraged to regularly reset passwords, so developers must increase in-built cross-checks for security and network firewalling. It is a battle that can never be won.

M14:01

Speaking to a number of other delegates at a Microsoft conference, all are buzzing about how work has been utterly transformed by the latest improvements in broadband connectivity, and how – unlike before – it can be commercially relied upon for voice-over-IP telephone calls, and the transfer of large files. Microsoft have been positioning themselves for this eventuality for some time now, with recent the announcement of their 'Azure' cloud platform. To summarise, most of the barriers to efficiency and communications have now dissolved, and experts that would otherwise not have been able to exchange ideas from one side of the world to the other, may now do so at the psuh of a key.

M14:08   **NEGATIVE CONCEPTUALISATION**

The recently transcribed data reveals use of a kind of negative dialectic, as expressed in two respondent narratives. E-mailed both to elaborate on their precise meaning, and it's something they have used as a discovery heuristic for years. Once indicated that a former manager used the technique, and so he adopted it with some degree of success. The other said that he couldn't remember when/how he had first encountered it, but he too had been using it as years, to useful effect. Neither had any philosophical training, or any interest whatsoever in philosophy: both were engineers/software coders and so had a technical/engineering background.

M14:12   **IDENTITY OF SELF**

Conversely, the 'less experienced' agents of enterprise that constituted the respondents of the case study and exit interview datasets exhibited no signs of overt entrepreneurial agency. They referred to themselves as anything but the 'entrepreneur', and despite exhibiting the very traits and tendencies (risk taking etc.) often associated with the entrepreneur, merely described themselves as "being in business" "owner-managers", "founding members", and paradoxically (for a very small firm), the label "CxO" – an executive designation accorded mostly to the senior board executives of much larger firms. Typical of the lack of importance relating to the self, when asked how he would describe himself, one respondent answered:

> *"Chief pot washer, bin emptier and all-round dogsbody."*

M14:14

Nothing ever seemed to come from the in-office brainstorming sessions that we arranged from time to time, and I guess the reason for this is clear: we were at work; part of work; part of a regime and a pre-ordained plan that already existed. But we were trying to discover new things: products, services, techniques - processes that didn't even exist yet, but were still expected to reference the new to the existing…the work environment somehow inhibited our creativity, which only ever seemed to want to play when we were outside of work, and had the freedom to decide which conversations we wanted to engage with, or not.

M14:16

Interesting that none of the respondents have yet made any direct reference to the way in which they perceive themselves or reflect on their self/identity. Respondent **EX5** did make reference to a kind of transient, adaptive identity, where he described himself as the 'chief pot washer, table cleaner and bin emptier', parodying his recollection of how it was by describing himself in terms of what would usually be viewed as menial, unskilled labour. When asked to elaborate on this via an exchange of post-interview e-mail communications, he explained that in the absence of others [usually employed to fulfil specific roles such as cleaning, accounting, marketing in traditional office settings], he would be compelled to take on any/every-which identity required of him in order to 'get the job done' and 'keep the show on the road'. In other words, menial tasks that would never normally be associated with entrepreneurial action were equally as vital as the higher-level [management] tasks in terms of maintaining stasis/balance across the whole operation; thereby ensuring continued survival of the new venture.

M14:22

Can symapthise with the plight of some respondents, who have lost friends, family and property during the building of their various ventures. Although I have been more fortunate, having only lost contact with a few individuals who I considered once to be friends, the possibility remains for business to drastically impact upon personal relationships etc.

M14:29

Respondent mentioned during meeting that brainstorming was probably the best single way of producing creative inspiration, but it was no use at all for truly independent blue skies thinking: that was more the preserve of the individual, and there seemed to be many methods, techniques and recipes out there for individual creativity. That said, once those basic flashes and germs of creativity were thrown in to a brainstorming session, then it was an entirely different dynamic: then, group creativity was much more able to come up with so many more off-the-wall and adventurous ideas than the lone individual could. We'd all figured this out some time ago, and so decided to split a session in to two halves: the first half allowed us each a week of our own time to apply our own methods for inspiration. After a week, we then all met to compare notes, and that particular approach proved to be dynamite.

M15:03

Entrepreneurs are apt to cast their nets out far and wide, which often involves unconditional giving, to see what – if anything – could come back. It worked for me when I think of the number of charity events I would attend over many summer weekends. It was the pure altruistic delight of giving without expecting anything in return, knowing that somebody less fortunate was being helped, either directly or indirectly. Although I never expected anything in return, the amount of business received in direct response to my help at these events was tremendous; not to mention some very high-level referrals in to government contracts that arose through charity connections.

M15:04

Beautiful synergy is beginning to develop across the conceptual categories now. It occurred to me that, in conjunction with other key conceptual indicators, the entrepreneurial imperative of 'restoring balance' (RQ1-OC8) could be usefully applied to exert a potent force in the restoration of moral and ethical awareness (RQ3-OC11), in a world that appears to be full of transgressing corporates (Enron, Barings Bank, Lehman brothers etc.). If all managers and executives had received early training in entrepreneurial thinking leading to a more principled form of praxis, would Enron and the like have ever happened to the extent that they did?

M15:06

Sociopreneurial Intervention: The Tragedy of the Commons

Collective virtuous action has already been recognised as a possible solution to issues described by the concept of *the tragedy of the commons*: an economic theory that relates to problem situations in shared resource contexts, where actors act individually according to their own degrees of self-interest, often behaving contrary to the common good of their community by depleting or spoiling resources collectively via their aggregated action.

In terms of an idealised entrepreneurial action, principled praxis is derived from collective action, but represents the actions of just a small number of entrepreneurial actants. In the case of the tragedy of the commons, the problem (tragedy) is addressed by the principled praxis of one or more individuals – usually described as *sociopreneurs*, as the problems are very often socially based - who recognise a problem and are prepared to marshal communal resources – often the same resources responsible for the problem in the first place – in a bid to remedy the situation.

M15:07

Spoke with a respondent by telephone – asked about the group brainstorming sessions they have, and if I could attend next as silent observer. Said next one wouldn't be for a while, as they'd just (last week) had their quarterly session. Asked about format/procedure – was told that it was a group session of no more than ten participants, and only one person could speak at once. Interruptions were forbidden, and the details of the discussion had to remain confidential within the group. Other than that, anything could be said without fear of comeback or any kind of reprimand. The sessions had really helped with staff morale, and had the unintended consequence of group members looking out for each other when in work – had something to do with the shared experience etc.

M15:16

The speed at which those in business can now acquire information is unlike anything before. Able to access the accounts of competitors, check their solvency, trading status etc., and see if they are in financial difficulty or not. Any problems with computer networking or using say MS Word or Excel, then there will always be some person, some *where,* willing to assist for nothing. This 'free knowledge' economy has radically transformed my approach to learning, in that I only tend to learn the relevant things, and those topics that I specifically search for.

M16:01

Overlap between entrepreneurial intuition, Peirce's notion of (abductive) retroduction, and the 'guesswork' involved in abductive inference keep pointing back to the physics of inquiry. It's to do with the theory of thermodynamics, and keeping unstable systems from either running away and melting down, or decaying to the point where they no longer exist. Balancing on that edge, where instability in either direction may lead to disaster, can be restored by positive or negative feedback – i.e. restoring disharmony – seems to be exactly what the entrepreneur is up to here….it's all about maintaining balance in an otherwise unstable system. The physics and chaos/complexity analogies are a perfect fit.

INITIAL SCREENING/DATA CAPTURE QUESTIONNAIRE

RESPONDENT ID CODE: EX4

Experience

Number of Active years as an entrepreneur:
(exclude any years spent in 'non-entrepreneurial' traditional employment)

Your post-18 Education:
(Subject area, level of qualification)

Previous work Experience:
(List conventional jobs held: sector + number of years)

Number of past ventures:
(those with which you no longer have any direct involvement – failed or continuing))

Main operating location of each venture:

Referring back to your very first venture, how was it funded, and to what extent?
(Approximate figures only. Include fund source(s). E.g. family/friends, own funds, bank loan etc.)

Parental Occupations: (M)   (F)

Current Situation

How would you describe your current position:
(e.g. MD, CxO, Owner-Manager, Entrepreneur, Employee, Business owner…)

Number of currently active ventures:
(those with which you are directly involved)

Main operating location of each venture:

Sector(s) in which your venture(s) are active:
(e.g. Telecoms, Health care, Software development)

How many employees in each venture?

Where is your operational base? *(town, country)*

Confidentiality
As part of the strict ethical code observed by the university when dealing with research subjects, the personal data provided above will only be tied to you respondent ID code. Only the researcher will know which respondent corresponds to which ID code, and any written record of this will be retained only until the study is complete; after which it will be destroyed.

Adapting to change – SC1

Source	Narrative Excerpt
RQ1:SC1 #1 **ST10**	*"When a new product or service arrives on the scene, there is a distinct lag between the time you incorporate it in to your infrastructure, workflow - or whatever – and the point at which the business begins to usefully benefit from its functionality in one way or another. Taking in to account the time it takes for training, shaking off any lingering habits from the 'old' system, there is a definite 'lag' involved in the uptake of new technology. The problem in recent years however, has been that new versions of said technology are now being released faster than the average 'lag' time to useful adoption."*
RQ1:SC1 #2 **EX7**	*"When everything is changing around you, there are no familiar anchor points via which to reference your judgements or actions. Unlike the stale predictability of, say a 9-5 office job, the life of an entrepreneur is characterised by constant change, unpredictability and uncertainty. Their actions are driven by the need to restore balance and harmony to an otherwise chaotic world, which perhaps explains their propensity for risk taking and seemingly rash decision making."*
RQ1:SC1 #3 **EX5**	*"Having banned Windows and all other Microsoft products from site, our whole operation now runs on the 'Linux' open source operating system. It takes a little more getting used to, but has saved us hundreds of thousands by avoiding the yearly licensing and upgrade 'trap'...Since 2010, our total annual spend on operating systems software has been negligible, and the feeling of freedom among our network engineers is palpable."*
RQ1:SC1 #4 **ST9**	*"Because life in a start-up is so closely allied with non-stop, incessant change, it means that only certain types of individual are likely to thrive in such environments. It's not a case of adapting to change, but more a case of thriving on it. I have colleagues who thrive solely on the 'buzz' of the start-up years – once it has fizzled away, they're off in search of their next challenge."*
RQ1:SC1 #5 **ST14**	*"I am concerned about the frequency of so-called 'security' updates from Microsoft and other software vendors. Installing them takes up so much of my time; time that I should be spending addressing the basic day-to-day needs of my business. Others I know are also beginning to recognise and resent the number of hours they are wasting on this ritualistic farce. As we are now so dependent on the technology, we have no choice but to comply."*
RQ1:SC1 #6 **ST8**	*"I find that there's a tendency to needlessly over-analyse problems now. Just because of the sheer amount of information available at the press of a button, people feel the need to include it all, even though much of it is ill-informed dross. A good example of this is when people get a pain or ache and make the fatal mistake of consulting Google: before you know it, you've got just weeks left to live. The same applies to the search for business and technical information: consulting Google is the last thing one should do if you're looking for even the slightest degree of clarity."*
RQ1:SC1 #7 **EX7**	*"One of the problems with an 'always-on' broadband culture is that everything is amplified, over-stated and seemingly on steroids: nobody has the patience to wait for anything or anybody, and immediate 'on-demand' response is not only expected, but is now the norm. One only has to watch the Web2.0 generation walking down the street to see that mobile 'smart' devices are capturing their complete attention."*
RQ1:SC1 #8 **ST9**	*"Those in the business of creating and managing enterprise are constantly needing to adapt to the very change that they are responsible for creating in the first place. Some complain and others just get on with it, but in the domain of high-risk, fast moving business, constant change keeps us all on our toes...it's a completely different dynamic to the standard 9-5 employee, whose life from one working day to the next is mapped out from start-to-finish. For entrepreneurs – especially those in the hi-tech industry - they usually have no idea what one day to the next will bring, and so need a chameleon-like response at the ready, able to deal with and react to anything that may be thrown at them."*

Adapting to change – SC1

Source	Narrative Excerpt
RQ1:SC1 #9 **EX6**	*"I have noticed that new software or hardware is received in one of two ways: it is either fiercely opposed by those who are settled in their use of the system that is about to be replaced; or, it is enthusiastically received by those who accept that things change over time in response to changes in technology, working practice and procedures etc… The problem now is that those who usually oppose any change have nothing left to hang on to, as everything changes so fast that they simply have to accept the inevitability of constant change. That's life."*
RQ1:SC1 #10 **ST13**	*"The biggest change I encountered was my transition from a 9-5 boring desk job in a town centre office, to suddenly being alone and 'out there' working for nobody but my myself, and from the comfort of my own home. I was Initially so overwhelmed by the sense of freedom that it took a good few weeks for me to realise that I should perhaps get on with some work. I now thrive on the daily challenges associated with running my own firm, and wouldn't have it any other way."*
RQ1:SC1 #11 **ST12**	*"I have now accepted the fact that I am not capable of simultaneously fulfilling every role required for the effective operation of a business: I now delegate the accounts to accountants; get a cleaner in to do the cleaning, and have a lawyer take care of the legal side of things. Before, I arrogantly assumed that I could do everything: how wrong I was."*
RQ1:SC1 #12 **ST9**	*"Just as WordStar was replaced by Microsoft Word, Facebook will surely go the same way as MySpace one day…and all the old habits and practices that you once spent hours learning with respect to these latest fads will get replaced over, and over again with new ways of doing things; ways of doing things that become mainstream as more and more users fall for their charms. The main point is to ensure that you remain ever-vigilant, and ensure that you as an individual do not get caught unawares by the creeping and inevitable progress that we call technology. Never stand still, and always ask questions that directly challenge the status quo."*
RQ1:SC1 #13 **ST15**	*"In a bid to survive we have had to reinvent ourselves time and time again in line with changes to the underlying technology. Fortunately, we've been able to keep pace so far, but each time there's a significant upheaval to the way things are done, the consequences become more expensive, more complicated and riskier to integrate with existing systems. How much longer we can continue like this is anybody's guess."*
RQ1:SC1 #14 **EX2**	*"In my previous employment, I found that the processes and workflows we had become accustomed to over years were starting to change more frequently to accommodate the latest advances in MIS technology, mostly driven by upgrades to hardware and software. Upgrading once is fine, but soon becomes tiresome when minor and major updates start to appear every few months. The updates can't be ignored, otherwise everything stops working. It's no different now, working for myself: I just don't have the time or the spare brain cells to keep resetting the goalposts and reinstalling things over and over – it really slows down my business."*
RQ1:SC1 #15 **EX7**	*"We realised that the processes and strategies we'd become accustomed to over the years had to keep changing to accommodate new advances in technology – mostly from upgrades to hardware and software. Adapting once was fine, but it became somewhat tiresome when it started to happen every couple of months."*
RQ1:SC1 #16 **EX1**	*"In my experience the typical life of an entrepreneur is punctuated by one fire-fight after another. Because of the dynamism of the environment in which we generally operate – which is even more demanding in the technology sector owing to its ever-changing nature – our life consists of restoring balance to situations that have the potential to damage, or even destroy a venture if left unattended. It's all a big balancing act in the name of survival."*
RQ1:SC1 #17 **ST15**	*"No sooner do you get accustomed to the way model 'x' works, model 'y' is released, accompanied by a whole new set of terms, rules, features and add-ons; and the whole process starts over again."*

Adapting to change – SC1

RQ1:SC1	Open Codes
#1 (4)	acclimatisation; acceptance; adoption; lag
#2 (4)	referential anchors; constant change; restoring balance, traits
#3 (4)	open source; cost savings; liberation; onerous licensing
#4 (4)	constant change; unique characteristics; thriving on change; transience
#5 (4)	software updates, insecure; wasted time; forced compliance
#6 (5)	over-analysis; abundance of information; junk; ill-informed; consider alternatives
#7 (5)	interconnectivity; over-stated; lack of patience; instant gratification; dehumanising
#8 (4)	recursive change; responsivity to change; future indicators; quick to adapt
#9 (3)	resistance to change; acknowledges constant change; resigned to change
#10 (5)	change in environment; responsibility; freedom; thriving; no turning back
#11 (3)	jack-of-all-trades; delegation; acknowledges own competence
#12 (4)	upgrade cycle; inevitability of decay; currency of skills; maintain critical attitude
#13 (4)	survival measures; reinvention; keeping pace; failure
#14 (4)	frequent change; process; workflow; upgrade cycle
#15 (4)	process; strategies; responsive change; upgrade cycle
#16 (5)	fire-fighting; restoring balance; avoiding damage; preventing failure; balancing
#17 (5)	upgrade cycle; recursive change; re-skilling; new terminology; changing rules
Total 71	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
constant change (x2); frequent change; thriving on change; responsive change; recursive change (x2); responsivity to change; changing rules; resigned to change; change in environment; resistance to change; acknowledges constant change	*Change (13)*
acclimatisation; acceptance; adoption; balancing; quick to adapt; reinvention; restoring balance (x2); fire-fighting; avoiding damage; preventing failure	*Adapting (11)*
currency of skills; re-skilling; keeping pace; unique characteristics; acknowledges own competence; jack-of-all-trades	*Competence (6)*
upgrade cycle (x4); software updates; forced compliance	*Compliance (6)*
freedom; thriving; liberation; dehumanising; open source	*Emancipation (5)*
abundance of information; interconnectivity; over-stated; over-analysis	*Ubiquity (4)*
process (x2); workflow; strategies	*Work (4)*
lag; wasted time; transience; future indicators	*Time (4)*
referential anchors; traits; new terminology	*Narrative (3)*
failure; inevitability of decay; survival measures	*Entropy (3)*
cost savings; onerous licensing	*Constraints (2)*
consider alternatives; maintain critical attitude	*Challenge (2)*
junk; ill-informed	*Worth (2)*
delegation; responsibility	*Ownership (2)*
lack of patience; instant gratification	*Satisfaction (2)*
no turning back	*Own referent (1)*
insecure	*Own referent (1)*
	Total 71

Control – SC2

Source	Narrative Excerpt
RQ1:SC2 #1 **EX6**	*"I would never dream of going anywhere without my mobile phone and/or iPad. I depend on both to schedule my day, tell me where to go, and how to get from A to B. I can't imagine it any other way."*
RQ1:SC2 #2 **ST8**	*"It's fair to assume that my actions are for the large part driven by my smart phone. If it rings, I have to answer it. If I hear that a new text, Facebook or Twitter message has arrived, I simply must read it immediately – even to the point of pulling over in the car, or suspending a conversation mid-flow. These things really do have power over the people they are interacting with."*
RQ1:SC2 #3 **ST13**	*"Our direct competitors now outsource most-all of their non-specialist functions to overseas companies willing to do the work for less. They save a small fortune on admin staff in the process, and in some way, gain a competitive advantage over us because they can spend more time and money on the things that matter, like improving their products, and gaining more market share. We are losing out big-time."*
RQ1:SC2 #4 **ST14**	*"With the E-lance and UpWork web sites, we can now outsource any specialist requirements we have to the so-called 'gig' economy, where hundreds or thousands of willing freelancers located in all corners of the world are willing to bid on the work. Much of our work gets subcontracted to Indians, who always do a fantastic job, are so willing to accommodate, and provide the best hourly rates. This kind of practice is becoming more prevalent in our industry, and I hate to say it, but is at the expense of us employing the locally available talent, which is too tardy, too expensive, and usually comes with attitude."*
RQ1:SC2 #5 **ST9**	*"My smartphone is my everything. It reminds me of all birthdays and anniversaries, it tells me when to get up, when to go to bed, and how many steps I've taken during the day. If it thinks I haven't been exerting myself enough, then it reminds me to breathe, and if I'm slouching in the chair it commands me to sit up straight. The funniest thing is that I actually do what it tells me, every time. The only problem arises when the battery runs out – then I really am stuffed."*
RQ1:SC2 #6 **EX7**	*"We have to work harder than ever now to win a contract. We're not only competing against local talent, but it seems that the whole world is also pitching for the same work, thanks to advances in global telecommunications. The whole world is now a market place, and anybody with a good internet connection can take trade in this market."*
RQ1:SC2 #7 **EX1**	*"I utterly depend on the information systems I access every day; to the point that I would have no idea how I might do my job if they were not there. This was regularly made all too clear to us when our in-house network would fail. Even if only for a day, it would cause mayhem and result in a total loss of productivity. For this reason we have now ceded all control of our systems to the guys at Microsoft, running all our apps and hosting all data and e-mail – everything - on their cloud network via the Azure platform. It means that if anything goes wrong, we know that they will get things up and running again. Thus far, not one outage in 3 years."*
RQ1:SC2 #8 **ST15**	*"To differentiate ourselves from the overseas freelancers now bidding for jobs we once had exclusive access to, we have had to lower our prices and ensure that we're up to date with the latest techniques when it comes to software design. These overseas guys really are giving us a run for our money, and one day they're going to put us out of business for good. Seems like a race to the bottom to me."*
RQ1:SC2 #9 **EX3**	*"I have seen so much arrogance and complacency in firms that think that the new way of doing things won't affect them. They stick their heads in the sand and expect business to continue as usual, while all the time their bottom line is being eroded by some far-flung guy with a computer and internet connection, who can do the work they do for less time and in a fraction of the time – all from the comfort of his bedroom in Timbuctoo. Big firms need to wake up and smell the coffee before it gets too late."*

Control – SC2

Source	Narrative Excerpt
RQ1:SC2 #10 **EX4**	*"While it does bring many benefits, technology has also empowered others who previously wouldn't have been able to compete to bid for the work we have comfortably enjoyed for years. Look at what Uber has done to taxi drivers; look at what self-employed drivers have done to traditional couriers...the list is growing, and to stay one step ahead, traditional industries will need to act fast to survive, otherwise it won't be long before the rug is pulled from under them, too."*
RQ1:SC2 #11 **ST10**	*"With technology comes many advantages, but you also need to remember that it forces its own way of doing things on you, and in so doing challenges your established way of doing things. If the way it wants you to work doesn't fit with the way you've always done something, then you – not the technology – has to give way."*

RQ1:SC2	Open Codes
#1 (3)	dependence; reliance; devotion
#2 (5)	controlling; obedience; subservience; immediate response; power
#3 (5)	outsourcing; cost savings; competitive advantage; focus on essentials; loss of control
#4 (6)	outsourcing; 'gig' economy; global competition; overseas talent; local unemployment; attitudes to work
#5 (7)	submission to technology; devotion; organizing ability; controlling ability; commandeering; obedience; single point of failure
#6 (5)	increased effort; global competition; global connectivity; global marketplace; open to all
#7 (8)	capitulation; dependence; mission-critical; subservience; ceded control; reliable vendors; absolution from responsibility; confidence in supplier
#8 (4)	differentiation from competitors; lack of exclusivity; competitive edge; pessimistic outlook
#9 (6)	complacency; ignoring change; rejecting change; external threat; remote working; slow to react
#10 (5)	empowerment; inclusivity; 'gig' economy; staying one-step ahead; adapting to survive
#11 (4)	dominance; forced compliance; changing habits; surrendering control
Total 58	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
controlling; controlling ability; loss of control; submission; ceded control; obedience; surrendering control; inclusivity; obedience; subservience (x2); dependence (x2); capitulation; reliance; focus on essentials; cost savings	*Control (17)*
global competition (x2); global connectivity; global marketplace; overseas talent; open to all; competitive advantage; competitive edge; mission-critical; differentiation from competitors	*Competition (10)*
forced compliance; power; dominance; ignoring change; rejecting change; empowerment; commandeering	*Empowerment (7)*
remote working; 'gig' economy (x2); local unemployment; outsourcing (x2)	*Employment (6)*
staying one-step ahead; increased effort; changing habits; adapting to survive	*Surviving (4)*
reliable vendors; confidence in supplier; pessimistic outlook	*Satisfaction (3)*
complacency; absolution from responsibility	*Egotism (2)*
devotion (x2)	*Devotion (2)*
immediate response; slow to react	*Responsivity (2)*
external threat; single point of failure	*Vulnerability (2)*
organizing ability	*Own referent (1)*
attitudes to work	*Own referent (1)*
lack of exclusivity	*Own referent (1)*
	Total 58

Empowerment – SC3

Source	Narrative Excerpt
RQ1:SC3 #1 **ST12**	*"Until very recently, we paid thousands to accountants and other professionals for their 'expert' opinions. With the transfer of many professional services to on-line portals however, payroll is now processed for about £6 per month; accounts are all processed and filed on-line for £20 per month, and sales tax returns are filed automatically on line, for free. Bad news for the accountants and their industry in general I suppose, but good news for innovative small firms like ours trying to get along and keep our heads above water."*
RQ1:SC3 #2 **ST15**	*"I can confidently attribute most of the recent improvements in our working style to changes and improvements in the underlying technology and communications that we are increasingly relying on. The move to on-line processing has liberated many of us from the manual tasks associated with paper-based administration, and freed-up so much time. The improvements to my personal efficiency have been amazing."*
RQ1:SC3 #3 **EX2**	*"Many of the old barriers to conducting business have disappeared. The yearly paper chase and inconvenience of statutory compliance with various government departments is now processed entirely on line. I get reminders to file via text message or e-mail, and it has saved tremendous amounts of time and worry traditionally reserved for dealing with red-tape matters."*
RQ1:SC3 #4 **EX3**	*"Improved transaction settlements between bank accounts has made a big difference to our cash flow situation...gone are the days of waiting up to nine days for a cheque to clear, especially if coast-to-coast. I've lost count of the number of times we nearly went bust because a large cheque was 'in the mail' or waiting to 'clear' in to the account. Those excuses just don't wash anymore."*
RQ1:SC3 #5 **EX3**	*"Gone are the days when we would spend hours completing paper forms, then sending them off for processing. Assuming they didn't get 'lost in the mail' you'd then spend ages waiting for a response, having no idea if it had been received and/or whether it was being processed. Whether it's tax, customer invoices, supplier invoices...whatever, the lag associated with the paper chase has almost completely been replaced by the immediacy of on-line systems. Now, most things are processed the moment they are received."*
RQ1:SC3 #6 **EX5**	*"Technology acts as guardian against human error, as it forces a consistent and uniform workflow to processes that were once manual and open to a whole host of different interpretations and possible abuse."*
RQ1:SC3 #7 **EX1**	*"I used to commute to work every day – three or four useless hours wasted travelling to and from the office. What amounted to half of every working day was idly spent listening to music and polluting my lungs with filthy air. Now, work comes to me no matter where I may be on the planet. So long as I have a fast internet connection, I can make and receive calls through the company switchboard, work on spreadsheets, make decisions and work just as effectively as I did when I was based in a physical office, sat at a physical desk."*

Empowerment – SC3

RQ1:SC3	Open Codes
#1 (5)	professional fees; automation; digitisation; cost savings; survival measures
#2 (6)	appreciation; transforming; liberating; digitisation; saved time; personal efficiency
#3 (6)	barriers to business; digitisation; on-line compliance; saved time; reduced stress; red tape
#4 (6)	Improved cash flow; manual processes; inefficiencies; deceit; threat to survival; no room for blame
#5 (4)	manual processes; paper-chase; automation; instant processing
#6 (4)	promotes accuracy; enforces uniformity; transformation; free from abuse
#7 (5)	wasted time; health concerns; remote connectivity; global connectivity; virtual office
Total 36	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
manual processes (x2); instant processing; inefficiencies; automation (x2); enforces uniformity; on-line compliance; barriers to business; digitisation (x3); personal efficiency; improved cash flow; promotes accuracy	*Empowerment (15)*
transformation; transforming; liberating	*Transforming (3)*
saved time (x2); wasted time	*Time (3)*
threat to survival; health concerns; survival measures	*Survival measures (3)*
remote connectivity; global connectivity; virtual office	*Presence (3)*
deceit; no room for blame	*Conforming (2)*
reduced stress; free from abuse	*Burden (2)*
red tape; paper-chase	*Process (2)*
cost savings; professional fees	*Overhead (2)*
appreciation	*Own referent (1)*
	Total 36

Networks – SC4

Source	Narrative Excerpt
RQ1:SC4 #1 **EX4**	*"Our customer service is driven entirely by Twitter, Instagram and Facebook now. Five years ago we just had an 0800 number and an e-mail address. Now, customers prefer to broadcast their opinions on our performance – positive or negative, but mostly negative - for all to see on various review websites. We must be seen to respond quickly and positively to every posting, or be prepared to take the corresponding hit in user confidence/market share when users decide to revolt. It really is that brutal."*
RQ1:SC4 #2 **ST12**	*"Social Media is like a double-edged sword: on one side, it's great for business networking and the cultivation of new industry contacts anywhere in the world; but on the other, it's a force to be reckoned with when somebody posts a complaint or review about your product's performance, or lack thereof. We now have dedicated employees to handle our entire on-line presence. They effectively handle our public profile, and are probably the most powerful employees in the company."*
RQ1:SC4 #3 **ST13**	*"All the experts in a particular field tend to gather in the same 'electronic meeting places', whether it be a Facebook or LinkedIn group, or a web-site forum dedicated entirely to the topic. For example, if I need advice on some obscure aspect of telecoms policy, there are forums out there dedicated entirely to its discussion. In the unlikely event that the people participating in that forum don't know the answer, they will for sure be able to tell you who can. And the best thing of all about it is that it's globally based, completely free, and open 24/7. Ten years ago I would have needed to pay specialist consultants hundreds, if not thousands, for access to the same kind of information."*
RQ1:SC4 #4 **EX1**	*"e-mail has to be the best thing to have come out of the technology revolution in terms of keeping in touch: Instant one-to-one – or even one-to-many communication; more or less guaranteed delivery, and the reassurance of knowing when it was read. What a far cry from letters and so-called 'snail-mail'."*
RQ1:SC4 #5 **EX2**	*"I used to attend yearly technical conventions to gather intelligence on the latest updates in my field. Now, I don't bother – it's much easier to keep updated via postings on the LinkedIn or Facebook profiles of my counterparts in different parts of the world. Yes, technically we're competitors, but that never gets in the way of us helping each other out…many of the barriers and prejudices of old have now completely dissolved, it seems."*
RQ1:SC4 #6 **EX3**	*"Smartphones, tablets and other mobile devices have had the effect of taking all this technology, and making it universally available, meaning that even when you're out and about, you can still be connected to the office, your colleagues and you family. If things have changed this much in the past twenty years or so, what the heck is it going to be like another twenty years from now?"*
RQ1:SC4 #7 **ST8**	*"One of the less-considered side effects of being constantly connected via 'always-on' broadband or mobile technology is that even when you're out and about in the field, visiting customers, or attending an international convention, you still have access to office files, e-mails, and the ability to communicate with anybody, at any time. If I need an expert opinion on anything, it takes but minutes to get a response or find the answer on an online forum."*

Networks – SC4

RQ1:SC4	Open Codes
#1 (10)	social media; transformation; digitisation; customer service; viral broadcast; perception; fast response; consequences for reputation; consumer confidence; threat to survival
#2 (8)	social media; making contacts; global reach; negative feedback; dedicated resource; on-line presence; public perception; power
#3 (10)	concentrated expertise; specialist fields; virtual venues; social networking; cost savings; specialised knowledge; altruistic referral; global reach; transcends barriers; pervasive
#4 (5)	instant communication; participation; reliability; validation; transformational
#5 (9)	knowledge transfer; information exchange; business intelligence; digitisation; social networks; disparate partners; global reach; no barriers; non-prejudicial
#6 (9)	smart devices; pervasive technology; ubiquity; transparency; seamless access; maintaining contact; transformative; revolutionary; future expectation
#7 (7)	pervasive reach; ubiquity; global reach; seamless access; virtual presence; expert opinions; efficiency of response
Total 58	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
pervasive reach; pervasive technology; global reach (x4); altruistic referral; seamless access (x2); ubiquity (x2); disparate partners; maintaining contact; making contacts; participation; transcends barriers; pervasive; transparency; no barriers	*Networks (19)*
social media (x2); social networking; social networks; virtual presence; virtual venues; viral broadcast; instant communication; on-line presence	*Inter-personal communication (9)*
public perception; perception; customer service; consumer confidence; consequences for reputation; validation; reliability	*Reputation (7)*
specialised knowledge; specialist fields; expert opinions; dedicated resource; concentrated expertise	*Expertise (5)*
transformation; transformational; transformative; power; cost savings	*Transformation (5)*
fast response; negative feedback; efficiency of response	*Responsivity (3)*
information exchange; knowledge transfer; business intelligence	*Learning (3)*
digitisation (x2)	*Digitisation (2)*
future expectation; revolutionary	*Anticipation (2)*
non-prejudicial	*Own referent (1)*
smart devices	*Own referent (1)*
threat to survival	*Own referent (1)*
	Total 58

CHANGE LOG

12/12/2013	Sub-category labelled *Social networks*
18/04/2014	Sub-category label changed to *Making Connections*
02/06/2015	Sub-category label changed to *Networks*

Locus of operation – SC5

Source	Narrative Excerpt
RQ1:SC5 #1 **ST10**	*"We still maintain a central office, but it's only used by a handful of part-time admin staff, and for hot-desking when remote employees come in for meetings. That said, most meetings are conducted via Skype now anyway."*
RQ1:SC5 #2 **ST8**	*"When customers call, they're under the impression that they're connected to a huge corporation. Little do they know that the employee they're speaking to is one of only five in the company, speaking to them from the comfort of his home office, and who is sometimes even in a different country. The quality of broadband and general connectivity is that good that it's almost impossible to tell where anybody is based now."*
RQ1:SC5 #3 **ST11**	*"We made the transition over to a fully-virtualised office about five years ago. All employees operate remotely from home, and they log-in to support customer's computers for troubleshooting and training purposes. They help clients to address issues that they're having with our product by remotely controlling their machine. The staff love it, and could never go back to traditional office-based work, what with that twice-daily commute."*
RQ1:SC5 #4 **EX7**	*"The one thing that all staff love about working from home – sorry, correct that – the TWO things that all staff love about it, are not having to commute every day, and being able to spend more time with family. It's a win-win situation, saves employers a fortune in office overheads, and I just don't understand why more companies don't do it. Maybe they don't trust staff to get on with the work, I don't know?"*
RQ1:SC5 #5 **ST12**	*"Working from home is the ultimate freedom: I can watch the kids while my partner is out working; do the school rounds at the beginning and end of the day, and so long as I put in the required number of hours every week, everyone stays happy. The best bit of all is not having some boss constantly looking over your shoulder."*
RQ1:SC5 #6 **EX5**	*"I've noticed that everything seems to be reverting back again to the old client:server model, where all processing and storage takes place on centrally-located servers, and clients access services via remotely connected terminals. The modern equivalent of client:server is facilitated now of course by web-based virtualisation and cloud technologies using products like Citrix and Azure… leaving all the hard work, headaches and expense usually associated with operating and maintaining your own network up to the big boys like Microsoft and Amazon."*
RQ1:SC5 #7 **ST9**	*"We use Amazon cloud services as our preferred medium for file storage and hosting applications; it's been this way for a few years now. The next big things to come along and have a transformational effect on working life will be so-called 'BigData' and the 'Internet of Things'.*
RQ1:SC5 #8 **EX6**	*"I love working from home - the only drawback of the virtual office is not having the human interaction that you would normally get in a traditional office space. Our company makes up for this by regularly arranging work socials, outings and brainstorming 'retreat' sessions, usually over a long weekend at some high-end country manor. The work:life balance is pretty much spot-on."*
RQ1:SC5 #9 **EX4**	*"Before outsourcing all our hosting, data storage and archiving requirements to the cloud, we had a dedicated server room at the old office, with its own dedicated network manager, and its own dedicated set of problems that regularly disrupted things. If it wasn't some hard drive failing, it was a power supply or a main logic board blowing, any of which would result in us all sitting around twiddling our thumbs until service was resumed. Now, we can blame it all on Amazon if anything goes wrong, which so far - in the three years we've been using them – just hasn't happened."*
RQ1:SC5 #10 **EX3**	*"The old boundaries that once hindered many aspects of business have mostly disappeared. The only thing that we don't have any power over is the time difference when dealing with international customer. Even then though, I don't mind staying up late or getting up a few hours early if it's to attend an important meeting. I can just go back to bed once it's over."*

Locus of operation – SC5

RQ1:SC5	Open Codes
#1 (4)	maintaining traditional presence; functionality; meeting space; video-conferencing
#2 (4)	deceptive presence; virtual office; global presence; improving connectivity
#3 (8)	transition; virtual office; remote working; remote support; remote training; remote control; retrospection; travelling to work
#4 (7)	working from home; travelling to work; family time; cost savings; overheads; low uptake; trust
#5 (7)	working from home; freedom; liberation; time with children; family duties; working hours; absence of authority
#6 (7)	centralised processing; centralised storage; remote connectivity; virtualisation of services; cloud technology; network support; devolved responsibility
#7 (4)	cloud services; data storage; data hosting; transforming technologies
#8 (8)	working from home; virtual office; inter-personal socialisation; remedial action; social gatherings; brainstorming; remote location; work-life balance
#9 (11)	in-house data network; facilities outsourcing; dedicated operation; attendant issues; hardware failure; systems failure; wasted time; lost productivity; deferred responsibility; reliability; established vendor
#10 (6)	boundaries; barriers to business; working hours; accommodating differences; international trade; home working
Total 66	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
centralised processing; centralised storage; data storage; data hosting; in-house data network; dedicated operation; facilities outsourcing; cloud technology; cloud services; virtual office (x3); meeting space; working from home (x4); maintaining traditional presence; virtualisation of services	*Locus of operation (19)*
working hours (x2); wasted time; work-life balance; lost productivity; travelling to work (x2); brainstorming; transforming technologies; transition; improving connectivity; hardware failure; systems failure; network support	*Productivity (14)*
remote connectivity; remote control; remote location; remote support; remote training; remote working; deceptive presence	*Remote working (7)*
social gatherings; time with children; family duties; family time; inter-personal socialisation; video-conferencing	*Social interaction (6)*
freedom; liberation; boundaries; barriers to business	*Emancipation (4)*
cost savings; overheads; low uptake	*Financial (3)*
established vendor; trust; reliability	*Vendor relations (3)*
devolved responsibility; deferred responsibility; absence of authority	*Responsibility (3)*
international trade; global presence	*Global reach (2)*
remedial action; accommodating differences	*Adapting (2)*
retrospection	*Own referent (1)*
attendant issues	*Own referent (1)*
functionality	*Own referent (1)*
	Total 66

Competence – SC6

Source	Narrative Excerpt
RQ1:SC6 #1 **EX4**	*"My usual response when asked how I'm going to go about learning how to do something I haven't done before is that there's nothing in this world that I can't look up on the web. It might be something I say flippantly, but I have come to realise just how powerful it is as a general 'how-to' resource - thanks to Google, mostly, but credit also goes to YouTube for showing me how to change the oil in my car."*
RQ1:SC6 #2 **EX3**	*"Knowing where to start is by far the biggest mental block I have, every time I need to figure out how something works. How can you possibly know what to ask for if you don't understand the problem to begin with? It's all very speculative to begin with – you just need that initial impetus to get the ideas flowing."*
RQ1:SC6 #3 **ST13**	*"My base skillset is still stuck in the late 1990s, having changed little since I completed my initial training. It served me well for my first ten years at work, when things didn't seem to change that much. These days however, I am beginning to feel less in control of the machines we use than ever before, because service updates and software fixes are issued almost daily, and I just don't keep up as much as I should."*
RQ1:SC6 #4 **ST10**	*"One way of staying ahead of the game is by being on the look-out for developments and key changes in your specialist area. There are plenty of on-line forums and chat rooms that help developers like me exchange vital information and keep up with the latest shortcuts, bug fixes and potential vulnerabilities in the latest round of 'security patches'."*
RQ1:SC6 #5 **ST11**	*"Even though you may not know what you are looking for to begin with, you soon find that by venturing a few tenuously-related keywords, you follow the rabbit down a particular hole, jumping around search engine pages, following one link to another like some kind of demented 'cyber-spider'. Following this random, almost chaotic 'knowledge trail' is so utterly productive in my opinion, that it should be taught to the kids at schools as a method. It's like an extremely powerful form of 'passive learning', where you don't set-out to learn anything specific, but end up gleaning so much incidental information – often peripheral to your specialist area - that it definitely bolsters your all-round knowledge in the area, and ensures that you're up to date with the latest trends."*
RQ1:SC6 #6 **EX1**	*"Have you ever had that feeling of being an 'imposter' when it comes to answering questions in an area that you may not be completely familiar with? It's something that we have all experienced, and I have come to understand that it's a sign that you actually do know what you're talking about…you get that feeling because those around you believe in you, but you yourself don't have the confidence to believe in your own competence. I see so many highly-intelligent and knowledgeable managers that fall in to this group."*
RQ1:SC6 #7 **EX5**	*"Although there are plenty of books and courses on how to 'become an entrepreneur', I am of the opinion that anybody can become an entrepreneur, at any time. Entrepreneurial action is nothing more than a response to the basic need to survive and provide for loved ones. It's something that arises out of necessity, and disappears again once the need has been satisfied. I think the entire basis of entrepreneurship lies in a pragmatic approach to life and survival."*
RQ1:SC6 #8 **EX7**	*"I have noticed that the earlier you start working for yourself, the more likely you are to continue on the self-employed path. This might explain why the most successful entrepreneurs either didn't finish high school, or dropped out of university/college. Those who engage earlier with venture creation and self-sufficiency will have a practical, real-world head-start over their contemporaries who decided to stay-on at school or university etc…I don't think it has anything to do with competence, but is more related to direct experience."*
RQ1:SC6 #9 **EX6**	*"I have always considered myself to be quite technically informed and up to date, but after overhearing a couple of our developers the other day discussing an issue they were having with some esoteric aspect of programming, I was forced to reconsider my perceived technical prowess. I have to admit that I didn't understand a single word of what they were saying. Yes, it was in English, but it may as well not have been. I felt so deflated and out of touch after the experience that I began to reconsider what I actually knew myself."*

Competence – SC6

RQ1:SC6	Open Codes
#1 (5)	learning confidence; pervasive knowledge; accessibility; default source; video-media as source
#2 (5)	Initial starting point; cognitive stress; Meno's paradox[1]; inspiration; speculation
#3 (7)	own skillset, mismatched skills; incongruence; keeping pace; control; upgrades; keeping pace
#4 (8)	staying ahead; updated knowledge; field of specialisation; on-line venues; learning; systems security; exchange information; keeping pace
#5 (9)	speculation; starting-point; keyword choice; search for knowledge; productive method; passive learning; unintended consequences; builds knowledge; staying current
#6 (5)	doubting confidence; expertise; unaware of own competence; belief in self; self-esteem
#7 (7)	theory of entrepreneurship; self-determination; necessity; survival response; provider; transient need; pragmatic approach
#8 (9)	precocious exposure; self-employment; point of education; early venture creation; self-reliance; pragmatic approach; practical approach; direct experience; accumulated experience
#9 (9)	self-confidence; technical ability; current skills; narrative; doubt own skills; loss of worth; lack of comprehension; despondency; question own competence
Total 64	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
question own competence; doubting confidence; despondency; belief in self; cognitive stress; current skills; mismatched skills; own skillset; self-esteem; loss of worth; self-confidence; self-reliance; doubt own skills; expertise; staying ahead; keeping pace (x3); staying current; field of specialisation; technical ability; accumulated experience; unaware of own competence	*Competence (23)*
learning; learning confidence; builds knowledge; passive learning; point of education; updated knowledge; pervasive knowledge; exchange information; search for knowledge	*Learning (9)*
pragmatic approach (x2); productive method; practical approach; speculation (x2); unintended consequences; direct experience	*Pragmatism (8)*
Initial starting point; inspiration; starting-point; Meno's paradox; narrative; keyword choice; lack of comprehension	*Inquiry (7)*
precocious exposure; self-determination; early venture creation; self-employment; theory of entrepreneurship; necessity	*Entrepreneurial (6)*
default source; video-media as source; on-line venues	*Information sources(3)*
upgrades; systems security	*Updated systems (2)*
incongruence	*Own referent (1)*
provider	*Own referent (1)*
survival response	*Own referent (1)*
transient need	*Own referent (1)*
accessibility	*Own referent (1)*
control	*Own referent (1)*
	Total 64

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[1] ***Meno's Paradox*** *-* *The argument known as "**Meno's Paradox**" can be reformulated as follows: If you know what you are looking for, inquiry is unnecessary. If you don't know what you are looking for, inquiry is impossible. Therefore, inquiry is either unnecessary or impossible.*   (Scott 2006)

Prior exposure – SC7

Source	Narrative Excerpt
RQ1:SC7 #1 **EX2**	*"Both my parents worked for Hewlett-Packard for many years, and all this tech stuff was just a normal, integrated part of family life in the valley[2]...Most week nights they would bring home the latest gadgets for us all to play with. First off it was a Commodore PET, then a Tandy TRS-80. At one point, we even had a PDP-11[3] sitting on the kitchen table for about a month."*
RQ1:SC7 #2 **EX6**	*"As well as being a miner, my father was in to radio and electronics; both of which I took an interest in from about age ten. Out of these hobbies grew my interest in computing and electronics, which eventually got me in to university to study electronics. By the end of the first year I thought that what they were teaching was irrelevant, and so dropped out and started out on my own. The rest is history..."*
RQ1:SC7 #3 **ST14**	*"Before deciding to set up on my own I'd worked for a big local employer in the telecoms sector. They had sponsored my degree as part of a modern apprentice scheme, and so I kind of owed it to them to work for them after I'd graduated - for a couple of years, at least."*
RQ1:SC7 #4 **ST9**	*"I'd always tinkered with electronics, pulling apart old radios in the garden shed, and then reconstructing them back to a working state. My folks just left me to it, but that tinkering cultivated a life-long interest in technology and how it had the power to enlighten and change lives. When the internet arrived in the mid-1990s, well, that was the turning point for me: I decided that this was going to be the career of choice for me after many years working in accounts."*
RQ1:SC7 #5 **ST11**	*"I was an electronics hobbyist at high-school, and started the electronics after-school club at senior high with the encouragement of my physics teacher. I went on to study Software Engineering at university during the early 1990s, which further fuelled my interest in computer networking that ultimately got me in to the Internet and service provision business."*
RQ1:SC7 #6 **ST10**	*"Other than playing Nintendo, Atari and arcade-based games when I was a kid, I wasn't really that interested in a tech-based career: I just wanted to play games. Somehow though, that morphed in to the desire to become a games programmer, and that in turn got me in to general programming. I guess without the games to begin with, I wouldn't have set-up as a software developer, and probably wouldn't be where I am in the industry now."*

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[2] *Reference to 'Silicon' Valley – an area in Northern California between San Francisco and San Jose.*
[3] *Digital Equipment Corp. (DEC) PDP-11: Early 16-bit minicomputer, popular during the 1970s-1990s.*

Prior exposure – SC7

RQ1:SC7	Open Codes
#1 (5)	parental influence; technical household; family life; play; experimentation
#2 (7)	parental influence; hobbyist; early influence; formative interest; further education; point of education; venture creation
#3 (4)	previous employment; relevant experience; corporate sponsorship; venture creation
#4 (8)	hobbyist; experimentation; play; formative interest; further education; lifelong interest; transformative effect; determined future path
#5 (7)	early hobbyist; extra-curricular activities; mentor encouragement; lifelong interest; further education; venture catalyst; technical services
#6 (7)	gaming; non-technical; play; transformation; coding; formative influence; games programming
Total 38	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
formative interest (x2); lifelong interest (x2); formative influence; determined future path; early influence	*Prior Exposure (7)*
further education (x3); point of education; extra-curricular activities early hobbyist; hobbyist (x2); experimentation (x2)	*Role of education (5)* *Hobbies (5)*
corporate sponsorship; mentor encouragement; parental influence (x2) play (x3); gaming	*Mentoring (4)* *Play (4)*
venture creation (x2); venture catalyst	*Venture formation (3)*
family life; technical household previous employment; relevant experience transformative effect; transformation technical services; non-technical coding; games programming	*Home factors (2)* *Work experience (2)* *Transformation (2)* *Vocation (2)* *Programming (2)*
	Total 38

Experimenting – SC8

Source	Narrative Excerpt
RQ1:SC8 #1 **ST9**	*"I see myself as taking part in a 24/7 experiment called life. Whether at work or at home, if you don't venture out of your comfort zone then the chances of learning something new are minimal. You have to take risks and be prepared to recognise failure as part of the learning curve. When you fail, adjust your approach and try again from a different angle. The technology now available has accelerated the speed at which new approaches can be tried. For example, 3D printing is a game changer when it comes to prototyping new products."*
RQ1:SC8 #2 **ST14**	*"Entrepreneurs conduct experiments all the time, but venture creation must also address the vagaries associated with human, financial, and technological factors. Other than that, we're just performing the same 'suck it and see' experiments as the guys in white coats. We conjure-up a new device or service by combining technologies – just as the chemist mixes chemicals or whatever – then we check if that combination performs or reacts as expected. If not, we back-track, change things a little, and give it another go; making sure that we maintain a note of what hasn't worked as we go along. OK, 99 out of 100, or even 1000 attempts will fail, but all it needs is that one success to make a break. It's all just a case of trial and error."*
RQ1:SC8 #3 **EX3**	*"Risk taking and experimentation are all part of the same approach to venture creation. Risks need to be taken when venturing in to unknown territory, and the approach is very much experimental. Something is tried, the desired result is not achieved; variables are changed, and try once again. Probably explains why scientists and start-up entrepreneurs experience so much failure early on – they're trying various approaches, one after the other…only a small fraction of which will prove worthwhile."*
RQ1:SC8 #4 **EX5**	*"Entrepreneurs are social engineers when you think carefully about it: they propose new and inventive ways of doing things, with the hope of improving some aspect of life, and making a living out of it in the process. Problem is that most of the ideas they come up with fail miserably; it's only when they begin to tinker around with the variables, the technology and the operating environment that the magic starts to happen. Perseverance and gut instinct are an absolute necessity."*
RQ1:SC8 #5 **ST13**	*"Although it may seem like many entrepreneurs act alone, fact is that many of them make a point of surrounding themselves with some of the best and most talented individuals in their field of operation. I know a few successful guys who partner with the engineering laboratories at their local university, funding research students to look in to the latest idea for a new product. With the advent of global messaging, the research department you end up working with could be on the other side of the planet."*
RQ1:SC8 #6 **ST11**	*"The reason entrepreneurs fail so often is that they can't resist changing the goal posts from one minute to the next, in terms of their approach to creativity and new ventures. It's all part of their search for the perfect solution, but also represents an extremely risky and often expensive approach. However, with the arrival of 3D printing, it is now much cheaper to commission a working prototype than ever before."*
RQ1:SC8 #7 **ST14**	*"Another difference between the standard owner-manager or small-business owner and the aspiring start-up entrepreneur is their attitude towards variety, diversity and risk. Unlike our non-entrepreneurial colleagues, us entrepreneurs thrive on experimentation, risk, diversity and constant challenging prevailing attitudes and practices."*
RQ1:SC8 #8 **ST10**	*"Truly innovative start-ups are the result of creative entrepreneurial experimentation with new ideas imposed by impartial, outsiders on a particular industry. It is particularly evident when an entrepreneur approaches a university research group for inspiration: the entrepreneur's previous experience initially guides the choice of domain for exploration, but their abject indifference to the routines and norms of the field - funding, departmental politics, rankings etc. - uniquely provide the entrepreneur with the freedom to break free from any limiting factors that have otherwise hindered the incumbents from advancing commercially in the field - students and professors in research groups are a classic example of this 'turn-around' phenomenon, that I have seen. Engagement with the entrepreneurial mind-set is a prerequisite to operationalising trapped inspiration."*

Experimenting – SC8

Source	Narrative Excerpt
RQ1:SC8 #9 **EX1**	*"Like most people, I never read the manual – assuming there is a manual to begin with. I think most smartphone manufacturers have realised that too, because I can't remember the last time a manual was included with a phone or tablet. So how are we expected to learn how to use these ever-complex gadgets? Me, and most others I know just resort to tinkering and exchanging ideas with other on-line users – that's how we learn. It's no longer applied learning – more like incidental, on the go learning, taken as and when required, in little snippets here and there."*

RQ1:SC8	Open Codes
#1 (11)	24/7 experimentation; life analogy; engaging with unfamiliar; learning outcomes; risk taking; failure as learning; recursive learning; adapt approach; diverse approach; 3D-printing; advanced prototyping
#2 (10)	entrepreneur as scientist; non-scientific factors; human factors; financial factors; differentiation; technological factors; diverse combinations; recursive feedback; initial conditions; change variables
#3 (9)	experimentation; risk taking; components of venture creation; frequent failure; recursion; change variables; multiple attempts; contingent success; low hit rate
#4 (11)	social engineering; creative; inventive; life enhancement; purposeful; high rate of failure; experimentation; variable environment; variable technology; perseverance; instinct
#5 (9)	solo operator; allied endeavour; experts in field; university collaboration; research groups; student sponsorship; sponsored research; technologically enabled; global access
#6 (6)	failure rate; changing objectives; quest for solution; high cost; 3D-printing; cheap prototyping
#7 (4)	contrasting attitudes; thrive on experimentation; challenge norms; reject dogma
#8 (10)	creative experimentation; playful; outsider perspective; research collaboration; creative inspiration; experience as guide; entrepreneurial outsider; creative freedom; unique perspective; different viewpoint
#9 (9)	user complacency; narrative; vendor presumption; complexity; absorptive capacity; experimentation; trial-and-error; user instigated; dynamic learning
Total 80	

Experimenting – SC8

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
entrepreneur as scientist; experimentation (x3); trial-and-error; high cost; thrive on experimentation; creative experimentation; adapt approach; risk taking (x2); change variables (x2); challenge norms; changing objectives; variable environment; multiple attempts; 24/7 experimentation; success; initial conditions; variable technology; life analogy; inventive; contingent; failure rate; frequent failure; high rate of failure; low hit rate; perseverance	*Experimenting (29)*
allied endeavour; solo operator; experts in field; technological factors; technologically enabled; social engineering; human factors; global access; research collaboration; research groups; student sponsorship; user instigated; sponsored research; university collaboration	*Collaboration (14)*
differentiation; diverse approach; diverse combinations; different viewpoint; contrasting attitudes; unique perspective; engaging with unfamiliar; playful; outsider perspective; entrepreneurial outsider	*Diversity (10)*
quest for solution; reject dogma; recursive learning; recursive feedback; recursion; failure as learning; components of venture creation; dynamic learning; instinct	*Reflexive learning (9)*
3D-printing (x2); advanced prototyping; cheap prototyping; creative freedom; creative inspiration; creative; experience as guide	*Rapid prototyping (8)*
non-scientific factors; complexity; financial factors	*Metaphysics (3)*
life enhancement; purposeful	*Goal-seeking (2)*
narrative; absorptive capacity	*Making sense (2)*
user complacency; vendor presumption	*Expectations (2)*
learning outcomes	*Own referent (1)*
	Total 80

Cutting corners – SC9

Source	Narrative Excerpt
RQ1:SC9 #1 **EX1**	*"We all knew that the software didn't do its job properly. On the surface it worked fine, but when it was under heavy load conditions in certain circumstances, it would always break – it just stopped working, and data was lost. We managed to cover the flaw up, and still sold about half a million copies worldwide, anyway. I couldn't believe that people bought software that just didn't work…More's to the point, I can't believe that we got away with it for so long."*
RQ1:SC9 #2 **ST12**	*"The problem with VC funding is that you trade control of your company for a big wedge of money and a chunk of stock. If your product doesn't meet the agreed milestones in terms of market share or some other performance metrics by Y1, Y2, Y3 etc. then they start to claw-back the stock – I think they call it 'ratcheting' or something? Anyway, by Y4 you could be left owning zero percent of your own company, and no money. So of course, the aim was to avoid this scenario, and in some cases the software we churned out to meet a final release deadline, didn't work exactly as it should – we all knew that – but it was easy to bullshit the non-technical board members with techno-babble and get them to sign-off for general release. It was only subsequent feedback from users – usually early adopters - that revealed the true story; but by the time a new release was due, we'd worked a fix in to the product to account for earlier…ermmm…indiscretions. Everyone was happy, and we got to keep control of the company."*
RQ1:SC9 #3 **EX2**	*"Because tax officials are not required to be familiar with every accounting app ever written – how can they when faced with an ever-expanding multitude of products? – it has become quite easy to just delete one or two invoices, or shift a few large bills from one quarter to the next to mitigate tax liability. It really does get that tight on the cash flow front sometimes. Even though the app tracks deletions and amendments via a hidden audit trail, many officials cannot keep up with the training required to effect a forensic investigation."*
RQ1:SC9 #4 **ST8**	*"I don't believe anybody who claims that they have never cut corners in order to be successful. All the people I know, either working for themselves or as part of a larger outfit, are up to some kind of skulduggery - however large or small in scope - in order to meet their targets, or to simply survive. The deception almost always relies on exploiting some kind of technological flaw in the accounting, finance or management software, and It's becoming easier to pull-off with the latest packages, in my opinion. For smaller guys like me, it's always – but always – down to a basic need to survive and provide for my family. For the bigger guys, such wrongdoings are driven by greed for profit and power, and so it probably gets a little more tricky when external auditors are involved. That said, look at Enron and Barings Bank: even when the auditors were in on the game, they got away with it for years…and I bet it's still going on to this day."*
RQ1:SC9 #5 **EX5**	*"Once-manual processes are now imbued with automatic checks-and-balances that serve to prevent human error during the transcription of data, and compel all users to adhere to identical work and process flows, according to the strict demands of the software. This forces a level playing field amongst users, instilling a greater degree of confidence regarding their attention to detail and the accuracy of their work."*

Cutting corners – SC9

RQ1:SC9	Open Codes
#1 (5)	unfit for purpose; superficial; unreliable; deceit; incredulity
#2 (10)	performance targets; penalties; mitigating acts; deceit; technical jargon; technical ignorance; duplicity; user feedback; restoring balance; narrative
#3 (10)	narrative; technical ignorance; vendor presumptions; change log; ghost records; resigned compliance; acknowledges wrong-doing; underplaying criminality; rationalisation; justification
#4 (11)	belief in widespread misconduct; anecdotal claims; survival measures; software exploits; ease of abuse; need to survive; need to provide; corporate misconduct; prolonged deceit; disbelieves honesty claims; misguided intentions
#5 (7)	digitisation; automation; mitigates error; forces common workflow; increases confidence; promotes level playing field; accuracy of work
Total 43	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
deceit (x2); belief in widespread misconduct; corporate misconduct; acknowledges wrong-doing; prolonged deceit; underplaying criminality; duplicity; ease of abuse; misguided intentions; software exploits; technical ignorance (x2)	*Cutting corners (13)*
digitisation; automation; ghost records; forces common workflow; change log; promotes level playing field; rationalisation; restoring balance; accuracy of work; increases confidence	*Corrective response (10)*
narrative (x2); technical jargon; user feedback; anecdotal claims; resigned compliance; disbelieves honesty claims; incredulity	*Narrative (8)*
need to provide; need to survive; survival measures; performance targets; penalties; mitigating acts; mitigates error	*Survival measures (7)*
unfit for purpose; unreliable; superficial; vendor presumptions	*Quality (4)*
justification	*Own referent (1)*
	Total 43

Learning – SC1

Source	Sample Narrative
RQ2:SC1 #1 **EX4**	*"Much of the knowledge I have has accumulated as a result of my experience at work, but I find that I can now easily supplement this, on- and off- the job, by what I see as a form of 'passive learning', which takes the form of random and spontaneous searches for everything and anything on the internet. The fact that I have a smartphone connected to the internet all the time, wherever I go, now means that I am learning all the time."*
RQ2:SC1 #2 **EX3**	*"When you are being actively 'entrepreneurial' you are in a permanent state of learning; constantly filtering the streams of information coming towards you for relevance and fit to the job in hand. When combined with the experience accumulated to date, this stream of information plus the aggregated past knowledge forms a seriously potent tool on which to base decisions and move forward."*
RQ2:SC1 #3 **EX2**	*"Knowing what your competitors are up to is one hell of a motivator, and to me, it represents one of the key drivers behind the desire to learn more and more about your sector: the who, the what, the why etc. Don't get me wrong: I don't engage in any kind of corporate espionage, but I do increasingly use information freely available in the public domain to gather as much information as possible about who I'm up against."*
RQ2:SC1 #4 **EX6**	*"Only very recently has Companies House opened-up its entire database of limited company accounts for free. Previously they would charge £2 to pull the accounts of any UK limited company, but even that relatively small barrier – and it was a barrier - has now been removed, meaning that I can get the latest financial position on any competitor or potential supplier I choose free of charge. I can also query the latest world-wide patent applications on-line; the corporate profiles of executives on LinkedIn or eCademy; and all kinds of other information that would previously have been quite difficult to get hold of."*
RQ2:SC1 #5 **EX1**	*"There is little doubt that the desire to acquire more and more knowledge is stimulated by the many options that modern technology provides. In fact, there are more sources to satisfy my 'data mining' activities than ever before; to the point of not choosing any particular one because there are so many."*
RQ2:SC1 #6 **ST11**	*"The need to survive dominates everything, especially during the first couple of years operating a start-up. Learning as much as you can about business in general - as well as keeping on top of current advances in your specialist area – are the two main rules; followed very closely by the mantra to 'communicate, communicate, communicate'. Talk to everybody and anybody about what you do. Get the message out there, and don't give a stuff about what anybody else thinks."*
RQ2:SC1 #7 **ST14**	*"Location and Wi-Fi connectivity play a large part in how efficiently you develop new ideas these days. I find that getting together in a relaxed, friendly atmosphere with a fast internet connection is more conducive to good learning than the stuffy confines of an office meeting room with a whiteboard and flip chart, being presided over by a boss figure with a time limit of 30 minutes. So long as there's a good quality Wi-Fi connection on hand, and at least one of you has a Wi-Fi enabled tablet or smartphone, then any good quality coffee shop, pub or even comfy train carriage will usually get the creative juices flowing, free from work-based power and time constraints."*
RQ2:SC1 #8 **ST13**	*"Whereas many larger companies measure their ability to learn in terms of how much training they offer and how much it might have contributed to their bottom line or market share, few - if any - make any reference to how much impact such training measures have, and how it has benefitted the individual(s) or wider stake holding community concerned. In entrepreneurial start-ups, there are only a few of you to begin with and immediate survival is the order of the day. Focussing on yourself is all you have, and so everything becomes very pragmatic, where everything is done for a specific purpose, and with a specific goal in mind."*

Learning – SC1

Source	Sample Narrative
RQ2:SC1 #9 EX7	*"The powerful ways in which data from many sources can be mined is astonishing. We now have databases of databases, and even database of those databases: look at how sophisticated comparison web sites like GoCompare.com and Comparethemarket.com are becoming – by doing all the hard work of searching and ranking for you, and presenting the meta-results according to price and/or popularity, that process of forming your own consumer judgements has been redefined and replaced by technology, fundamentally changing the way we select and identify our common purchases."*

Learning – SC1

RQ2:SC1	Codes
#1 (4)	acquiring skills; work experience; passive learning; ease-of-access
#2 (6)	always learning; filtering; discerning; selecting; past & present; perspectival
#3 (4)	awareness; motivation; catalyst; business intelligence
#4 (3)	ease-of-access; no barriers; business intelligence
#5 (3)	desire to learn; facilitator; over-abundance
#6 (5)	survival; keeping current; communication; making connections; confidence
#7 (7)	location; connectivity; social relations; atmosphere; authority; casual setting; office environment
#8 (4)	reputation; training; impact; pragmatic
#9 (5)	mining; source; meta-search; automation; consumer choice
Total 41	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
desire to learn; keeping current; passive learning; always learning; survival; acquiring skills; work experience; making connections; communication; connectivity; social relations; business intelligence (x2); training; confidence	*Learning (15)*
mining; filtering; discerning; selecting; source; meta-search; over-abundance	*Selectivity (7)*
no barriers; facilitator; ease-of-access; automation; ease-of-access	*Admittance (5)*
casual setting; office environment; atmosphere; location	*Setting (4)*
past & present; perspectival; awareness; pragmatic	*Pragmatism (4)*
catalyst; motivation; authority	*Motivation (3)*
reputation; impact; consumer choice	*Impact (3)*
	Total 41

Confidence – SC2

Source	Sample Narrative
RQ2:SC2 #1 **EX5**	*"It makes you appreciate how much more there is to know about something once you start to dig away at a topic via an internet search. It certainly brings you back down to earth with a thump, and it's then that you realise you have so much more to learn."*
RQ2:SC2 #2 **EX7**	*"I had been so blinkered in my approach to problem solving, especially when we had brainstorming sessions for new products. It took collaborative group sessions like these for me to realise that other people approach things from a completely different perspective and/or starting point, based on their previous life and work experiences. The fact that other people know more and are perhaps better than you becomes even more apparent when you take part in on-line collaborative exercises...then, you realise the whole world working together is so much better than you could ever hope to be by yourself, which is quite intimidating."*
RQ2:SC2 #3 **ST8**	*"Knowing the various etiquettes and formalities expected of the different types of on-line social interaction is the key to successfully engaging with other users on-line, especially when part of a social media platform. For example, we've all had the experience of inadvertently offending via e-mail, when what we thought we had typed was completely innocuous, right? Well, the same extends to chat rooms and expert forums on specific topics: you had better be fully conversant with the language and customs associated with that 'group', or you'll be unceremoniously 'kicked' from their channel – the technical forums especially do not suffer fools gladly."*
RQ2:SC2 #4 **EX4**	*"I am always knocked-down a peg or two when I arrogantly try to assert any kind of intellectual superiority in on-line collaborative settings. I don't know whether it's a cultural thing or not, but the moment you begin to get even a bit above your station, you are quickly put in your place – maybe the anonymity of it all emboldens people to be more critical?"*
RQ2:SC2 #5 **ST12**	*"Remember at school when you were the smartest in your class? You then went up to high school and there may have been one or two as good as, if not better than you? You then went to college/university, and were surrounded by only smart people? Well, the next step to this sequence is a seldom-mentioned and unintended consequence of the latest social communications technology: when you engage with global collaborative forums brainstorming a particular topic, believe me when I say that you will be, by far, the dumbest member in the group."*
RQ2:SC2 #6 **EX3**	*"I think it's the pseudo-anonymous nature of on-line collaborative forums that goad people in to saying things that they usually wouldn't say, and this helps to promote a deeper inquiry and discussion. While this can extend to the much-publicised phenomenon of trolling and on-line bullying – especially among younger participants - I wouldn't have it any other way with adult users, as that very anonymity allows for total and unrestricted freedom of expression, without any accountability or recourse."*

Confidence – SC2

RQ2:SC2	Codes
#1 (5)	appreciate limitations; abundance of knowledge; expansive; humility; own limitations
#2 (9)	lack of originality; group brainstorming; differing perspectives; experience driven; own limitations; defer to experts; on-line collaboration; wisdom of crowds; intimidation
#3 (11)	narrative; on-line etiquette; formalities; social intercourse; misinterpretation; social cues; nuances; specialist terminology; lexicon; rejection; intolerance
#4 (8)	arrogance; humility; put in one's place; cultural nuance; "出る釘は打たれる" [4]; anonymity; emboldened critique; freedom to criticise
#5 (6)	relative intelligence; group collaboration; brainstorming; concentrations of expertise; global reach; humility
#6 (6)	veil of anonymity; emboldens critique; promotes inquiry; prompts discussion; comprehensive analysis; context appropriate
Total 45	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
own limitations (x2); relative intelligence; appreciate limitations; arrogance; on-line etiquette; formalities; social intercourse; context appropriate; emboldens critique; emboldened critique; freedom to criticise; experience driven	*Confidence (13)*
defer to experts; on-line collaboration; wisdom of crowds; brainstorming; group collaboration; group brainstorming; concentrations of expertise	*Group expertise (7)*
humility (x3); put in one's place; "出る釘は打たれる"; intolerance; intimidation	*Humility (7)*
abundance of knowledge; expansive; global reach; comprehensive analysis	*Global village (4)*
social cues; nuances; cultural nuance	*Cultural cues (3)*
narrative; lexicon; specialist terminology	*Narrative (3)*
promotes inquiry; prompts discussion	*Catalyst (2)*
differing perspectives; lack of originality	*Intolerance (2)*
rejection; misinterpretation	*Exclusion (2)*
anonymity; veil of anonymity	*Anonymity (2)*
	Total 45

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[4] *"出る釘は打たれる" – Japanese expression referring to outspoken confidence: "The nail that sticks out gets hammered down"*

Thoroughness – SC3

Source	Sample Narrative
RQ2:SC3 #1 **ST15**	*"I'm always aware that what I know about something probably only represents a tiny fraction of the full extent of what could be known. Being able to search for those bits that I don't know – mostly via search engines – makes the picture complete. I can be pretty much assured that I then know as much as there is to know regarding my search target."*
RQ2:SC3 #2 **ST9**	*"Having full access to searchable databases full of archived material is what helps to complete the jigsaw when searching for the complete picture. Of course, nobody can know the future, but by taking on the historical, and then seeing how that fits-in with the current state of things, you might just get a glimpse in to how things may turn out tomorrow."*
RQ2:SC3 #3 **ST8**	*"We can only every rely on the past, and our experience of it. Whether to take on board what others say involves a considerable amount of trust; after all, how do you know that they're not lying? I find that gathering as many opinions as possible helps. If enough people start saying the same thing over and over, then you're pretty much assured that that must be representative of the truth."*
RQ2:SC3 #4 **ST15**	*"Knowing how things should be done usually has no relation whatsoever to how they are actually done in real-life, and to develop habits of good practice I've always encouraged our employees to ask as many questions as possible – no matter how stupid they may think the question – to get a better understanding on complex topics. Making mistakes and asking stupid questions is how we all learn, and I encourage staff to celebrate both."*
RQ2:SC3 #5 **ST11**	*"Even though many people I know disagree with me on this one, developing habits of best practice in the workplace helps to get rid of sloppy attitudes and what I call the 'culture of least effort'. Mediocrity has no place in a start-up: only the best will do, otherwise you may as well go work a regular 9-5."*
RQ2:SC3 #6 **EX1**	*"We all work in the present and apply responses to situations based on what has worked for us in the past. When something works, that adds to our stock of 'on the job' experience, which I guess makes us wiser. When confronted with new situations, we try and relate them to similar occurrences in the past; that's all we can ever do. So, it stands to reason that those new to the job will make many more mistakes until they become as experienced as older workers."*

Thoroughness – SC3

RQ2:SC3	Codes
#1 (6)	limitations to knowing; completing the picture; digital approach; fulfilment; satisfaction; state-of-the-art
#2 (9)	searchable corpus; accessibility; fulfilment; present state of knowledge; apperception; historical perspective; temporal elasticity; future planning; assimilation
#3 (8)	reliance on past; subjective experience; trusting hearsay; anecdotal value; assurance of truth; wisdom of crowds; commonality; representative truth
#4 (11)	normative action; prescriptive action; contrasting ideals; asking questions; facing ridicule; develop best practice; standing up to scrutiny; deep understanding; embrace mistakes; courting ignorance; pathways to learning
#5 (6)	habits of best practice; removes mediocrity; enhances clarity; culture of least effort; dedication to start-up; encourage others
#6 (8)	relying on experience; apply to present; selective action; increases experience; increased wisdom; correlation of past with present; errors due to inexperience; wisdom comes with experience
Total 48	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
develop best practice; standing up to scrutiny; removes mediocrity; commonality; enhances clarity; culture of least effort; embrace mistakes; habits of best practice; satisfaction; encourage others; completing the picture	*Thoroughness (11)*
future planning; reliance on past; temporal elasticity; historical perspective; apperception; correlation of past with present; relying on experience; apply to present	*Apperception* (8)*
errors due to inexperience; wisdom comes with experience; increased wisdom; increases experience; wisdom of crowds; subjective experience; assimilation	*Wisdom (7)*
state-of-the-art; present state of knowledge; limitations to knowing; deep understanding prescriptive action; normative action; contrasting ideals; selective action facing ridicule; courting ignorance; asking questions; pathways to learning	*Extent of knowing (4)* *Approach (4)* *Tenacity (4)*
searchable corpus; digital approach; accessibility	*Ease of access (3)*
trusting hearsay; anecdotal value representative truth; assurance of truth fulfilment (x2)	*Belief (2)* *Truth (2)* *Fulfilment (2)*
dedication to start-up	*Own referent (1)*
	Total 48

Access to information – SC4

Source	Sample Narrative
RQ2:SC4 #1 **EX3**	*"We produce innovative accounting software for use in the cloud by smart devices, so technology defines every aspect of what we do. The one thing that continually impedes our progress on the R&D front is the 'pay-wall' that bars access to important research in our field. We are held to ransom for up to sixty US dollars per research paper, all for a report on research that we have already paid for with our tax dollars. The results of all publicly funded research should be made available to all; not handed over to money-making profiteers."*
RQ2:SC4 #2 **EX4**	*"I have always been intimidated by how much information is out there, and like a rabbit frozen to the spot by the glare of approaching headlights, I often freeze and don't know which way to go when faced with the need to do a bit of research on a topic."*
RQ2:SC4 #3 **ST14**	*"If I've had a hard day at work, and especially if we've all been working on a tough or especially complex set of problems, I'll often wake up in the wee hours and spend some very productive time on my iPad searching the internet for answers to problems associated with the previous day. The fact that this technology is available anytime, anywhere is fantastic, and pays-off big time, especially when you're unable to sleep."*
RQ2:SC4 #4 **ST12**	*"It's easy to forget that the rest of the world isn't in the same time zone as us, and the nature of the 24/7 broadband connection now makes it even easier to conduct business around the clock. By getting up at 5.30am every day I can have most of my work done before the others even clock-in. This leaves the rest of the day for me to spend either with family or friends, or to engage with what I refer to as my 'discovery mode,' where I tinker around with new ideas and form impromptu solo brainstorming sessions."*
RQ2:SC4 #5 **ST12** *(relevant RQ3:SC7)*	*"I am sure that we have all copied something from the Internet that we shouldn't have; whether it's downloading a music track, a movie, or even a whole book that's available in digital format. The fact that many of us do this doesn't make it right, of course, but people do it just because they can, and it's far easier to download a song, book or movie than going to the shops and having to buy it, right? Many distributors have latched-on to this, and offer e-books, music and movies on demand via services like iTunes and NetFlix."*
RQ2:SC4 #6 **EX5**	*"Have you noticed the recent arrival of all these so-called 'aggregator' web-sites, designed to accelerate your search for hotels, flights, car insurance and the like? Well, meta-sites like these are just the beginning of the kind of 'BigData' that everyone has been talking about: those who can aggregate the most data in the best indexed, most useful mega-sites will be the ones who ultimately control our on-line search and shopping habits."*
RQ2:SC4 #7 **EX6**	*"Many have no appreciation for the scale of information out there on the internet; it truly is vast. With the advent of hyperlinks on a web page, filled with symbolic links that daisy-chain related ideas and concepts together, giving some degree of sense and structure to the jungle of data out there."*
RQ2:SC4 #8 **EX2**	*"Having grown up during the so-called information age I can't imagine how people acquired their business intelligence previously. OK, before the 1990s, they still had coffee shops and bars for casual chit-chat and the exchange of ideas etc…but the only other way I can imagine that like-minded people might have traded information is at a trade-fair, exhibition or university department. If only those people back then could see how we do it today…"*
RQ2:SC4 #9 **EX1** *(relevant RQ3-SC7)*	*"We used to be fiercely protective when deciding who could access our intellectual property, but the internet has changed all that. It's now easier to disclose what would once have been seen as commercially sensitive to a competitor, because it works both ways when you have similar problems, as you inevitably do when working in similar sectors. There's an unspoken rule that we won't abuse the relationship – especially to the benefit of third party competitors – on the promise that we help each other out. Everybody wins in the end, and it has helped us form some amazingly strong and lasting relationships with the most unlikely partners."*

Access to information – SC4

Source	Sample Narrative
RQ2:SC4 #10 **ST8**	*"That technology tries to draw people in and include them isn't denied. Look at Facebook, X-box, PlayStation, and all these other 'inclusive' multi-user platforms that have surfaced in the last decade or so: they are prompting diverse global connections at a level of cohesion that has never existed before. Unfortunately, they also tend to be transient and somewhat shallow, and are going to leave kids deficient in many of the social skills that they would have normally acquired before this technology came along. You only need to ask your kids how many thousands of friends they have on Facebook."*
RQ2:SC4 #11 **ST12**	*"Wireless connectivity has been a game changer, and a major vindication of the telecoms sector's ability to be able to deliver. When local wireless hot-spots are combined with the 4G and soon-to-be 5G cellular data protocols, then we will begin to really understand the benefits that an 'always-on' connected world will bring. At present connectivity is still very patchy unless you're based in a big city, but expect that to be remedied within the next decade."*
RQ2:SC4 #12 **EX6**	*"Traditional boundaries and borders have all-but disappeared, and the ability for anybody to work remotely, wherever there happens to be a good internet connection - is having a huge impact on who we employ to produce our software. There are financial benefits, too: we employ a room of twenty or so highly experienced, top-notch PHP [PHP: a web coding language] developers in Bangalore, and including the cost of a locally based project manager to keep them all in check, that team costs us less than employing just three – yes three – full time developers of equivalent skillset here."*
RQ2:SC4 #13 **ST14**	*"WiMax will be the next major technological revolution in terms of wireless connectivity: Its full roll-out is something we are eagerly anticipating, as it will herald the beginning of an environment saturated with ultra-high speed wireless availability, regardless of location. This means that we will no longer have to depend on the patchy availability of internet access; as the signals will be so pervasive that even in the remotest parts of the country you'll have full, high-speed connectivity."*
RQ2:SC4 #14 **EX3**	*"The so-called Internet of Things [IoT] is just a fancy way of describing the next phase of our journey towards complete and seamless connectivity. It describes a world of infinite bandwidth, accessible by anything and any-one, at any time, from any location. I don't think people living outside the Valley [Silicon Valley] can quite yet imagine the consequences of such a world, but we had all better get ready, because it's coming, and it's only a decade or so away."*
RQ2:SC4 #15 **ST13**	*"When at college I would spend hours in the library trying to locate academic journals that had published a paper on a topic I was researching. Assuming that the record card wasn't missing from the index drawer, I would proceed to the relevant shelf or stack, only to find that either the journal itself was missing because it had been misfiled or stolen, or the relevant article had been defaced or physically torn-out. It was downright inconvenient at the best of times, and soul-destroying at the worst. Move forward 25 years and look at it now: you could be anywhere in the world, and via a good quality connection to the internet, your computer, smartphone or tablet can rely on the latest search technologies to immediately locate a pristine digital 'pdf' version of that very same article; download it, and read it within seconds. If only the kids of today knew how good they've got it."*
RQ2:SC4 #16 **ST11**	*"How much have advances in technology improved our ability to engage more readily with the vast amount of information out there? When you consider that all of this has happened in the last twenty years, it makes you wonder how it's going to be in another twenty years' time: I hope to be around to see it."*

Access to information – SC4

Source	Sample Narrative
RQ2:SC4 #18 **EX7**	*"It is now much easier to just 'get things done', as and when the need dictates; and almost according to demand. I've been involved in high-tech product development for some time, and can see strong parallels between the Japanese manufacturing techniques of the just-in-time [JIT] approach, the Kanban technique and others, with our day-to-day strategizing and decision-making. In other words, because of the additional power technology provides, I can make accurate decisions 'just in time' based on optimised search engine results that provide an exact snapshot of the requirements at that precise moment. I suppose what I'm saying is that our decision making has become more of an ordered process, rather than the series of chaotic hand-waves and guesses that it once was. It certainly feels more productive, and endows you with a greater sense of confidence when deciding things."*

Access to information – SC4

RQ2:SC4	Codes
#1 (9)	technology-led innovation; impediment to R&D; publication pay wall; privileged information; cost of access; publicly funded research; universal access; public access; profiteering
#2 (3)	Information overload; intimidation; daunted inaction
#3 (2)	24/7 availability; universal access
#4 (10)	24/7 access; working efficiency; ease of business; head-start; liberating; creative thinking; experimentation; discovery; brainstorming; unstructured
#5 (12)	digitisation; intellectual property; copyright; petty misdemeanour; widespread; digitisation; enabled by technology; ease of replication; convenience copying; new business model; on demand content; content providers
#6 (9)	comparison web-sites; on-line aggregators; accelerated search; big-data; meta-search; competitive advantage; reforming habits; consumer impact; centralised points of contact
#7 (5)	vast corpus; abundant content; structured data; linked content; sense-making
#8 (9)	early exposure; business intelligence; meeting venues; exchange of ideas; social contact; specialist exhibitions; academic departments; research groups; retrospective wonder
#9 (9)	protection of Intellectual property; less guarded; ease of disclosure; mutual respect; commercial information; mutual disclosure; shared problems; assured assistance; unlikely alliances
#10 (9)	inclusivity; multi-user engagement; global connectivity; unprecedented; socially shallow; transient; socially deficient; superficiality; social media
#11 (6)	transformative effect; wireless technologies; pervasive connectivity; unrealised potential; 'always on' access; future prospects
#12 (8)	traditional boundaries; remote working; manpower; employability; financial benefits; cost savings; outsourcing; comparative costs
#13 (7)	revolution in wireless technology; saturated environment; ubiquitous accessibility; location independent; quality of service; reliability; pervasive access
#14 (6)	ubiquitous accessibility; bandwidth improvements; universal accessibility; unfettered access; unimagined consequences; poorly prepared
#15 (8)	manual research processes; drawbacks of manual approach; anecdotal recall; retrospective comparison; digitisation; universal access; portable content; instant access
#16 (5)	improved engagement; prevalence of information; vast corpus; speed of progress; future considerations
#17 (10)	multiple sources; diversity of source; enhanced creativity; choice of platform; combined technologies; choice of access; expert opinion; meta-search; variety of sources; socio-technical collaboration
#18 (10)	pragmatic approach; on-demand; management processes; speed of access; enhanced retrieval; optimised results; structured decision making; accurate information; enhanced productivity; instils confidence
Total 137	

(See next page for table of conceptual indicators)

Access to information – SC4

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
speed of access; ubiquitous accessibility (x2); unfettered access; on-demand; universal access (x3); universal accessibility; prevalence of information; variety of sources; multiple sources; pervasive access; pervasive connectivity; global connectivity; 'always on' access; 24/7 access; 24/7 availability; bandwidth improvements; choice of access; public access; diversity of source; specialist exhibitions; instant access; on demand content	*Access (25)*
publication pay wall; protection of Intellectual property; brainstorming; publicly funded research; intellectual property; ease of disclosure; less guarded; commercial information; impediment to R&D; mutual respect; academic departments; multi-user engagement; shared problems; socio-technical collaboration; assured assistance; mutual disclosure; social media; centralised points of contact; social contact; unlikely alliances; research groups; unimagined consequences; unrealised potential	*Privileged knowledge (23)*
comparison web-sites; meta-search (x2); consumer impact; optimised results; big-data; on-line aggregators; accelerated search; linked content; enhanced retrieval; manual research processes; vast corpus (x2); abundant content; saturated environment; daunted inaction; transient; Information overload; reliability; quality of service; content providers	*Big data (21)*
enhanced creativity; creative thinking; exchange of ideas; expert opinion; enhanced productivity; enabled by technology; combined technologies; choice of platform; technology-led innovation; transformative effect; digitisation (x3); unprecedented; instils confidence; intimidation; liberating	*Enhanced creativity (17)*
business intelligence; privileged information; speed of progress; discovery; structured decision making; sense-making; structured data; experimentation; pragmatic approach; accurate information; poorly prepared; unstructured	*Structured inquiry (12)*
outsourcing; location independent; meeting venues; traditional boundaries; remote working; wireless technologies; revolution in wireless technology future considerations; future prospects; early exposure; inclusivity; competitive advantage; improved engagement; head-start employability; manpower; management processes; working efficiency; drawbacks of manual approach; ease of business; new business model	*Locus (7)* *Head-start (7)* *Operations (7)*
petty misdemeanour; convenience copying; copyright; widespread; portable content; ease of replication.	*Piracy (6)*
cost of access; cost savings; comparative costs; financial benefits; profiteering superficiality; socially deficient; socially shallow; reforming habits;	*Financials (5)* *Engagement (4)*
retrospective comparison; retrospective wonder; anecdotal recall	*Reflection (3)*
	Total 137

(See previous page for table of constituting codes)

Creative thinking – SC5

Source	Sample Narrative
RQ2:SC5 #1 **ST9**	*"The best ideas and solutions seem to appear when you are least expecting them. It works for me when I push all problems to the back of my mind, don't dwell on them, and then allow that space to be filled with whatever happens to drift along – often while I'm dozing, day-dreaming, or running on 'automatic'. Much of what comes by is irrelevant garbage, but once in a while, a true gem appears that sets you on a course for life."*
RQ2:SC5 #2 **ST14**	*"Intentionally looking for a specific solution never seems to work that well. The real winners come along when you are off-guard or looking at some peripheral aspect of the original problem; and is especially effective if you happen to be in a playful, impish, or mischievous mood."*
RQ2:SC5 #3 **ST13**	*"The best brainstorming at [company name] happens in two stages: to begin with, you come up with a bunch of off-the-cuff hunches about how to solve a problem; you then introduce these to your colleagues over a beer or two, critically pitching all hunches against one another in a 'battle of the hunches'. When combined together, the surviving hunches probably represent your optimal solution. Problem solved."*
RQ2:SC5 #4 **EX5**	*"I love to be challenged and told that I'm wrong – it's a red flag for me to then go out and find out what the real deal is – or probably just my ego wanting to prove that I'm right, once and for all. Either way, it's creative."*
RQ2:SC5 #5 **EX6**	*"For me, being in the right 'frame of mind' and relaxing in the appropriate environment is vital to creative discovery. Some people I know thrive on the chaos arising from high-pressure business and deadlines in order to be creative, but I'm the complete opposite: I need to reach an almost zen-like meditative state before my creative side reveals itself."*
RQ2:SC5 #6 **EX2**	*"It's difficult to be creative on demand, as I need to be surrounded by the right people, in the right kind of place. Forget the office, as there are too many distractions. Get a group of you together; rent a log cabin up-state, and lock yourselves away with some food and a few kegs of beer for a long weekend. You'll be amazed at what comes out of those sessions."*
RQ2:SC5 #7 **ST10**	*"I see innovation as a multi-stage process: First, you have to come up with your own ideas, doubts and beliefs concerning the need for a new service or product. You then use the internet to gather as much existing information as possible already out in the field. Finally, you compile your case and present it to your peers for a thorough appraisal. The ensuing process usually consists of having your ideas being ripped apart, but when what remains is blended with the constructive input of others, it probably represents the best that you can come up with at that point in time."*
RQ2:SC5 #8 **ST11**	*"When I'm trying to innovate or get my creative juices flowing, I apply a technique I read about a few years back that some comedians use to produce their new material. You do it by taking the basic idea – in my case, represented by the problem – then think of ideas negative to it or opposing it, and then grab some totally unrelated, avant-garde concept verging on the playfully ridiculous, and throw it in between the two. For the comedian this process hopefully results in a laugh, but for entrepreneurs, it has the power to conjure up the latest 'killer app' to hit the market. It doesn't work every time, but when it does, it produces winners."*
RQ2:SC5 #9 **EX3**	*"Don't dismiss the crazy suggestions; think around and play with them for a while, and you'll find that they're not so crazy after all. If you then go on to adopt a more playful, almost teasing attitude with respect to such ideas, you will find that very interesting and powerful concepts begin to emerge."*
RQ2:SC5 #10 **ST10**	*"Some of my most creative insights arise at times when I'm least expecting them. It's usually when I'm involved in some mundane, repetitive or automatic task like playing with the kids, waiting for the kettle to boil, driving, or even when I'm in that daze of semi-consciousness just before falling asleep, or in the morning during the process of waking up. It's as if the brain needs to be in neutral; disengaged and free to wander [wonder?] before insights start to spontaneously pop-up, out of nowhere. I can't think of any other way to explain it."*

Creative thinking – SC5

Source	Sample Narrative
RQ2:SC5 #11 **EX2**	*"Knowing how not to do something is a very informative lead when it comes to wanting to know how to do that same thing properly. This inverse way of thinking is a very powerful approach to learning, and is why I encourage staff to always reflect on – and even sometimes celebrate - their mistakes. The flawed parts of a process that lead to mistakes can usually be isolated, inverted, and reincorporated in to a new approach next time a similar issue arises. Iteratively isolating flawed antecedents over time will eventually result in a flaw-less solution."*
RQ2:SC5 #12 **ST11**	*"Engaging with a creative mind set needs some forethought and advance preparation, where both the location and general environment are amenable to unrestricted, abstract thought. I know a few people who claim to come up with their best ideas when working under tremendous amounts of pressure, but for me, it tends to be the exact opposite."*

RQ2:SC5	Codes
#1 (10)	surprise solutions; ignore; dwelling; obsessing; vacuum; space to be filled; unaware; subconscious; low quality; occasional success
#2 (6)	intentionality; distracted; peripheral aspect; tangential; play; mischief
#3 (7)	brainstorming; abstract hunches; problem solving; sharing; critical discourse; survivor; optimal solution
#4 (6)	Invites challenge; mistaken; challenge to solution; satisfies ego; proof of outcome; creativity
#5 (12)	frame of mind; cognitive state; situation; relaxed environment; creative discovery; creativity; thrive on chaos; deadline compliance; pressure; meditation; zen-like mood; creative side
#6 (10)	creativity; correct surroundings; group effort; office distractions; remote location; peaceful surroundings; undisturbed; casual interaction; out of work; unexpected outcome
#7 (15)	multi-stage process; innovation; self-generated ideas; doubt; belief; secondary source; confirm validity; internet search; existing information; group discussion; group critique; constructive blending; combined inputs; diverse contributions; in-context solution
#8 (6)	comic heuristic; negated notions; playful adjunct; combine variants; powerful tool; effective
#9 (6)	maintain open mind; entertain outliers; play; tease; make sense; emergent concepts
#10 (10)	unanticipated; most creative; distracted; automatic task; dream-like; semi-consciousness; neutral state; cognitively disengaged; free to wander; spontaneous emergence
#11 (15)	Ignorance; best practice; blank slate; inverse thinking; learning technique; celebrate mistakes; reflect; isolate flaws; invert flaws; reincorporate; recursive; new approach; iterative action; optimisation; refines solution
#12 (8)	creative mind-set; engaging; advance thought; planning ahead; unrestricted thought; abstract thought; response to pressure; relaxed setting
Total 111	

(See next page for table of conceptual indicators)

Creative thinking – SC5

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
creative discovery; creative mind-set; creative side; creativity (x3); engaging; satisfies ego; critical discourse; most creative; mischief; play (x2); innovation; playful adjunct; best practice; combine variants; combined inputs; thrive on chaos; constructive blending; comic heuristic; peripheral aspect; diverse contributions; celebrate mistakes; entertain outliers; casual interaction; abstract hunches; abstract thought; deadline compliance	*Creative thinking (29)*
space to be filled; zen-like mood; vacuum; subconscious; undisturbed; blank slate; semi-consciousness; meditation; unrestricted thought; dream-like; frame of mind; free to wander; neutral state; cognitive state; relaxed setting; cognitively disengaged; situation; maintain open mind; peaceful surroundings; correct surroundings; relaxed environment; distracted (x2)	*Receptive state (23)*
spontaneous emergence; tangential; self-generated ideas; surprise solutions; unanticipated; unaware; unexpected outcome; tease; emergent concepts	*Spontaneity (9)*
recursive; iterative action; reincorporate; refines solution; reflect; multi-stage process; automatic task	*Reflexive (7)*
in-context solution; challenge to solution; proof of outcome; intentionality; obsessing; dwelling	*Focus (6)*
doubt; belief; confirm validity; ignorance; mistake; make sense	*Conviction (6)*
group critique; group discussion; group effort; brainstorming; sharing	*Group effort (5)*
inverse thinking; invert flaws; isolate flaws; negated notions	*Antithesis (4)*
low quality; ignore; occasional success; survivor	*Marginal (4)*
pressure; response to pressure; Invites challenge	*Pressure (3)*
out of work; remote location; office distractions	*Setting (3)*
new approach; planning ahead; advance thought	*Planning (3)*
optimal solution; optimisation; effective	*Optimisation (3)*
learning technique; problem solving	*Inquiry (2)*
secondary source; internet search	*Support sources (2)*
existing information	*Own referent (1)*
powerful tool	*Own referent (1)*
	Total 111

(See previous page for table of constituting codes)

Co-dependent inquiry – SC6

Source	Sample Narrative
RQ2:SC6 #1 **ST11**	*"If you make it generally known what you need, people tend to want to help you achieve your goals. Whether it's introducing you to others who may be able to help, or suggesting an app or web site that may be useful, there is a whole invisible army of others – all connected in one way or another – waiting to help you. In most cases, you have to just ask; in others, you needn't say a thing."*
RQ2:SC6 #2 **EX6**	*"To succeed as an entrepreneur, you need to accept that you can't be good at everything, knowing when to delegate and/or outsource those elements that you can't or don't want to do. Learning how and when to 'let go' is key.*
RQ2:SC6 #3 **EX7**	*"The flip side of involving others in your most treasured pursuits is that it's possible to over-delegate. I once invited a group of graduates to manage a new project for me, and once I had fully taken my eye off the ball, they grabbed the opportunity to run-off with my idea; going public with it five years later. I lost a fortune."*
RQ2:SC6 #4 **ST10**	*"The best solutions arise from the best questions, and the best questions are most often formulated when a group collaborates; pooling the collective experience and wisdom of its members together."*
RQ2:SC6 #5 **EX6**	*"Even though you may feel alone when trying to get a new product or service launched, it's easy to encourage others to help 'evangelise' your portfolio: use social media platforms to get your message across; offer shameless incentives to people willing to re-tweet and 'like' your pages; setup a web site dedicated to the new gadget or mobile app. It really isn't that difficult; you just need the confidence to stand out from the crowd, and the good grace to face failure, should it come your way."*
RQ2:SC6 #6 **ST9**	*"University and college engineering students are a massively under-rated source of innovation and new thinking. Here, you have very eager and intelligent groups of youngsters working on fantastic projects, many of which will never see the light of day in the practical world, because their research has either been pay-walled off and made inaccessible to the general public; the university has no idea how to bridge the gap between theory and real-world practice; or, worst of all: the work poses a threat to the lifelong work of some fusty old career academic who sees to it that the work is promptly buried in order to avoid any discredit."*
RQ2:SC6 #7 **ST11**	*"The fact that you can rely on help from random people, anywhere in the world, is a tremendous boost to my confidence as a valued employee who contributes positively to the success of my company, and its future."*
RQ2:SC6 #8 **EX6**	*"Technology is my partner in disguise when I'm tasked with the job of suggesting new features for the next version of our product."*
RQ2:SC6 #9 **EX5**	*"All good start-ups are based on groups of dedicated talent working towards similar goals. No matter what anybody tells you, it's impossible to get to the top all by yourself."*
RQ2:SC6 #10 **EX5**	*"You need contributions from others when making key business decisions – the responsibility is just too great for one person to take on if things don't turn out as expected. Also, if these decisions are always based on collaborative group effort, then it's easier in the long run to maintain that the right decision was made at the right time, and no individual is to blame, no matter how disastrous the consequences."*
RQ2:SC6 #11 **ST11**	*"Being completely up to date and familiar with the latest that technology has to offer in terms of locating and acquiring new knowledge, and connecting with the right kind of knowledge source, is crucial to an effective, modern-day creative mind-set. Being able to pool your intuitive capacity to discover with the search and analytical capabilities of on-line databases, and then inviting third party 'experts' to develop things further probably represents the best kind of rigorous inquiry I am aware of at this point in time."*

Co-dependent inquiry – SC6

Source	Sample Narrative
RQ2:SC6 #12 **ST13**	*"If a substantial number of hours have been dedicated to the design, production and testing of a new product, then taking the blame for its subsequent failure is hard to take. Although the majority of designs do turn out well in terms of user and market performance, the failed ones can stick with you for many years after, and I think that in itself contributes to the success of future attempts: you get to know what leads to ultimate success, and so make a point of avoiding any actions that could be identified with past failures. Knowing what **not** to do is therefore as important as knowing what to do."*
RQ2:SC6 #13 **EX4**	*"There are many 'apps' out there that specialise in creating mind-maps to assist with the creative process; they help by clarifying thinking and conceptualise complex issues by adding structure. The truly amazing aspect of these on-line tools is that they are able to classify the various types of mind-map, and put users in touch with others who are working on similarly structured problems, no matter where they may be located. They instantly match-make you with brainstorming buddies all over the world."*
RQ2:SC6 #14 **ST15**	*"Making decisions together helps strengthen your case, and certainly validates what you're saying in the eyes of others. Furthermore, if it can be backed up by multiple evidence from credible on-line sources, such as competitor web sites, supplier forums, academic research portals etc. then you can be sure that you've done as good a job as you possibly can, and nobody can accuse you of a half-hearted attempt."*
RQ2:SC6 #15 **EX2**	*"I see the IT [Information Technology] at my disposal as the perfect partner: it follows me wherever I go; is available 24/7; doesn't complain if I ask it awkward questions at 3am – as I very often do – and has a reach that extends globally, transcending time zones and the restrictive hours of business-as-usual. How we managed to know what we knew before the days of all this technology astonishes me each and every time I fire-up Google to do a search. I will never, ever take it for granted."*
RQ2:SC6 #16 **EX3**	*"No matter what others say, humans will always be needed to provide that initial spark of intuition. I doubt that machines will ever be capable of replacing that side of our ability to reason speculatively, it's just too random to be ever simulated programmatically."*
RQ2:SC6 #17 **EX4**	*"The technical design of a new product or service relies on knowledge and experience that you have accrued professionally in the past. It can be, but rarely is, the lone pursuit of the maverick inventor; but in group settings, the potential for unique and powerful design is enhanced to the nth degree."*

Co-dependent inquiry – SC6

RQ2:SC6	Codes
#1 (6)	reaching out; invites altruism; achieve goals; invisible army; confidence; spontaneity
#2 (6)	limitations; success; delegation; own limitations; outsourcing; letting go
#3 (4)	over-delegation; keeping track; appropriation; opportunism
#4 (4)	well-formed questions; group collaboration; collective experience; aggregate wisdom
#5 (11)	lone warrior; co-opting others; evangelise; social media; broadcast; incentivise; viral incentive; digital promotion; marketing; confidence; accept failure
#6 (11)	engineering students; innovative talent; extending frontiers; knowledge creation; barriers; pay wall; academic cloak; inaccessibility; theory-practice gap; threat; lifelong work
#7 (6)	global expertise; global reach; reliable source; confidence; work satisfaction; future value
#8 (4)	technology as partner; tacit presence; inspirational; innovation
#9 (4)	grouped talent; common goals; lone warrior; group success
#10 (10)	external contributions; key decisions; responsibility; onerous; responsibility of failure; shared responsibility; group effort; justification; blame; consequences
#11 (10)	familiarity; latest technology; knowledge; selection of source; creative mind-set; combined intuition; pooled resources; co-dependence; expert validation; rigorous inquiry
#12 (8)	development time; blame; failure; failure breeds success; components of success; evasive action; learn from mistakes; negative doing
#13 (12)	mind maps; creative heuristic; clarification of thought; conceptualisation; adding structure; on-line tools; artificial intelligence; global introduction; similar mind-maps; like-minded; collaborative brainstorming; global reach
#14 (8)	joint decision making; strengthens case; validation; credible sources; on-line sources; reassurance; satisfaction; mediocrity
#15 (9)	technology; perfect partner; availability; accessibility; forgiving; global reach; transcends; life before search engines; complacency
#16 (6)	human necessity; intuitive catalyst; first step; automation; speculative ability; simulation
#17 (7)	accrued knowledge; aggregate experience; lone warrior; maverick inventor; group effort; combined power; enhanced effect
Total 126	

(See next page for table of conceptual indicators)

Co-dependent inquiry – SC6

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
co-dependence; co-opting others; collaborative brainstorming; group effort; credible sources; collective experience; combined intuition; like-minded; combined power; group collaboration; group effort (x2); group success; grouped talent; pooled resources; joint decision making; key decisions; common goals; external contributions; delegation; over-delegation; appropriation; reliable source; selection of source; perfect partner; outsourcing; invisible army; shared responsibility; enhanced effect; engineering students; aggregate wisdom; aggregate experience; technology as partner	*Co-dependent inquiry (33)*
global expertise; global introduction; global reach (x3); broadcast; inaccessibility; availability; reaching out; invites altruism; pay wall; academic cloak; accessibility; marketing; evangelise; opportunism; digital promotion; keeping track; on-line sources; on-line tools; social media; viral incentive; knowledge	*Accessibility (23)*
failure breeds success; accept failure; failure; evasive action; letting go; success; components of success; consequences; responsibility of failure; reassurance; responsibility; blame (x2); satisfaction; work satisfaction; maverick inventor; lifelong work; achieve goals	*Achievement (18)*
well-formed questions; speculative ability; creative heuristic; first step; creative mind-set; conceptualisation; strengthens case; spontaneity; inspirational; intuitive catalyst; incentivise; innovation; innovative talent; knowledge creation; extending frontiers; human necessity	*Creativity (16)*
lone warrior (x3); limitations; own limitations; onerous; barriers; complacency; life before search engines; familiarity; threat; development time; tacit presence; theory-practice gap	*Limitations (14)*
clarification of thought; validation; expert validation; justification; mind maps; similar mind-maps; accrued knowledge; adding structure; technology; automation; latest technology; learn from mistakes; simulation	*Enhancing accuracy (13)*
mediocrity; negative doing; rigorous inquiry; confidence (x3); transcends	*Thoroughness (7)*
future value	*Own referent (1)*
forgiving	*Own referent (1)*
	Total 126

(See previous page for table of constituting codes)

Reflection & reflexivity – SC7

Source	Sample Narrative
RQ2:SC7 #1 **EX5**	*"Cutting-edge can very quickly turn in to overly-complicated 'bleeding-edge' if too much reliance is placed on the mass of unstructured data available on-line. The way to keep things in check is by tempering any proposed advances or improvements to your portfolio by taking stock and reflecting on how previously successful products were typically improved in the past; usually in a step-wise, controlled series of releases."*
RQ2:SC7 #2 **EX7**	*"Maintaining a keen perspective relating to what is, what was, and what can be is key to ensuring that your product portfolio evolves in line with changing environments, and also keeps you one step ahead of the competition."*
RQ2:SC7 #3 **ST11**	*"You always have to maintain an appreciation for the past, and how it affects what you're doing now. This is the problem that new entrepreneurs have: they have no previous experience by which to reference things, which explains why they tend to fail quickly and often in the early years. It's par for the course, unfortunately."*
RQ2:SC7 #4 **ST9**	*"I encourage colleagues to get in to the habit of pausing and re-framing the questions that they would have normally asked, to include concepts from other technical areas that have only a loose connection to the problem space. To use a biological metaphor, I refer to it as 'cross-pollination', because that's exactly what it is. Forcing diversity of this type when posing the question causes a corresponding diversity in possible solutions, which give rise to highly unusual outcomes that very often provide unexpected inspiration and additional food for thought."*
RQ2:SC7 #5 **ST9**	*"The many techniques available to encourage the emergence of new ideas when innovating all have their place, but few recognise the power of feedback when applying these methods. By feeding previous results back in to a fresh round of inquiry, old errors are corrected, refined and help to optimise resulting solutions."*
RQ2:SC7 #6 **EX6**	*"The Japanese and Koreans have long been recognised for their technical and engineering prowess, but I think that we could all very easily incorporate their practices in to our working culture, too: by working closely together on small, incremental tasks; reflecting on what has been accomplished at each stage; taking pride in our work, and accepting errors readily. Such qualities already exist as prominent features of the Lean and Agile approaches that have been the mainstay of our Eastern colleagues' approach for years; something that we in the West are only just beginning to discover."*
RQ2:SC7 #7 **ST15**	*"Part of the whole change dynamic is that no matter how good the solutions you and your team may happen to develop, they will only be appropriate to the language, technology and cultural understandings of today. Don't believe any vendor who claims to offer a 'future proofed' solution – it's impossible.*
RQ2:SC7 #8 **EX4**	*"Knowing the right questions to ask is very difficult. Think about it: if you already know what to ask, you must already have a fairly good idea of the kinds of solutions you are expecting. The same goes for kick-starting the search for knowledge: you have to base searches to begin with on something that you have previously experienced or encountered…it doesn't just appear 'as if by magic.'"*

Reflection & reflexivity – SC7

RQ2:SC7	Codes
#1 (7)	overabundance; unstructured data; loss of meaning; historical performance; reflection; temporal elasticity; controlled approach
#2 (8)	maintaining perspective; present; past; future; controlled evolution; one step ahead; environmental change; keeping pace
#3 (7)	past appreciation; influences present; rely on experience; reference point; frequent failure; early failure; inevitability
#4 (14)	question structure; habit; external factors; unlikely alliances; tenuous connections; novel; cross-pollination; biological metaphor; mixing ideas; forced diversity; unusual outcome; diversity of solution; unexpected inspiration; added dimensions
#5 (4)	power of feedback; recursive inquiry; corrective action; optimisation
#6 (8)	recognised expertise; technique; incorporating; joint effort; incremental; reflection; pride; embracing error
#7 (5)	cultural context; context of change; context appropriate; future-proofing; impossible claims
#8 (5)	correct questions; expectant solutions; previous knowledge; prior experience; starting point
Total 58	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
past appreciation; prior experience; past; temporal elasticity; present; maintaining perspective; power of feedback; recursive inquiry; optimisation; reflection (x2); habit; influences present; historical performance; joint effort; expectant solutions; rely on experience; previous knowledge; recognised expertise	*Reflection & reflexivity (19)*
cross-pollination; biological metaphor; diversity of solution; mixing ideas; forced diversity; unexpected inspiration; controlled evolution; novel; added dimensions; unusual outcome; tenuous connections; unlikely alliances	*Creative diversity (12)*
future-proofing; future; inevitability; one step ahead; keeping pace	*Inviting a future (5)*
early failure; embracing error; frequent failure; loss of meaning; pride	*Facing failure (5)*
question structure; correct questions; reference point; starting point	*Framing (4)*
controlled approach; corrective action; technique	*Mediation (3)*
cultural context; context appropriate; context of change	*Context (3)*
overabundance; incremental; unstructured data	*Corpus (3)*
environmental change; external factors	*Environment (2)*
Incorporating	*Own referent (1)*
impossible claims	*Own referent (1)*
	Total 58

Diversity – SC8

Source	Sample Narrative
RQ2:SC8 #1 **EX2**	*"I was convinced that making decisions using the 'wisdom of the crowds' only ever gave results that represented a 'perceived average', and so tended not to be a reliable indicator of the truth. This may be correct when talking about numerical measurements, which do require accuracy; but when you pitch a question to 'the crowds' via social media platforms such as Facebook or Twitter, asking for an opinion on how something could or should be done, then the responses you get back can be astonishingly intuitive, utterly blowing you away by revealing things that you – in your blinkered little world – would never, ever have previously imagined or conceived of."*
RQ2:SC8 #2 **EX3**	*"Diversity of approach helps tremendously when it comes to making the best decisions. You must have the confidence to use everything and everybody in your quest for the best."*
RQ2:SC8 #3 **EX5**	*"To get the best outcomes you have to be cunning and completely versatile in your approach: track down the most knowledgeable experts; find the best databases; consult with others on the best keyword combinations for your search. All this is made so much easier now with the advent of the technical resources at our disposal – use them: that's what they're there for."*
RQ2:SC8 #4 **ST8**	*"If there's information I need on a specific and highly complex topic, I do my preliminary searches for information on-line, but then go that extra step further by finding out which universities in the world specialise in the area and e-mail their head of department directly. Most of the time, and not-withstanding time differences, I'll get a reply within a day or two, with some eager professor delighting in the fact that a foreigner is showing interest in his research."*
RQ2:SC8 #5 **ST10**	*"Thinking outside the box doesn't just mean being creative in your thoughts, although that is a major part of it. No, I take it to mean that you also need to be insanely creative in the diversity of your approach. The more strands you can add to an initial inquiry, the more results you will get; and the more peculiar the mix, the better – for example, by offering a monetary award to a group of college kids who come up with the best solution to your problem – then you really will begin to see the benefits of a diverse approach. It's easy to access such groups via Facebook or other social media platforms these days. Of course, everything must be above board: you simply cannot leave room for any misinterpretation of your intentions etc. especially if money or children are involved."*
RQ2:SC8 #6 **ST15**	*"We are all trapped inside our own heads and can only sensibly relate to what we have experienced or encountered before. I've come to learn that in order to break out of this 'mind prison', you have to do something that is first of all outside your comfort zone and see if it works. If it doesn't, then try, try and try again. Keep getting disturbed, keep getting uncomfortable, and keep making mistakes. That's what makes the difference between those that create businesses, and those that just work in them. It's what gets creativity flowing, in my opinion."*
RQ2:SC8 #7 **ST14**	*"Employ as many people who are different from you as you possibly can. Most business owner/managers make the fatal mistake of hiring people who they perceive to be less intelligent than them, and then wonder why nothing ever happens. Don't be threatened by them if they are more intelligent than you: you need them to challenge your standard response to life, and shake-up the stagnation. You might not like it, but I can you tell you that it will improve things no-end.*

Diversity – SC8

RQ2:SC8	Codes
#1 (9)	wisdom of crowds; combined perception; truth indicator; social media; intuitive; mass collaboration; revelations; novel conceptions; new meanings
#2 (6)	diverse approach; decision making; confidence; reliance on others; best endeavours; perfection
#3 (7)	honed approach; best expertise; comprehensive sources; search keywords; enabling; empowerment; technical resources
#4 (6)	preliminary search; on-line search; university specialists; direct communication; academic; theory meets practice
#5 (10)	creative thinking; outside the box; diversity of thought; diverse approach; propriety; multiple strands; diverse mix; incentives; social medial groups; ethical approach
#6 (9)	subjective trap; prior experience; mind prison; comfort zone; repeated attempts; invite discomfort; encourage mistakes; generates diversity; promotes creativity
#7 (7)	vary employees; under-hire; stagnation; no challenge; intimidation; break-free; challenge norms
Total 54	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
diverse approach (x2); diverse mix; diversity of thought; generates diversity; promotes creativity; combined perception; multiple strands; social media; prior experience; decision making; wisdom of crowds; mass collaboration; encourage mistakes; invite discomfort; challenge norms; comfort zone; break-free; outside the box; social media groups; creative thinking	*Diversity (21)*
ethical approach; honed approach; perfection; propriety; repeated attempts; stagnation; confidence; best endeavours; empowerment; enabling; no challenge	*Best practice (11)*
university specialists; academic; comprehensive sources; best expertise; technical resources; theory meets practice; direct communication	*Sound knowledge (7)*
novel conceptions; new meanings; mind prison; subjective trap; search keywords	*Escaping norms (5)*
under-hire; vary employees; reliance on others; intimidation	*Colleague mix (4)*
truth indicator; revelations; intuitive	*Intuition (3)*
preliminary search; on-line search	*Initial search (2)*
incentives	*Own referent (1)*
	Total 54

CHANGE-LOG

01/11/15   Change name to 'Diversity'
13/08/15   Change name to 'Creative diversity'
21/01/14   Originally named 'Disruptive diversity'

Habits – SC9

Source	Sample Narrative
RQ2:SC9 #1 **ST8**	*"Cultivating good habits based on best-practice and doing the right thing as much as you possibly can, is what it's all about. Working with technology – as opposed to against it – tends to push people in the right direction."*
RQ2:SC9 #2 **EX3**	*"Developers are always looking for ways to cut corners in a bid to make their code more efficient, but their approaches don't always pay-off. It's really up to the IDE to enforce a level playing field, by ensuring that all code meets a common standard. There are various tools out there that do this, and all ultimately ensure a certain level of quality, and force good, lasting coding habits."*
RQ2:SC9 #3 **ST10**	*"To be truly creative, I always maintain a record to track where thoughts have taken me before. I used to use a notebook to monitor my thought processes, so I knew where to pick-up from if/when the idea ever resurfaced. Now though, I have a search history saved for each idea I'm working on. The drudgery of manual note keeping has been replaced by a comprehensive electronic history indexing all my recent ideas."*
RQ2:SC9 #4 **ST11**	*"Trust sites like TripAdvisor are now forcing us to uptake an attitude of trust when buying, and responsibility when selling. Sites like this with inbuilt trust monitoring systems really are revolutionising the way we transact with each other in terms of honesty and a principled way of conducting ourselves in business situations. They are forcing us all to develop habits of proper conduct."*
RQ2:SC9 #5 **ST10**	*"Because there is just as much trash as useful stuff out there on the internet, you are forced to develop a habit of always questioning your choices, your search criteria, and any conclusions you draw from those choices. The down sides to technology are what actually help you to refine your critical skills in the end. Before you know it, such unrelenting questioning becomes a useful habit to have."*
RQ2:SC9 #6 **EX4**	*"I make a habit of pitching my latest queries to multiple chat-rooms, social media forums and search engines when looking to gather the latest and best information on a particular topic. Cross-posting like this helps me eliminate the junk responses and build-up a vision of perhaps how something should be done. If this is what people refer to as the wisdom of the crowds, then I think it's a good habit to have."*
RQ2:SC9 #7 **ST15**	*"When thinking about how recent changes in technology have helped my attitudes to business, I would say that I have become more receptive to the way tech[nology] has the power to change things. With that change, I too am forced to change, and my working habits adjust accordingly – always for the better."*
RQ2:SC9 #8 **EX5**	*"The business world has much to learn from the saying 'begin as you intend to go on', meaning that managers need to encourage a culture of learning and training from the very beginning that is able to persist over time, and which permeates every aspect of the operation. Once the employees recognise the need for continual learning, the firm will readily adapt to any change that may be thrown at it."*

Habits – SC9

RQ2:SC9	Codes
#1 (6)	best-practice; habits; doing the right thing; co-opting technology; support; encouragement
#2 (6)	efficiency measures; unreliable; enforced standard; quality; software tools; coding habits
#3 (6)	creative measures; past record; habit of record keeping; thought processes; automation; searchable history
#4 (6)	trust network; social media; trust sites; better trading; develop habits; proper conduct
#5 (5)	habit of critique; quality of information; derivative conclusions; refined critical skills; useful habit
#6 (9)	habitual action; search for information; diverse posting; focus on truth; eliminate junk; vision of reality; multiple sources; wisdom of the crowds; good habit
#7 (5)	techno-change; determines attitude; receptive to technology; co-ordinated change; working habits
#8 (8)	cultivate good habits; learning culture; habitual; encourage; temporal persistence; penetrating; recognition; adaptable
Total 51	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
habit of record keeping; past record; good habit; habits; habitual action; habitual; useful habit; habit of critique; develop habits; coding habits; working habits; cultivate good habits; temporal persistence	*Habits of response (13)*
doing the right thing; focus on truth; better trading; best-practice; support; eliminate junk; efficiency measures; enforced standard; proper conduct	*Best practice (9)*
learning culture; wisdom of the crowds; multiple sources; social media; diverse posting; trust network; trust sites	*Diverse opinion (7)*
receptive to technology; adaptable; techno-change; co-opting technology; automation; co-ordinated change	*Embraces technology (6)*
encourage; encouragement; recognition quality of information; quality; software tools	*Encouragement (3)* *Quality (3)*
creative measures; thought processes determines attitude; vision of reality penetrating; refined critical skills search for information; searchable history	*Creativity (2)* *Dedication (2)* *Critical approach (2)* *Search record (2)*
derivative conclusions unreliable	*Own referent (1)* *Own referent (1)*
	Total 51

Previously labelled *Habits of response*

Belief & doubt – SC10

Source	Sample Narrative
RQ2:SC10 #1 **EX4**	*"Doubt everything you come in to contact with, no matter how reputable the perceived source – whether human or non-human - is meant to be. OK, others may think that you are a nightmare to deal with, but rest-assured, it's the only way you will survive in the long-term. Everything must be questioned."*
RQ2:SC10 #2 **ST9**	*"The problem with many managers is that they unquestionably accept what they are being told, without looking in to the source of the information, or possible alternatives for an answer. I think it says something about human laziness and going for the path of least resistance."*
RQ2:SC10 #3 **ST10**	*"I won't believe anything until I've had the opportunity to check it out for myself. The modern-day advantage accompanying this attitude is that I have so many resources at my disposal to thoroughly check anything I'm presented with, and I am able to do it from a number of distinct vantage points. For example, I read something about the latest developments in hard-drive storage capacity and doubt its authenticity, or the accuracy of the portrayed 'facts'. I simply drop a post in to Twitter, and/or the appropriate specialist forum on-line to get an immediate take on the situation from some of the world's most informed experts in that area."*
RQ2:SC10 #4 **ST14**	*"There's so much lies and fakery out there that it's difficult to know where to look for the truth. Knowing what to believe and what not to believe is the biggest problem I'm faced with when confronted with some unfamiliar technical situation at work. Much of the stuff portrayed as 'news' or 'fact' on the internet is known to be fabricated, and has the potential to be extremely dangerous. I'm thinking about ill-informed medical advice, or anecdotal stories of cures by people who are coincidentally selling a remedy off the back of their story."*
RQ2:SC10 #5 **ST8**	*"To doubt is what makes us challenge the norm. Not to doubt is just plain silly, and blind acceptance – what others might also refer to as 'faith' – is very slippery territory to get in to. Be as critical as you can, as often as you can. You probably won't be admired for it at the time, but it will add that extra dimension of rigour to your standing, and eventually you will be respected for it."*
RQ2:SC10 #6 **EX7**	*"Doubt and belief are like a juggling act that gradually veers towards the truth, or something close to the truth, but never quite gets there. Both go hand in hand when you're trying to weigh-up the pros and cons of any situation."*
RQ2:SC10 #7 **ST15**	*"It's good to express your doubts to as many co-workers as possible, who will inevitably counter with their own beliefs. But when should you allow your doubts to turn in to a belief? And when that does happen, how and when should you allow that belief to be challenged when further doubt creeps in, as it inevitably will? I think entrepreneurs are especially adept at dealing with this, because there are no 'company lines' or 'house rules' to maintain in the face of doubt… and represents the ultimate freedom of being your own boss: there's nobody to tell you what or how to believe."*

Belief & doubt – SC10

RQ2:SC10	Codes
#1 (6)	critical outlook; doubt-all; reputable source; long-term survival; survival attitude; criticality
#2 (6)	belief; blind acceptance; check sources; seeking alternatives; laziness; path of least resistance
#3 (10)	blind acceptance; self-reliance; resource-rich; diversity of information; accessibility; reliability; social media; viral inquiry; expert opinion; global reach
#4 (7)	misinformation; establishing truth; decision making; fabrication; consequences; dangerous outcome; profiteering
#5 (9)	challenging norms; doubt as heuristic; folly of faith; critical engagement; habit; added rigour; dimensions of thoroughness; enhanced standing; respect
#6 (4)	converge on truth; truth-likeness; asymptotic truth; points to solution
#7 (9)	express doubts; invites opinion; express beliefs; challenge belief; increased doubt; no rules; entrepreneurial doubt; authority; power
Total 51	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
belief; express beliefs; challenge belief; challenging norms; converge on truth; increased doubt; misinformation; check sources; express doubts; doubt-all; doubt as heuristic; entrepreneurial doubt; establishing truth; invites opinion; expert opinion; blind acceptance (x2); seeking alternatives; folly of faith	*Belief & doubt (19)*
social media; global reach; viral inquiry; diversity of information; accessibility; resource-rich	*Accessibility (6)*
laziness; dimensions of thoroughness; no rules; path of least resistance; added rigour	*Endeavour (5)*
reliability; reputable source; self-reliance; respect; enhanced standing	*Reputation (5)*
dangerous outcome; consequences; points to solution; decision making	*Destiny (4)*
critical outlook; criticality; critical engagement	*Critique (3)*
truth-likeness; asymptotic truth; fabrication	*Honesty (3)*
authority; power	*Dominance (2)*
survival attitude; long-term survival	*Survival measures (2)*
habit	*Own referent (1)*
profiteering	*Own referent (1)*
	Total 51

Inviting a future state – SC11

Source	Sample Narrative
RQ2:SC11 #1 **ST13**	*"Asking 'What if…' type questions uniquely allow you to project in to an unknown future by supposing a potentially infinite number of scenarios to your plans. There are no boundaries with these kinds of questions, because the whole thing is speculative and hypothetical, to the point that it doesn't matter what you throw in to the mix. I find it especially powerful during brainstorming, because the 'what-if' scenarios are quite distinct from the 'how-can' types, which appear to usually dominate such sessions."*
RQ2:SC11 #2 **ST10**	*"Imagine where you want to go in terms of how you see your product adding to a future user's experience; then bring yourself back to the here-and-now by picturing what they already have. That void – that gap – that exists between those two extremes, contains the steps that need to be taken by you and your team to get from A to B. I know it sounds like I'm stating the obvious here, but by shifting your perspective - by casting the timeline forward, backwards, and then forward again - and imagining yourself in the shoes of a future user, your mind can't help but step-in and come up with creative suggestions to fill the void."*
RQ2:SC11 #3 **EX7**	*"I'm sure academics have perfect explanations for the way those in business approach decision making, and I wouldn't even try to begin to understand the terminology they use to explain such phenomena. All I can say is that, to me, it seems straightforward: either alone or as part of a group, dip your toes, so to speak, in to a future that has yet to exist. You imagine how work and family life may have changed by then, and think of the products and services that could be useful to the daily life of your future self. Because we're in the technology sector, most of the ideas that appear are technology-based too – no real surprise there. Then, you reel yourself back to the present day and begin to work out ways of laying the foundations for the future that you just imagined. Couple of points to remember here though: the team working on these ideas needs to be a good mix of young and old, inexperienced and experienced; as the more diversely mixed groups seem to challenge the assumptions of the other more readily and prevent old or immature ideas from sticking."*
RQ2:SC11 #4 **EX1**	*"Groups have the ability to pool their resources collectively, and this includes the ability to picture a future that hasn't happened yet. There's nothing unusual or supernatural going on here; they are merely situating themselves in a future that hasn't happened yet by asking a series of simple, yet powerful 'what-if' questions. For example, 'What if wireless Internet was unlimited and available at the same ultra-high speed everywhere on the planet?' is a real future possibility – I would go so far as to say inevitability - based on current progress in the proliferation of communications technologies. It hasn't happened yet and is probably a good ten years or so away, but we can be almost 100% certain that it IS going to happen. By picturing a world in which this is the case, which is a very reasonable assumption to make, our current portfolio can be optimised to accommodate such an eventuality NOW; years before that level of technological maturity even reaches us."*
RQ2:SC11 #5 **EX2**	*"Waiting for the technology to 'catch-up' is a game that we often play when designing new features in to products. In some ways, we intentionally over-specify a design in the knowledge that when the product finally goes in to production, the new stuff it has been designed to rely on will have matured. Most of the time we get it right, but sometimes we don't, and are faced with having to explain why production needs to be delayed, which has a knock-on effect to the final release date."*

Inviting a future state – SC11

Source	Sample Narrative
RQ2:SC11 #6 **ST12**	*"It's easy to extrapolate in to the future and see how some frontiers will have advanced in coming years. For example, data storage was once a straight-line graph and it was easy to predict the dollar cost of a Gigabyte of disk storage. In recent years though, and with the advent of cloud technologies, it is tending to take on more of an exponential form, suggesting that by about 2040, we will have an infinite capacity for data storage. I'm not sure exactly what 'infinite storage' will look like, as it's still in the future and hasn't happened yet; but I would venture to suggest that it will focus on 'big data' in a cloud environment, where all data is stored in a fragmented fashion, across many thousands of networked devices spanning the globe. The traditional concept of local storage on fixed hard drives and the like will have likely faded in to history."*
RQ2:SC11 #7 **EX1**	*"The decisions you make today, especially if they involve the design and implementation of transformative technologies, may entail significant consequences for future generations that you haven't even considered. Do you think the inventors of the atom bomb thought about what they were doing in the closing years of World War II? I very much doubt it. No, they simply wanted an end to the misery of the war there and then. Unfortunately, things can't be un-invented, so think very carefully about what you get involved with."*
RQ2:SC11 #8 **ST12**	*"One of the methods I attribute to my continuing success is by having an active financial forecast at all times. It's only a simple cash flow spreadsheet, but it deals with the coming six-month window at all times, ensuring that my 'business mind' is always six months ahead of the present. retrospectively act only if the decision I make toward impact favourably on my future self. Does that make any sense? It's only a simple spreadsheet, but it works well for me.*
RQ2:SC11 #9 **ST11**	*"Being expected to make decisions about the design and functionality of products or services that don't even exist yet is similar to being asked to look in to the future, and say with confidence what's going to happen – there's no way you can guarantee an accurate outcome, as there's always a degree of uncertainty in everything you do, and a multitude of possible outcomes. A good web search for similar ideas often helps to kick-start the process: seeing what others are doing or have done before you provides a firm reference point from which to begin. Then, co-opting others in to the process means that a good, well-considered end result is more or less guaranteed."*
RQ2:SC11 #10 **EX5**	*"Being able to think clearly in perspective, moving forwards and backwards in terms of the present situation and any number of futures is the way I believe that many of us entrepreneurs come up with new ideas for business. To do it well though, you must have a sound understanding of the current state-of-play in your specialist area, and this tends to only come with experience. By firmly grounding yourself there to begin with, you can then start tinkering with a few of the variables relevant to that industry; changing a few things here-and-there, and then imagining the possible outcomes. Doing this repeatedly builds a mental image of how the business will likely pan-out in the coming years, but only If you've grounded yourself sufficiently well to begin with."*
RQ2:SC11 #11 **EX2**	*"Whatever I set my mind to requires a vision of the future – first and foremost, to help me plan in which direction I want my firm to go. To get this vision I need to pitch a series of questions to my 'future self' and imagine what the responses might include. While this is probably one of the most difficult things to carry-off – precisely because you have no way of knowing what will happen – such visions offer reassuring goals to work towards. Even though these future aspirations are held entirely within your mind, it helps optimise and tune every action you take now, to be geared towards fulfilment of that picture - that goal - that you have in mind."*

Inviting a future state – SC11

Source	Sample Narrative
RQ2:SC11 #12 **ST8**	*"Because of AI [Artificial Intelligence] and robotic automation, more than half of the jobs that currently employ Americans will have disappeared in 20-30 years. If that doesn't prompt you to look in to the future and consider what things might be like, then perhaps you should start imagining what it might be like, as you too will soon be playing a part in that same future. Many of the techies I know who live in the San Francisco-Silicon Valley 'bubble' actually live this future now – economically, socially, and of course technologically – as they rely on the unique perspective of being able to plan and forecast the types of technology that they will be engineering and producing in future, and that we will ultimately use."*
RQ2:SC11 #13 **ST9**	*"Something that continues to amaze me is a person's inability to appreciate change and incorporate it in to their future-based thoughts when planning and forecasting. I was once accused of changing my mind concerning a fundamental decision relating to one of our manufacturing processes, and was challenged by the CTO who was clearly under pressure to deliver…I simply replied: 'that was then, this is now: don't you realise how much has changed since I made that decision?"*
RQ2:SC11 #14 **ST13**	*"When trying to teach colleagues about goal and scenario planning, the one critical point that many consistently forget to take in to account is the inevitability of change. For example, when planning sales forecasts, they assume a flat-line sales profile by not building-in growth percentages or seasonal highs and lows in to the predictions. In other words, their figures reflect a snapshot of the firm's business as it stands on that day, with sales figures based on existing business up to that point, and no provision made whatsoever for the possibility of new customers. I immediately challenge this by asking them if they plan to do nothing during those projected months, as this is what they are essentially implying with their figures."*
RQ2:SC11 #15 **EX5**	*"How things ought to be and how things actually are represents two very different ways of looking at the world, and if you think about it, picturing how things should be in future is one way of setting goals for yourself and/or the company. It is possible to set goals way too high of course, so when thinking about what should or ought to be the future case, the goals should be realistic and attainable; then, you may have some chance of getting there."*

Inviting a future state – SC11

RQ2:SC11	Codes
#1 (11)	question formulation; unknown future; supposition; no boundaries; speculation; hypothetical; non-discerning; tool for brainstorming; heuristic; scenario planning; speculative questions
#2 (12)	Imagining future state; user experience; existing state; contrasting; appreciation of void; creative gap; shifting perspective; temporal elasticity; temporal shuttling; transcendence; inviting creation; tempting inspiration
#3 (16)	individual inquiry; group inquiry; speculative future; vision of a future state; future self; future work environment; future family life; future needs; speculation; temporal shifting; retrospective planning; imagined future; diversity of experience; age diversity; mix-up status quo; dislodge fixed ideas
#4 (8)	group resources; collective vision; future state; question formulation; accurate speculation; optimise products; future planning; forecasting
#5 (5)	advance design; expectant design; technological maturity; delayed production; setting expectations
#6 (10)	ease of forecasting; extrapolation; unexpected advances; anticipating future state; perception; remote storage; cloud technology; fragmented storage; globally dispersed; local storage
#7 (5)	decision making; future consequences; unanticipated; unintended consequences; careful planning
#8 (6)	success metrics; financial forecast; future window; temporal displacement; thinking ahead; temporal elasticity
#9 (8)	future planning; uncertainty; multiple outcomes; initial search; catalyst; starting point; comparative search; co-opted inquiry
#10 (14)	perspectival thinking; temporal elasticity; multiple futures; generative inspiration; up-to-date; specialised knowledge; experience; grounded start-point; experimentation; speculation; recursive action; build mental image; future state; grounded starting-point
#11 (11)	vision of future; planning heuristic; self-questioning; future-self; imagined response; imagining a future state; uncertainty; reassuring goals; aspirational; guides action; future goals;
#12 (9)	artificial intelligence; automation; future employment; concern for future; own destiny; living in the future; future perspective; enables planning; enables forecasting
#13 (7)	appreciation of change; planning heuristic; forecasting heuristic; change as inevitable; thinking in perspective; acknowledges change; admits change
#14 (7)	future planning; inevitability of change; misguided assumption; excludes change; snapshot; lack of dynamism; appreciation of change
#15 (8)	normative state; prescriptive state; differing outlooks; goal setting; overly-ambitious; realistic; attainable; realisation
Total 137	

(See next page for table of conceptual indicators)

Inviting a future state – SC11

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
future consequences; future employment; future family life; future goals; future needs; future perspective; future planning (x3); future self; future-self; future state (x2); future window; future work environment; imagined future; concern for future; anticipating future state; unanticipated; unexpected advances; living in the future; multiple futures; thinking ahead; unintended consequences; vision of a future state; vision of future; unknown future; scenario planning; thinking in perspective; imagining a future state; imagined response; imagining future state; build mental image; setting expectations	*Future states (34)*
question formulation (x2); self-questioning; hypothetical; realisation; supposition; reassuring goals; decision making; specialised knowledge; initial search; comparative search; speculation (x3); speculative future; speculative questions; accurate speculation; uncertainty (x2); multiple outcomes	*Speculation (20)*
temporal displacement; temporal elasticity (x3); temporal shifting; transcendence; temporal shuttling; perspectival thinking; shifting perspective; snapshot; perception; retrospective planning	*Temporality (12)*
extrapolation; financial forecast; forecasting; forecasting heuristic; heuristic; ease of forecasting; enables forecasting; enables planning; guides action; careful planning; planning heuristic (x2)	*Planning (12)*
inevitability of change; excludes change; change as inevitable; own destiny; appreciation of change (x2); acknowledges change; admits change; normative state; contrasting; prescriptive state	*Change (11)*
dislodge fixed ideas; existing state; inviting creation; tempting inspiration; mix-up status quo; up-to-date; generative inspiration; creative gap; appreciation of void; experimentation	*Disruption (10)*
tool for brainstorming; age diversity; user experience; recursive action; realistic; differing outlooks; collective vision; experience; diversity of experience	*Creativity (9)*
cloud technology; technological maturity; remote storage; local storage; fragmented storage; globally dispersed	*Accessibility (6)*
goal setting; expectant design; optimise products; aspirational; attainable; success metrics	*Goal seeking (6)*
no boundaries; non-discerning; misguided assumption; lack of dynamism; overly-ambitious	*Wayward (5)*
grounded start-point; grounded starting-point; starting point; catalyst	*Starting point (4)*
individual inquiry; group inquiry; group resources; co-opted inquiry	*Inquiry (4)*
artificial intelligence; automation; advance design	*Cybernetic (3)*
delayed production	*Own referent (1)*
	Total 137

(See previous page for table of constituting codes)

Context – SC12

Source	Sample Narrative
RQ2:SC12 #1 **EX1**	*"Putting everything in to context is a skill only possessed by few individuals. It's the skill of recognising everything in relation to the time and place of occurrence. For most, time and place remain static and boring. But to be creative – as entrepreneurs are – context is something that you have to repeatedly nudge yourself in to remembering…it has to become a habit of sorts, where you keep resetting the starting point back to zero, so that you don't get trapped in to relying on the same old beginnings."*
RQ2:SC12 #2 **EX2**	*"Dealing with technology on a daily basis – in work and at home – often prompts me to reconsider how I approach things creatively, because as the technology changes, it too forces a change in the way I interact with it. If you don't want to become enslaved by it, you need to maintain an acute awareness of how things change with time, and with the overall situation. I suppose when it's all added together, this is what constitutes our culture of the day – the Germans refer to it as the 'zeitgeist' or something, don't they?"*
RQ2:SC12 #3 **ST14**	*"I've noticed how people respond to technology according to where they happen to be. At home it's all about entertainment, shopping and holidays; in colleges and universities it's about extending the frontiers of knowledge; and in the workplace, it's about keeping up with it in order to survive. The problem has always been its changing nature: just as you get accustomed to something, it gets replaced with something more complicated and difficult to understand."*
RQ2:SC12 #4 **ST9**	*"There is a time and place for everything, but many owner/managers seem to be locked in to a time-freeze, where they assume that nothing really changes and tomorrow will be the same as today. I make a point of actively noticing the changes in nuance and meaning of things as the location changes, and as the whole lot changes over time. This is key to being a good manager, I am sure. Unfortunately, most managers are completely oblivious to it, and its implications."*
RQ2:SC12 #5 **ST14**	*"Our best and most creative ideas come from an ultimate recognition of change. Just as a product is released, we force ourselves to begin thinking about the next one, realising that things never stay the same for long. Look as MySpace for example, where did that go? The same fate will no doubt befall Facebook and Twitter one day – to be replaced by the fad of that period. This is the way it is if you are in the technology game – you must always be on your feet, as nothing lasts forever."*
RQ2:SC12 #6 **EX4**	*"Reflecting on past actions and trying to predict a best course of action for the future all concerns an element of time when you think carefully about it. I know that location in terms of geographical and cultural settings play a significant role in planning, too: my colleagues in China, for example, fully immersed in their Chinese culture, will have a completely different take to me when faced with an almost identical challenge. Because we (in the West) are not usually privy to this side of things, we often miss-out on significant advances, especially when it comes to developments in certain specialist fields. Fortunately, modern communications technologies like E-mail, Facetime etc. now allow me to tap-in to that kind of contextual diversity, and wow, what a difference it has made to our outlook. Our products now cater to a much wider audience of global users, because we consider a horizontal diversity that would previously only ever have been vertically oriented."*
RQ2:SC12 #7 **ST15**	*"Trying to be creative in the office is almost impossible for me and the other guys I work with. The time and place has to be amenable to the flow of good conversation and good ideas, free from the pressures of a working environment. So, when we feel like bashing-out some new ideas, it just has to be done over a few beers on a Friday night, in the casual surroundings of a nice friendly, local pub. Providing that we have a good wireless connection to the internet so that we can check things as we go along, there's not much else to worry about, until the batteries go flat, that is!"*

Context – SC12

Source	Sample Narrative
RQ2:SC12 #8 **ST8**	*"Acting appropriately and according to the context of a situation is a skill that many in business overlook. As they say, there is a time and place for everything. Unfortunately, many owner-managers and so-called entrepreneurs that I know decide things – and subsequently, act – in a manner so ill-suited and out of context with the prevailing situation that they fall flat on their face. I've seen this mostly with inexperienced entrepreneurs, but I must also say in their defence, that acting like this may go a long way towards building the person they will eventually become…if they can survive until then, that is."*

RQ2:SC12	Codes
#1 (10)	contextualisation; temporal recognition; spatial recognition; creative precursor; habit; foregrounding context; back to beginning; old habits; same beginnings; foundational
#2 (11)	prompting creativity; shifting response with change; adapting; one step ahead; avoid enslavement; automation; temporal awareness; temporal change; cultural memes; situational awareness; zeitgeist
#3 (8)	situational response; contingent response; consumer focus; academic focus; extending frontiers; survival of business; responding to change; perpetual change
#4 (12)	situational contingency; temporal contingency; frozen in time; lack of change; stagnation; spatio-temporal awareness; alert to change; shifting nuances; change with time; good management; lack of understanding; underappreciated
#5 (9)	recognition of change; creative inspiration; one step ahead; vision of future; inevitability of change; transience; fleeting; contemporary fads; transience
#6 (10)	reflection; apperception; prediction; temporal dimension; situational dimension; cultural memes; contextual interpretation; communications technologies; global reach; horizontal diversity
#7 (9)	contingent creativity; context sensitive; time sensitive; office strictures; power; authority; casual setting; free-flowing thought; internet access
#8 (11)	context of action; management skill; overlooked; spatio-temporal contingency; incongruence; inappropriate action; out of context; failure; inexperience; failure breeds success; interim survival
Total 80	

(See next page for table of conceptual indicators)

Context – SC12

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
temporal awareness; temporal change; temporal contingency; context of action; temporal dimension; temporal recognition; time sensitive; spatial recognition; spatio-temporal awareness; spatio-temporal contingency; foregrounding context; contextualisation; context sensitive; out of context; contextual interpretation; casual setting	*Context (16)*
recognition of change; responding to change; inevitability of change; shifting response with change; perpetual change; lack of change; change with time; stagnation; alert to change; frozen in time; shifting nuances	*Change (11)*
creative inspiration; creative precursor; prompting creativity; extending frontiers; contingent creativity; free-flowing thought; horizontal diversity	*Creativity (7)*
situational awareness; situational contingency; situational dimension; situational response; contingent response; adapting	*Recognition (6)*
same beginnings; back to beginning; reflection; foundational; apperception	*Reflection (5)*
one step ahead (x2); prediction; vision of future	*Prescience (4)*
incongruence; inappropriate action; lack of understanding; inexperience	*Credibility (4)*
cultural memes (x2); zeitgeist; contemporary fads	*Cultural milieu (4)*
failure breeds success; failure; survival of business; interim survival	*Survival measures (4)*
internet access; communications technologies; global reach	*Accessibility (3)*
power; office strictures; authority	*Control (3)*
transience (x2); fleeting	*Transience (3)*
habit; old habits	*Habits (2)*
academic focus; consumer focus	*Focus (2)*
automation; avoid enslavement	*Automation (2)*
management skill; good management	*Management (2)*
overlooked; underappreciated	*Marginalised (2)*
	Total 80

Doing the right thing – SC1

Source	Sample Narrative
RQ3:SC1 #1 **ST12**	*"Learning how to do things well isn't just about doing them to the best of your ability; it's about remembering how others performed in similar situations and incorporating what you see in to an adapted and improvised version; appropriate, relevant and specific to your own needs. As time progresses, this is what counts as experience."*
RQ3:SC1 #2 **EX2**	*"Before the web came along, you either learned how to do something at school, looked it up in a book, or were shown in person, or by some TV programme dedicated to a specialist area - like DIY for example. Now the whole game has changed: you want to learn how to do anything – and I mean, anything – you can watch any number of 'demonstrator' videos on apps like YouTube or Vimeo. By combining the best elements from the various video tutorials, it's then very easy to formulate your own 'best practice' rendition. As ridiculous as I might sound, I have watched videos on how to cut an onion properly, how to cook rice so that it stays fluffy, wire an Ethernet plug, and even replace the oil filter on my car."*
RQ3:SC1 #3 **EX3**	*"When making decisions as an entrepreneur you always have to consider who the ultimate beneficiary of your actions will be. Initially, your choices have to serve at least yourself and your customers, if only from a basic survival perspective; but when you become more established, your decisions need to serve a wider, more noble purpose, such as 'helping people transact safely over the internet' or 'preventing cyber-bullying of children via social media' etc."*
RQ3:SC1 #4 **EX1**	*"The university graduates we interview are all asked to explain how their presence and contribution would make our company more ethically sound if they were to be offered the job. They seem to equate ethical awareness with aspects of health and safety, staying on the right side of the law, and doing whatever it takes to get away with 'remaining legal'."*
RQ3:SC1 #5 **EX5**	*"Doing what you think is right carries with it a lot of responsibility, because you're making choices that will inevitably have some impact on others: fellow workers, customers, suppliers, and anybody else involved with helping your venture to make it past the first three years and still be around. It doesn't take long to realise that these individuals are key to your survival, so do everything you can to keep them happy – you'll soon know about it if you upset them."*
RQ3:SC1 #6 **ST10**	*"If you know that what you are doing is right, and it's based on gut-instinct, previous experience, or whatever; then stick with it, no matter what, because there will be plenty around you telling you how they think it should be done, or how there are better ways than your chosen way. Maybe there is something in what they say, but in my experience, if you really are committed to a project, and have had the idea rattling around in your head for months on end – whereas they probably haven't - then the right choices at the right time will usually follow, and shouldn't be deviated from."*
RQ3:SC1 #7 **ST13**	*"It's all about doing the right thing, all of the time. Most people generally make a point of keeping others in line, which of course is what management is all about. You soon get to know if you've been doing something that could bring the firm in to disrepute, and you're expected to correct it without question. If you perfect such an attitude by developing a habit of always acting properly to the best of your abilities, then it will stick, and continue to serve you well in later years."*
RQ3:SC1 #8 **ST8**	*"Being forced to perform your duties 100% correctly, and not being allowed to proceed to the next stage until you've complied in full may sound harsh, but that's exactly what technology can do when enforcing a standardised workflow. Whether you are picking items to fulfil an order in a large distribution warehouse, doing the accounts on-line, or completing an on-line questionnaire, there are no short-cuts; you simply have to get the job done accurately: no room for only half-done jobs anymore."*
RQ3:SC1 #9 **ST11**	*"Do it well, or don't do it at all, is something that we have all heard parents or teachers say at one point or another, but the great things about working in a technological environment, surrounded by other so-called 'techies', is that you are very often compelled to do things right, and to the best of your ability anyway, because anything less will be criticised or rejected, either by your peers, the technology you're working with, or a combination of the two."*

Doing the right thing – SC1

RQ3:SC1	Codes
#1 (5)	comparative action; revised approach; improvisation; tailored to situation; experience
#2 (9)	sources of knowledge; person to person; multimedia learning; digitisation; mundane tasks; on-line learning; multiple sources; builds best-practice; acquisition of skills
#3 (9)	beneficiary of actions; consequences; caters to close contacts; survival measures; wider purpose; ethical; noble purpose; financial propriety; remaining legal
#4 (5)	contemporary attitudes; ethical contribution; health and safety; law-abiding; minimal effort
#5 (8)	responsibility; doing the right thing; impact on others; survival measures; key individuals; key to survival; maintain relations; making the effort
#6 (6)	awareness; perseverance; doing the right thing; external interference; commitment; persistence
#7 (7)	doing the right thing; management of others; chastisement; habits; enduring; permanence; develop best practice
#8 (6)	perfection; accuracy; barrier to progress; enforced accuracy; quality; mediocrity
#9 (6)	childhood memes; avoid mediocrity; tech influence; enabling technology; multiple sources; corrective measures
Total 61	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
doing the right thing (x3); law-abiding; ethical; financial propriety; remaining legal; mediocrity; minimal effort; ethical contribution; avoid mediocrity; habits; quality; making the effort; develop best practice; builds best-practice; comparative action; perfection; accuracy; health and safety	*Doing the right thing (20)*
revised approach; improvisation; tailored to situation; corrective measures; mundane tasks; tech influence; external interference; contemporary attitudes; digitisation; barrier to progress	*Adapting (10)*
sources of knowledge; multiple sources (x2); multimedia learning; on-line learning; acquisition of skills; experience; enforced accuracy; enabling technology; childhood memes	*Learning (10)*
management of others; responsibility; key individuals; chastisement; awareness; consequences; impact on others	*Responsibility (7)*
commitment; noble purpose; wider purpose; beneficiary of actions; caters to close contacts	*Duty (5)*
perseverance; persistence; permanence; enduring	*Tenacity (4)*
key to survival; survival measures (x2)	*Survival measures (3)*
person to person; maintain relations	*Relations (2)*
	Total 61

Ecology and sustainability – SC2

Source	Sample Narrative
RQ3:SC2 #1 **ST12**	*"Modern consumer culture now dictates that things – especially electronic things – should be disposed of and replaced, rather than repaired. This is a symptom of the way technology is changing in front of our very eyes, and any item that has been designed to be repaired indefinitely is not only bad for turnover, but bad for the customer too, who will be left stranded with a device that very quickly becomes obsolete. And if there's only one important lesson to learn from our friends at Apple, it's that customers will do anything to ensure that they continue to have the latest, shiniest model, and are prepared to part with considerable sums to keep it that way."*
RQ3:SC2 #2 **ST13**	*"If we could only teach people that it's OK to use a cell phone, car or computer that's more than five years old, and we could get manufacturers to significantly increase the elapsed time between version releases, then we might start making progress. Unfortunately, we can't, because (a) the pace of technological advance will not slow down, and so frequent upgrade is a necessity if these devices are to stay compatible, and (b) the drive to make more and more money, and grab a bigger market share to keep shareholders happy with ever-bigger dividends overrides all. Yes, greed trumps all anyway, even if you could slow-down the technology."*
RQ3:SC2 #3 **ST12**	*"Everything we manufacture has a very short lifespan – 18 months at best is the current guideline. It's not something we plan intentionally, as we're simply responding to consumer demand. Every six to nine months our entire product portfolio is upgraded just to keep up with the competition and trends in the market. Not only that, but our suppliers will regularly update the firmware [software hard-wired in to a device] and chipsets that the products are based on, so we have to jump whenever they jump. It's very wasteful on one hand, but on the other, it keeps the cash flowing and turning over."*
RQ3:SC2 #4 **EX7**	*"The carbon footprint of what we do here at [company name] is roughly neutral – possibly even negative if you count the number of trees we have saved by transferring all data that was previously maintained on paper record in to digital CRM format. OK, some may claim that carbon power is needed to power the servers and drives that store the data, but what if I told you that our primary data centre has recently been re-located to Iceland, where 99.98% of their grid power comes from geothermal generators? And the best bit? It's 40% cheaper to run than our previous data centres in London and New York."*
RQ3:SC2 #5 **EX6**	*"Focus has to be shifted away from capitalist attitudes associated with maximum profits and shareholder value, to an increased awareness of limited resources, sustainability and the reduction of inequality. If we can teach this stuff to kids and business school students, then we just might have a future to look forward to. However, as somebody who has personally benefitted from the very social ills of the modern world to which I am referring, it would be remiss – even hypocritical – of me to try and change things."*
RQ3:SC2 #6 **ST9**	*"Is the outer casing made from naturally degradable polymers? Are the internal metals easy to reclaim and recycle? Has a dedicated end-of-life pathway been planned for the 1 million plus of these devices you are planning to manufacture? Will you be providing the consumer with a post-paid bag to send it back when they upgrade? Will upgrade to the next version be heavily discounted on return of the old model? Only a small fraction of today's producers are in a position to answer 'yes' to just ONE – never mind all five – of these questions."*
RQ3:SC2 #7 **ST11**	*"Those involved in the design and manufacture of new products have a moral duty to us all: they have to be able to imagine where the artefacts and gizmos they are producing today will be in five, ten, or even twenty years' time. It's safe to say that 100% of today's output will have been supplanted many times over by more advanced versions within 3-4 years – let alone 5. Just think of your last cell phone: I doubt you had it for more than 4 years, right? Where do you think it is now? Based on current WEEE [Waste Electrical and Electronic Equipment Directive] recycling statistics, there's an 80% plus chance that it just went straight in to a poisoned land-fill somewhere, and probably not even in this country."*

Ecology and sustainability – SC2

Source	Sample Narrative
RQ3:SC2 #8 **EX4**	*"All manufacturing industries are in desperate need of a rigorous framework defining the birth-to-grave journey of the raw materials they use: how they are ecologically resourced and sustainably re-manufactured in to consumer goods; followed by how the post-consumer items are then recycled at the end of their life. I worry that we will have poisoned the planet beyond repair before most even realise that such basic guidelines are even required."*
RQ3:SC2 #9 **EX2**	*"I was pleased to discover that many of our old wireless router products now end-up in Africa, where solar-energy is used to power them and provide a wireless connection to the internet for a whole village. The guy doing it – who is a true entrepreneur of the future – realised the potential for these devices and asked us to send all our old units to him, which we gladly did."*

RQ3:SC2	Codes
#1 (9)	disposable culture; materialistic waste; electronic waste; consumerism; redundancy; technological change; repair or replace; financial implications; lust for the new
#2 (7)	device longevity; upgrade frequency; capitalist imperative; technological change; greed; shareholder value; shareholder satisfaction
#3 (9)	built-in obsolescence; unintended consequences; consumer demand; passing blame; responding to external forces; complying with vendor demand; acknowledging waste; profit & cash flow; ethical & moral considerations
#4 (9)	carbon footprint; ecologically aware; sustainability; mitigating factors; cost saving; infrastructure relocation; financially driven; natural resources; geothermal energy
#5 (10)	ecological primacy; dominant attitudes; capitalism; shareholder value; inequality; wider picture; need for education; future consequences; hypocritical; lack of action
#6 (10)	build materials; sustainable; potential for re-use; residual value; disposability; end of life plan; future planning; innovative recycling measures; consumer incentives; manufacturer ignorance
#7 (7)	moral duty; future planning; future considerations; forecasting; device longevity; durability; contamination of third-world
#8 (7)	life cycle framework; raw material processing; resourcing; disposal; recycling; concern for planet; slow realisation
#9 (8)	recycling devices; third world; developing countries; non-carbon energy; local access; enables connectivity; true entrepreneurial spirit; guaranteed redeployment
Total 76	

Ecology and sustainability – SC2

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
ecological primacy; ecologically aware; sustainability; sustainable; durability; carbon footprint; guaranteed redeployment; residual value; life cycle framework; device longevity (x2); concern for planet; potential for re-use; recycling devices; recycling; redundancy; resourcing; repair or replace; innovative recycling measures; raw material processing; build materials; disposability; disposable culture; materialistic waste; disposal; end of life plan; electronic waste; built-in obsolescence; acknowledging waste	*Ecology & sustainability (29)*
financial implications; profit & cash flow; financially driven; capitalism; capitalist imperative; cost saving; forecasting; inequality; greed; shareholder satisfaction; shareholder value (x2); true entrepreneurial spirit	*Capitalist imperative (13)*
future consequences; future considerations; future planning (x2); unintended consequences; responding to external forces; slow realisation	*Future planning (7)*
technological change (x2); enables connectivity; upgrade frequency; local access; lust for the new; infrastructure relocation	*Tech-factors (7)*
ethical & moral considerations; hypocritical; lack of action; moral duty; passing blame	*Integrity (5)*
complying with vendor demand; consumer demand; consumer incentives; consumerism	*Supply & demand (4)*
third world; contamination of third-world; wider picture; developing countries	*Wider picture (4)*
natural resources; non-carbon energy; geothermal energy	*Natural resources (3)*
dominant attitudes; mitigating factors	*Influence (2)*
manufacturer ignorance; need for education	*Awareness (2)*
	Total 76

Life-work balance – SC3

Source	Sample Narrative
RQ3:SC3 #1 **EX2**	*"I thrive on the challenges that come with setting up new businesses. One business might focus on the provision of firmware for the data storage industry, while the other might import wireless appliances from Malaysia to North America. I don't care about the kind of technology - the main overriding point is that whatever I end up doing has to be interesting, enjoyable, and of course profitable: the moment it stops delivering on either of those fronts is when you should start seriously thinking about moving on."*
RQ3:SC3 #2 **ST15**	*"I know many so-called entrepreneurs who have been trapped in loss-making ventures for years, convinced by the misguided belief that 'one day' things will turn around and they will make their fortune. Of course, this never happens, and those poor guys live desperately unhappy lives, having given up all hope of making a success of things and often dying prematurely from exhaustion and overwork."*
RQ3:SC3 #3 **EX1**	*"To be fair to yourself and others, you must have a well thought out exit strategy in place for each venture. Should things not work out, for whatever reason, then you can sell the business on, or gracefully wind it down with minimal debts or other lingering contractual obligations. It's such a simple bit of forward planning, yet many – especially those who have yet to experience significant failure - don't give it a second thought. Of course it's easy for me to say this now, because I've been at the head of several failed ventures over the years; and it's only because of those failures that I now recognise the absolute need for a well thought-out exit plan."*
RQ3:SC3 #4 **EX5**	*"Recognising when your venture isn't working is vital; and acting immediately on this recognition, even more so. In the early years I naively re-financed my home and maxed-out all credit cards to raise the capital for a new idea that I was convinced would be the 'next big thing' on the Internet. The stress and worry associated with the financial risk just wasn't worth it in hindsight: I became seriously ill through lack of sleep and obsessive worry; the business suffered as a consequence and almost failed. Fortunately, a friend recommended I get in touch with an old business mentor of hers; an experienced entrepreneur with twenty or so years, and just as many companies under his belt. We met, and he decided to bail me out there and then. OK, he now owns 51% of my company, but I ask you to consider which is better: 100% of nothing, or 49% of a business which has an annual turnover of twenty-five million dollars? Sometimes you simply have to share the burden when it is so abundantly clear that you can't manage on your own. To do otherwise, is, well, just stupid. Thankfully, I was taught this lesson at a very early stage without being burned. Unfortunately though, there are plenty of others who are prepared to just fail, never having anything to do with business again."*
RQ3:SC3 #5 **ST12**	*"My parents were both self-employed programmers from age 16 right through to retirement, and, although I'm not in the same line of work – I'm more of a hands-on hardware guy - I guess that a certain amount of their work ethic and business acumen has rubbed-off on me over the years. I always looked-up to them and recognised, even at an early age, that they were in business to guarantee that they had direct and total control over their quality of life. They were – and still are – totally self-reliant, and when I get to the later decades of my life, would like to be exactly as they are now: happy, without debt, and enjoying every moment of life."*
RQ3:SC3 #6 **EX3**	*"To protect my sanity and the long-term well-being of my family, I have walked away from businesses in the past. Twice actually. Both ventures had survived the bumps and humps of the early years as typical start-ups, and were thriving in their respective sectors. On paper the turnover was very healthy – in the millions – but the profit was not so good. After paying all the overheads associated with the business, what remained in terms of gross profit just wasn't worth the effort. I had been working 80-hour weeks, never saw my family, and was beginning to miss-out on the kids growing up – all for a director's salary of about £22,000p.a. Life as a 'busy fool' just wasn't worth it. So I sold both businesses with full disclosure of company accounts to the buyers, so they knew what they were getting in to. Both firms failed within 12 months of being bought."*

Life-work balance – SC3

RQ3:SC3	Codes
#1 (6)	challenges of venture creation; diversity of challenge; geographical diversity; needs to be enjoyable; needs to be profitable; knowing when to walk away
#2 (4)	pseudo-entrepreneurs; misguided belief; unfulfilled life; loss-making trap
#3 (8)	exit-strategy; exit planning; contingency planning; graceful departure; clean shutdown; overlooked; easy in hindsight; experience of failure
#4 (9)	recognising failure; contingency plans; acting immediately; needless stress; seek help; sharing the burden; experienced mentors; working together; lone warriors
#5 (9)	parental influence; work ethic; business acumen; early recognition; control of own destiny; quality of life; self-reliance; burden-free; life satisfaction
#6 (8)	knowing when to walk away; health and well-being; busy fool; realistic outlook; time with family; impact on health; sold as going concern; exit strategy
Total 44	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
busy fool; impact on health; life satisfaction; health and well-being; seek help; pseudo-entrepreneurs; self-reliance; sharing the burden; loss-making trap; challenges of venture creation; time with family; misguided belief; needless stress; needs to be enjoyable; needs to be profitable; quality of life; unfulfilled life; lone warriors; burden-free; control of own destiny	*Life-work balance (20)*
knowing when to walk away (x2); sold as going concern; experienced mentors; work ethic; contingency planning; contingency plans; business acumen; realistic outlook; acting immediately; early recognition; easy in hindsight	*Realistic expectations (12)*
exit planning; exit strategy (x2); recognising failure; experience of failure; graceful departure; clean shutdown	*Exit planning (7)*
diversity of challenge; geographical diversity	*Diversity (2)*
working together	*Own referent (1)*
overlooked	*Own referent (1)*
parental influence	*Own referent (1)*
	Total 44

Universal good – SC4

Source	Sample Narrative
RQ3:SC4 #1 **ST8**	*"When you realise that everything you are doing and working towards only serves to benefit the financial interests of corporate investors or remote stakeholders, then it's probably time to start thinking about your next venture."*
RQ3:SC4 #2 **EX6**	*"I think most entrepreneurs would admit that they're in it for the money first-off, and secondly for the independence that being your own boss brings. I'm not so transparent, in that I have a wider perspective in terms of who I'd like to benefit. I'd go so far as to say that I want everybody I come in to contact with to benefit from the fortunes of my business dealings in one way or another. Customers, suppliers, family, friends, and even – yes, even – competitors. I don't ever expect anything in return except for complete down-the-line honesty. Once that fine thread of trust is broken, by being ripped-off or scammed in any way, then I let them know about it, and ditch them."*
RQ3:SC4 #3 **EX1**	*"'Treat others as you would expect to be treated yourself' is the one thing that I remember my Granny teaching me from way-back-when. That one guiding principle has never left me, and I am convinced that it's the only reason why I am where I am now."*
RQ3:SC4 #4 **ST13**	*"Our corner of the tech sector is highly specialised and we all know one another well, even though we are – strictly speaking – competitors and should be at loggerheads. However, that just is not the case. We all get together for socials every couple months or so, exchanging the latest chit-chat and information on bad suppliers, late payers etc. and talk about the latest developments in our industry. We regularly refer work to each other if, for whatever reason, one can't fulfil the order and another can. There's just one rule that we all abide by: 'Don't poach customers or staff'. So far, not one breach!"*
RQ3:SC4 #5 **ST11**	*"It's very satisfying to see that the design or engineering decisions you once made - sometimes many years ago - which were subject to extreme scrutiny and criticism at the time, are being vindicated time and time again by feedback from current users and fans of my designs. I always wondered why this happened, and then it dawned on me that it was because during the early planning and design phase, I always imagined myself in the shoes of future users, asking what they would want to see featured in the final product."*
RQ3:SC4 #6 **EX7**	*"What's the point of all the things we do every day – this so-called 'busy-ness', if it isn't to improve lives and lessen the burden somehow – no matter how small? That's the whole point of technology, surely? Unfortunately, greed gets in the way, and for some, it's a race to the end…but for what: to see who can die with the most money in the bank? We all need to stand back and realise that we need to concentrate more on the wellbeing of others, and less on money. The so-called capitalist imperative to work has much to blame for this, but I think technology can play a huge part in helping us to do this, but the dark side of total automation also needs to be carefully mediated."*
RQ3:SC4 #7 **EX4**	*"It upsets me when huge corporates try to give the appearance of 'doing good' for the benefit of all; yet at the same time they are the biggest distributors of mind-numbing games that play [prey?] on kids to progressively extract increasing amounts of money from their parents, to pay for 'gaming points' and other 'virtual' add-ons that don't even exist in the real world. The social consequences of such overt greed aimed directly at kids does not have a good outlook."*
RQ3:SC4 #8 **EX7**	*"I hope that the data storage products we pioneered will be remembered for many years to come. Even though they may have been quickly superseded by better, faster, cheaper models, many of the products we make – and have made – helped to lay the groundwork for the future direction of a specific technology, and I like that. I don't know how history will judge us for our efforts, but I hope we'll be recognised for our excellence in engineering, and our ability to advance the frontiers of understanding."*

Universal good – SC4

RQ3:SC4	Codes
#1 (3)	self-reflection; vested interests; independence
#2 (8)	financial independence; independence; freedom; wider benefit; connected stakeholders; altruism; honest dealings; mutual trust
#3 (3)	"do unto others as you would have them do unto you"; guiding principle; continuing success
#4 (10)	community of professionals; communities of practice; unlikely alliances; ground rules; social interaction; exchange intelligence; mutual referral; order fulfilment; mutual respect; poaching talent
#5 (5)	business decisions; vindicated; loyal fan base; forward planning; inviting a future state
#6 (9)	questioning purpose; improve quality of life; purpose of technology; blinded by financials; wealth accumulation; welfare of others; capitalist imperative; benefits of technology; beware automation
#7 (9)	superficiality; corporate hypocrisy; vicarious sales; access children through parents; greed; immorality; unethical; social consequences; concern for future
#8 (5)	data storage; ground-breaking technology; historical record; best practice; advances in field
Total 52	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
mutual referral; mutual respect; mutual trust; unlikely alliances; loyal fan base; connected stakeholders; community of professionals; altruism; exchange intelligence; wider benefit; social interaction; welfare of others; "do unto others as you would have them do unto you"; social consequences; improve quality of life	*Universal good (15)*
questioning purpose; self-reflection; inviting a future state; ground rules; concern for future; guiding principle; continuing success; forward planning; best practice; business decisions; historical record; communities of practice	*Critical inquiry (12)*
honest dealings; unethical; poaching talent; superficiality; greed; immorality beware automation; benefits of technology; purpose of technology; advances in field; ground-breaking technology; data storage blinded by financials; capitalist imperative; corporate hypocrisy; wealth accumulation; financial independence; vested interests	*Conduct (6)* *Emerging technology (6)* *Capitalism (6)*
independence (x2); freedom; vindicated	*Emancipation (4)*
access children through parents; vicarious sales	*Dubious intent (2)*
order fulfilment	*Own referent (1)*
	Total 52

Commitment – SC5

Source	Sample Narrative
RQ3:SC5 #1 **ST14**	*"Family is what makes you get up every day. It's what drives you and gives you a purpose in this life. You need to provide for them, and running any kind of business has the potential to fulfil this need. The flip side is that if you fail, you'll likely lose your home and your family will desert you. So, going it alone is not an option for the faint hearted."*
RQ3:SC5 #2 **ST15**	*"I've always been married to my work, so I don't think I'd ever be able to give enough of myself to a family situation without continuing to put work first. Some say that I'm selfish, and I guess that I am to a degree; but I just see it as being realistic, knowing the type of person I am. I think it was the French actor Gérard Depardieu that once said: 'I work to live, but I will never live to work' – well, that pretty much sums-up my attitude to life, too."*
RQ3:SC5 #3 **ST10**	*"Being your own boss allows for additional benefits, over and above those enjoyed by people working a standard 9-5 day. Once your company can run itself without your micro-managerial interventions, you find that you can delegate, and vacation any time you choose, taking the occasional day off here and there to spend time with your loved ones. I could never work for anybody else ever again. The loss of freedom would be unbearable."*
RQ3:SC5 #4 **ST10**	*"You ensure that your friends and family are looked after and provided for out of a sense of duty – it's not just about the money, although plenty of that can help, too. That same sense of duty also compels you to do the very best you can for customers when helping them to resolve their problems."*
RQ3:SC5 #5 **EX5**	*"Most entrepreneurs would argue that they are not in it for the money, but to simply provide for their family. Of course, if they get things right then the financial benefits will usually follow; but not always. A number of my contemporaries are quite happy to run their businesses not according to an all-out 'dominate the world' growth strategy, as is the general perception of entrepreneurial life, but to keep things running on a sustenance level, where employees are compensated well for their efforts, and the company ticks-along without the need to fulfil ever-demanding and onerous sales targets. The only stakeholders that need pleasing are the founders themselves: professional investors, VCs and the like are not welcome."*
RQ3:SC5 #6 **ST15**	*"Social media has turned many of the kids I know in to antisocial morons. How the heck are they going to function in a future society that thrives on networking, socialisation and good old face-to-face chit-chat? I salute those parents that impose an outright ban on smartphones and gaming consoles; no matter how much pressure the kids get from their peers, or the kids put on their parents, it will pay-off for sure in the long run."*
RQ3:SC5 #7 **ST8**	*"My two sons and daughter are already showing an interest in the family business: my daughter works for us on Saturdays maintaining the company profiles on Twitter, Instagram and Facebook. After all, she represents the new generation who understands this stuff, and I just let her get on with it. She's fiercely protective of the firm's reputation and will defend it to the end when faced by a customer or competitor who is intent on damaging our image."*
RQ3:SC5 #8 **EX6**	*"It helps to view your co-founders and colleagues as part of a small, tightly-knit family during the start-up years. When you're all 'in it together' at the beginning, rising and falling with the good and bad times, lasting bonds that would otherwise never be created in the confines of a conventional workplace are formed. Even though you may eventually go your different ways, to have gone through such trials and tribulations together – and survived them – means you'll probably know these people for many years to come, if not the rest of your life."*

Commitment – SC5

RQ3:SC5	Codes
#1 (7)	importance of family; purpose; business as provider; consequences of failure; loss; fortitude; strength of character
#2 (5)	dedication to work; family man; work takes priority; acknowledges selfishness; realistic outlook
#3 (9)	benefits of self-employment; self-sufficiency; freedom; authority; power; ease of delegation; time with family; benefits of self-employment; loss of freedom
#4 (5)	duty; provide for loved ones; best endeavours; benefits of wealth; helping others
#5 (11)	benefits of wealth; provide for family; subsistence; growth imperative; against expectations; targets; performance indicators; founding stakeholders; external investors; venture capital; remote stakeholders
#6 (8)	social media; social issues; social discourse; human interaction; peer pressure; parental control; controlled access; long term impact
#7 (7)	family business; reputation; social media; generational understanding; tech savvy; influence of new media; protecting image
#8 (6)	colleagues as family; start-up years; common journey; formative years; life bonds; enduring
Total 58	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
helping others; duty; ease of delegation; family man; time with family; enduring; importance of family; life bonds; colleagues as family; family business; purpose; common journey; dedication to work; work prioritisation; provide for family; provide for loved ones; best endeavours; realistic outlook	*Commitment (18)*
growth imperative; venture capital; performance indicators; targets; remote stakeholders; external investors; long term impact; founding stakeholders	*Capitalism (8)*
benefits of self-employment (x2); benefits of wealth (x2); subsistence; business as provider; self-sufficiency; consequences of failure	*Independence (8)*
peer pressure; power; authority; parental control; strength of character; fortitude; acknowledges selfishness	*Control (7)*
generational understanding; social media (x2); influence of new media; tech savvy	*New generation (5)*
freedom; loss of freedom; loss; controlled access; against expectations	*Freedom (5)*
social discourse; human interaction; social issues	*Society (3)*
start-up years; formative years	*Early years (2)*
reputation; protecting image	*Image (2)*
	Total 58

Compliance – SC6

Source	Sample Narrative
RQ3:SC6 #1 **EX1**	*"Holding-out for as long as possible before paying suppliers was something that I admit we used to do, and intentionally so. We knew it was wrong and so did everybody else…but – and this isn't an excuse – it was accepted as the norm, because our customers were in turn making us wait for payments on our invoices. Everybody was at it, and it causes mayhem to cash flow when you're trying to keep your head above water. Thankfully, there are now laws in place to protect small businesses from such damaging practice, but it still goes on…I mean, would you take your best customer to court for persistent late payments… not a chance if you wanted to keep the business…and therein lies the conundrum."*
RQ3:SC6 #2 **ST11**	*"Claiming that 'we hadn't received the invoice,' or that 'the cheque must have gone missing in the post' were all used as delaying tactics to hold on to cash for a few extra days. Yes, it gets that desperate when you're first starting out, and you know it's wrong but continue to do it anyway. I would have no shame in saying that I would do it all over again if my firm's survival depended on it. Unfortunately, 'cash is king' as they say, and without it, you're dead."*
RQ3:SC6 #3 **ST14**	*"I know a family whose teenage son stole his mum's credit card and used the details to register with a well-known gaming site, run by a large U.S. software company. He became so addicted to his [gaming] console that he rarely engaged in family events, appearing to collect his plate from the table at meal times, only to disappear to his room again. He would routinely stay up until 3, 4a.m., resulting in his grades falling and teachers complaining of his falling asleep in class. Soon after, a credit card bill for £2,000 or so alerted everybody to the problem: the parents banned all consoles, took away his smart phone, and made him do odd-jobs at home and for neighbours until the debt was fully repaid. The parents realised the error of their ways, but I want to know when, if ever, will the big corporates realise the extent of the problems they are creating for families and their kids' well-being?"*
RQ3:SC6 #4 **EX6**	*"The temptation to engage in petty fraud has been minimised now that accounting systems require rigorous compliance with reporting conditions. Audit logs are maintained in digital format indefinitely, and are all fully searchable; meaning that it's that much easier to spot outlying abusive patterns or trends among a given sample."*
RQ3:SC6 #5 **EX3**	*"Owner-managers will do anything they can to remain within the law, and fortunately, the latest cloud-based accountancy and management information systems enforce a rigorous degree of compliance. It's not as easy as it once was to circumnavigate systems that have now moved from being manual and paper-based, to wholly digitised and on-line. The checks and balances that were once subject to occasional, manual scrutiny now happen as a matter of course, transparently, and without you even being aware of them."*
RQ3:SC6 #6 **EX2**	*"Because of the prevalence of automated reporting and audit trails, employers simply have no choice but to abide by the law. With real-time on-line payroll reporting for example, the revenue department can immediately tell whether an employer is paying less than the minimum wage or not making the right deductions from pay, along with a whole host of other metrics. The systems are so automated that they don't permit you to cross that line, even if you want to; they simply won't allow you to complete a process or proceed to pressing the 'submit' button until all of the data entered has passed through the necessary checks and balances, all in real time."*
RQ3:SC6 #7 **EX5**	*"Trying to get around the system just isn't worth it these days. Mis-declaring tax returns or falsifying accounts no longer pays, as digital audits accompany every on-line transaction made. Even though you may think you've permanently deleted an invoice or record of payment, fact is that it has simply been rendered in to a 'ghost' record; invisible to you, but designed to stand-out in an investigative audit log."*

Compliance – SC6

RQ3:SC6	Codes
#1 (9)	past practices; delaying payment; accepted norms; widely practiced; strategy; survival measure; protective legislation; continuing practice; futility
#2 (7)	delaying tactics; manual processes; cash flow; desperate measures; wilful wrong-doing; survival measures; cash society
#3 (11)	child crime; financial impropriety; on-line gaming; vendor sponsored; social recluse; obsessive behaviour; detrimental impact; parental intervention; reparations; parental realisation; corporate responsibility
#4 (7)	enforced rigour; accounting systems; impropriety; petty fraud; activity logging; permanent record; identifying abuse
#5 (9)	keen compliance; cloud technology; enforced compliance; digitisation; improved security; compliance checking; digital efficiency; automation; transparency
#6 (8)	automated audit; enforced compliance; real-time information; statutory enforcement; stoppage calculations; automation; strict enforcement; forced completion
#7 (5)	futility of crime; financial crime; automated audits; permanent record; forensic proof
Total 56	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
compliance checking; enforced rigour; forced completion; real-time information; strict enforcement; enforced compliance (x2); keen compliance; child crime; protective legislation; improved security; wilful wrong-doing; financial crime; statutory enforcement; petty fraud; impropriety; financial impropriety	*Compliance (17)*
automated audit; automated audits; accounting systems; cash society; permanent record (x2); forensic proof; cash flow; activity logging; stoppage calculations	*Audit trail (10)*
past practices; continuing practice; strategy; manual processes; accepted norms; widely practiced	*Practice (6)*
delaying payment; delaying tactics; desperate measures; survival measures (x2)	*Survival measures (5)*
automation (x2); digital efficiency; digitisation; cloud technology	*Digitisation (5)*
futility; futility of crime; detrimental impact; reparations	*Restitution (4)*
obsessive behaviour; social recluse; on-line gaming	*Behaviour (3)*
corporate responsibility; identifying abuse	*Responsibility (2)*
parental intervention; parental realisation	*Parenting (2)*
vendor sponsored	*Own referent (1)*
transparency	*Own referent (1)*
	Total 56

Copyright and intellectual property – SC7

Source	Sample Narrative
RQ3:SC7 #1 **EX4**	*"The free and seemingly unrestricted interchangeability of digital content facilitated by modern telecommunications has radically altered a number of industries, but those that first spring to mind are the music, gaming and book publishers who are powerless to prevent the digitisation and widespread copying of their intellectual property; engaged in a constant battle against websites that enable users to locate their desired movie, sound-track or book that exist in abundance. Everybody knows that it is illegal and in direct contravention of most Western copyright laws, but for some reason, proceed and commit the crime anyway. As for me, if I like a film, book or music track enough I might do a 'cheeky' illegal download to see if I like it first, and then if I do decide to keep it, will proceed to pay for it without hesitation. It's just a modern-day equivalent of try before you buy."*
RQ3:SC7 #2 **EX5**	*"The music and movie industries are having a hard time fighting against the widespread digitisation of their catalogues. Apple, Google, NetFlix and the like are already moving in on their territory, and if the old incumbents don't change their business model soon, there will be no business left for them."*
RQ3:SC7 #3 **ST8**	*"Did you know that you can search for any patent on-line? For us, this has been a game changer, but not for the better. Patents are now being filed that are so insanely vague, they effectively prevent other providers from developing products that have even the remotest resemblance in terms of name, appearance, form or operation; and are therefore inhibiting the usual creative and innovative processes on which smaller firms thrive. It means that the larger companies are on their way to gradually 'owning' whole conceptual areas, for now and the foreseeable future. This is completely anti-competitive, and unfortunately technology is complicit in facilitating its ruthless efficiency at spotting potential infractions. Look at Apple and Samsung for example: they are two large corporates known for stock-piling patents, either by acquisition, outright purchase, or generation from source."*
RQ3:SC7 #4 **ST15**	*"Those that profit from the dissemination of information, whether it be digitised music, videos or other on-line content are facing real problems when it comes to the protection of their intellectual property. They are more-or-less powerless when it comes to others making copies of their content and selling it on at a lower price."*
RQ3:SC7 #5 **ST14**	*"All software should be published in the spirit of the open source GNU 'copy-left' licensing agreement, where software is placed directly in to the public domain, uncopyrighted. GNU allows private and business users alike to freely use and copy software as they see fit, so long as the original author attributes are preserved – i.e. not stripped-out and/or replaced with other names. What's more, the source code of so-called 'copy-left' protected software may be freely adapted by companies and sold-on, at profit, providing that all developing parties are acknowledged. When copyright is taken out of the equation you see, wonderful things start to happen."*
RQ3:SC7 #6 **EX6**	*"We have to adopt a practical attitude towards the impact that technological change is having on the protection and distribution of data. The problem is that once something has been digitised, there is very little that can be done to prevent its widespread copying, which amounts to theft, no matter which way anybody looks at it."*
RQ3:SC7 #7 **EX7**	*"Every countermeasure that has been implemented so far to protect software, music or other forms of paid content has failed. However, by allowing unrestricted and unlimited access to all of their content for a flat monthly fee, services like Spotify and Netflix have convinced customers to part with some money on a regular basis in return for their content, which can only be streamed for immediate viewing, and only temporarily stored, but not duplicated. It's a good idea, but there are still those out there who are determined to compromise such services. It's a never-ending battle unfortunately."*

Copyright and intellectual property – SC7

Source	Sample Narrative
RQ3:SC7 #8 **ST9**	*"Three years ago the founders collectively decided to move away from software vendors who were beginning to progressively attach aggressive and costly subscription models to the ongoing use of their software. We saw this as a license to print money for software that was, for the most part, poorly written, insecure and flaky. To demonstrate our outright rejection of these new models, and in a fit of protest, we migrated everything over to open source operating systems and applications based on the CentOS distribution of Linux. It was a steep and frustrating learning curve at first, but in retrospect, is the best thing we ever did. We no longer need to worry about how many users are using how many licenses, and whether we'll get sued years from now for being 'unlicensed', as seems to have been the case for many of our colleagues. To be honest, we were just fed-up to the back teeth of being ripped-off year-after-year, and can now claim to run an operation entirely based on freely-available, open source, cutting edge and commercially viable software."*

RQ3:SC7	Codes
#1 (12)	portable content; transferability; transformative; publishing; unauthorised copying; intellectual property; content piracy; automation; enabling; known contravention; petty misdemeanour; try-before-buy rationalisation
#2 (8)	publishing industry; digitisation; on-line availability; distribution model; business model; adapt; technological change; survival measures
#3 (10)	on-line search; intentionally vague; anti-competitive; inhibits creativity; inhibits innovation; disadvantage; corporate domination; enabled by technology; patent infringement; patent acquisition
#4 (6)	powerless; futility of on-line protection; digital content; intellectual property; eroded profit; threat to survival
#5 (9)	publishing model; open source approach; free distribution; public domain; copy 'left'; copyright-free; acknowledges authorship; intellectual property rights; freely adaptable
#6 (6)	practical approach; content protection; data security; digitisation; content piracy; widespread distribution
#7 (7)	futile countermeasures; protect content; open access model; flat access fee; paid-for content; streaming services; future model
#8 (12)	vendor distancing; greed; low quality; license costs; open source approach; overheads; steep learning curve; migration; license-free; vendor lock-in; commercially viable; open source
Total 70	

Trust and respect – SC8

Source	Sample Narrative
RQ3:SC8 #1 **EX1**	*"Two-way trust is essential when immersed in the highly pressurised, often politically charged environments associated with software and product development. It's a life driven by deadlines and threats – one after the other - and while a project is active, there's just no let-up. The project manager has to trust that the developers will accomplish their tasks, delivering accurately and on-time; likewise, the project owners, clients and various stakeholders have to trust that the project manager is doing a proper job in managing the development team. Trust has to endure for each working relationship, seemingly in every direction, and not necessarily between people: something very often overlooked is the fact that you have to trust your software and hardware platforms to deliver consistently, too."*
RQ3:SC8 #2 **EX2**	*"Modern web-sites and social media platforms do a very good job of building-up so-called 'trust' profiles for their users: the more one buys or sells, or submits reviews – of on-line products, holidays and hotels, for example - the more one becomes recognised as a 'trusted' contributor. I haven't thought about the ethical implications of this yet, but I am sure there are some dubious elements that will one day come to light, given the potential for marketeers to abuse the data being collected, most of which continues unbeknownst to the users."*
RQ3:SC8 #3 **ST13**	*"Trust doesn't just exist between people; it has to exist between people and machines, too."*
RQ3:SC8 #4 **EX3**	*"Did you realise that all of your on-line transactions contribute to other databases, compiled by third parties often without your knowledge, and certainly without your authority? The usual culprits are financial institutions and sales marketing firms, who compile cumulative profiles based on scores they assign according to their perception of your honesty, integrity and 'likelihood to default'. Current data is combined with past records, say from social media, the electoral register and your credit file, to offer prospective suppliers or lenders an instant snapshot of your financial and/or personal integrity. Rightly or wrongly, important life decisions will then be based on this single assessment. Insurance companies are already taking an interest in aggregated data like this, with respect to life and other types of cover…so be very, very careful about what you disclose."*
RQ3:SC8 #5 **ST9**	*"On-line marketing and sales companies need to refresh themselves on the ethical and moral dimensions associated with the disclosure of personal data and its resale for profit. Many argue that they operate well within the confines of the data protection act, and simply collate their data from multiple, publically available databases. Therefore, they reason, there is nothing wrong with what they do. Really, somebody needs to point out to them just how misinformed they are."*
RQ3:SC8 #6 **ST15**	*"Who to trust and who not to trust, whether it's on a financial or personal level, will soon be the kind of information that can be acquired – for a price, of course – for every connected individual on the planet. Imagine being able to run such checks for a potential love interest on your smartphone, immediately after the first date."*
RQ3:SC8 #7 **ST12**	*"For many firms operating in the digital technology, software and internet sectors, corporate social responsibility for them means nothing more than adding a cookie disclaimer to their web-site and parading a whole host of meaningless industry accreditations that carry little or no meaning to people outside their industry. You usually find later on that these are the companies who have something to hide."*
RQ3:SC8 #8 **ST12**	*"I take my hat off to anybody who has the balls to set up on their own. Despite having the absolute conviction that their plans will succeed no matter what, failure is a real possibility for them. I wish there was something I could do to help them avoid the common mistakes and pitfalls that we all encounter in the early days, but unfortunately, people will be people, and they probably have to endure such traumas as an early baptism of fire if they are to succeed in future."*

Trust and respect – SC8

Source	Sample Narrative
RQ3:SC8 #9 **ST13**	*"Respect others by showing that you are interested in their story too; even if they are competitors, they too will have values and opinions not too dissimilar from your own. Why make an enemy of them when you're both in the same game and could share ideas? Agree not to fight over customers, and compete on friendly terms; heck, even refer customers over to them as a 'one-off' if your order book gets too full and your feel like being charitable. It doesn't hurt once in a while, and the positive repercussions that ensue can rattle around for years after."*
RQ3:SC8 #10 **ST10**	*"I've encountered more than my fair share of ruthless and unscrupulous characters in business, and now make a point of actively avoiding the more aggressive types who will typically stop at nothing to steal or acquire a bit of your pie. There are some rules that just shouldn't be broken in business: poaching the customers or staff of a competitor is up there; with a close second being not to bad-mouth the competition, no matter what…such action just demonstrates an abject lack of respect, and is downright unprofessional."*

RQ3:SC8	Codes
#1 (16)	mutual trust; high pressure; environment; tech industry; deadline-driven; relentless pressure; implicit trust; competence; trust in staff; ability to deliver; confidence; customer-supplier trust; management; enduring trust; trust in technology; confidence to deliver
#2 (9)	trust profiles; social media; on-line activity; transaction volume; on-line reviews; feedback; ethical implications; abuse of data; privileged information
#3 (4)	mutual trust; trust in technology; trust in automation; trust in people
#4 (16)	data collation; transaction log; public domain; marketing data; financial data; activity profiles; cumulative scoring; trust; integrity; ability to pay; aggregated data; social media; disclosure; composite picture; life decisions; consequential action
#5 (8)	ethical awareness; moral dimensions; disclosure; personal data; profit generating; impunity; public domain; acting within the law
#6 (6)	trust; trust profiles; financial status; personal background; profit making; implications
#7 (5)	corporate social responsibility (CSR); industry accreditation; misguided claims; superficiality; lack of respect
#8 (10)	respect; independence; venture creation; optimistic flair; possibility of failure; rookie mistakes; character forming; baptism of fire; necessity of error; contingent on later success
#9 (12)	respect for others; similar stories; narrative; similar values; common objectives; sharing experiences; friendly competition; mutual referral; exchange intelligence; charitable actions; positive repercussions; lasting respect
#10 (5)	unsavoury characters; traits to avoid; predatory forces; unspoken rules; poaching talent
Total 91	

Trust and respect – SC8

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
trust in automation; trust in people; trust in staff; trust in technology (x2); trust profiles (x2); trust (x2); enduring trust; customer-supplier trust; respect; mutual trust (x2); mutual referral; positive repercussions; friendly competition; poaching talent; unspoken rules; unsavoury characters; similar values; implicit trust; lack of respect; respect for others; lasting respect; traits to avoid; exchange intelligence	*Trust & respect (27)*
on-line activity; activity profiles; on-line reviews; data collation; composite picture; aggregated data; abuse of data; personal background; privileged information; marketing data; personal data; transaction log; transaction volume; feedback; cumulative scoring; disclosure (x2); misguided claims; implications; consequential action; superficiality; corporate social responsibility (CSR); industry accreditation; contingent on later success	*Image & reputation (24)*
high pressure; relentless pressure; deadline-driven; management; environment; predatory forces; common objectives	*Work pressures (7)*
possibility of failure; rookie mistakes; necessity of error; baptism of fire; character forming; life decisions; independence	*Early years (7)*
moral dimensions; ethical awareness; ethical implications; impunity; acting within the law; charitable actions; integrity	*Ethics & morals (7)*
social media (x2); sharing experiences; public domain (x2)	*Exposure (5)*
confidence to deliver; confidence; ability to deliver; competence; optimistic flair	*Competence (5)*
financial data; financial status; ability to pay	*Financial status (3)*
profit generating; profit making; venture creation	*Capitalism (3)*
similar stories; narrative	*Narrative (2)*
tech industry	*Own Referent (1)*
	Total 91

Reputation – SC9

Source	Sample Narrative
RQ3:SC9 #1 **EX4**	*"My reputation has been on the line more times than I care to remember. Fortunately, I've managed to rescue it by relying on the meticulous notes that I always keep when involved in projects. This is one area where you simply have to rely on yourself: to rely solely on the technology or other people to do what they are supposed to do can be very short-sighted – you must keep your eye on the ball at all times. How many times has a hard-drive failed, and the backups that should have been scheduled to protect your data been forgotten about, or not been completed because the designated person was away on holiday and didn't rotate the off-site backup media? How many times has the technology just not done what it was supposed to do, or crashed all systems in mid-flow?"*
RQ3:SC9 #2 **EX2**	*"To 'look out for number one' is an unfortunate mantra of modern times: the sheer diversity of personalities, ambitions and worldviews are bound to clash from time to time, and this is no more apparent than in larger organisations. For these reasons I will only ever be involved with small ventures, where there's a distinct absence of corporate politics, management bullshit and ruthless career building. I worked at Vodafone for a few years and experienced enough of that crap to last me a lifetime. My career and/or reputation is no longer at the mercy of line managers who have the power to stall a career indefinitely by writing just one bad progress report. Not for me."*
RQ3:SC9 #3 **ST12**	*"I found that when new customers were referred to us by word of mouth they would always insist on asking for me, or one of the other co-founders, directly by name. Nothing unusual in that, but it dawned on me one day that our success and reputation might not be recognised by the achievements of the wider company, but by the individuals within the company who were responsible for driving its success. I got a chance to put this to the test when I moved to take up a CTO post at a new competing start-up: even though I was now clearly with a competitor, customers still insisted on dealing with me directly, and conducting their business through me, as opposed to the company. It was my reputation that they were following; not the company's."*
RQ3:SC9 #4 **EX7**	*"Firms, as well as individuals, have reputations to maintain, and while it's probably much easier for an individual to keep track of how they are generally perceived in the outside world, businesses – especially those with a significant on-line presence – need to take extra steps now to ensure that their customers have a flawless end-to-end, on line experience. The phenomenon of the 'on-line review' ensures that an increasing number of on line transactions are open to public scrutiny from a variety of angles; whether it's a Facebook group dedicated to rating the company, a twitter follower directly lodging a customer service complaint for the whole world to see, or a set of onerous trip advisor reviews; on-line providers simply must ensure that all reviews are dealt with promptly, and to the ultimate satisfaction of the complainant. Otherwise, the power of on-line recommendation will see to it that their business dives, and dive quickly it will if ignored: I have seen this happen so many times to others in our industry, and it scares me to death that we could be next."*
RQ3:SC9 #5 **EX1**	*"When you're an influential player in a niche and emerging area of technology, you don't necessarily realise how much your words, decisions and actions are being monitored by others. Because everything is now so interconnected, transparent, and immediate, it's all too easy to gain a reputation – for better or for worse – and be judged by your comments in on-line forums, discussion boards, Twitter and the like. One throw away comment or word out of place, and they can haunt you for years after."*

Reputation – SC9

Source	Sample Narrative
RQ3:SC9 #6 **ST10**	*"The problem with so-called 'trust sites' is that they review every possible supplier-customer variation: Employees can review employers; students can review their teachers; a whole community can review a tradesperson, doctor or lawyer; and travellers can leave a review for every location they visit. The problem I have with these sites is that the reviews could be there forever - a matter of the public record, for all to see - and I think it's grossly unfair to penalise a hotel, school or teacher if they happen to be having an uncharacteristically bad day. OK, the aggregate score system should account for these outliers, but what about a student who decides to fabricate multiple stories about a teacher who gave them a bad grade? That's career changing stuff, and should not be allowed. The purveyors of review sites should adhere to a strict code of ethical conduct, and at the very minimum need to pre-screen every submission prior to publication for truth and accuracy."*
RQ3:SC9 #7 **ST15**	*"Being accountable for what you do and what you intend to do is a matter of choice. Some choose not to think about the consequences associated with their actions and pay the price accordingly, but I find that technology in all manner of daily situations now helps people to think in a more responsible manner: for example, speed cameras cause you to reconsider your driving speed; accounting software prompts you to file your returns on time; shared calendars ensure that you no longer miss meetings; GPS makes sure you get there on time. The list is endless."*
RQ3:SC9 #8 **EX2**	*"Comparison sites like TripAdvisor are becoming increasingly sophisticated. They have recently started to include user reviews and opinions in with their search results, and in so doing, have immediately re-engineered the selection process away from traditional one-way consumer-targeted vendor marketing, to a negotiation between you – the potential buyer – and a whole host of customers who have dealt with the supplier in the past – many of whom have left on-line reviews. What could be more impartial? Of course, the success of such a system relies on authentic, original reviews that have not been auto-generated by agents intent on swaying opinion one way or the other."*

RQ3:SC9	Codes
#1 (12)	credibility; standing; activity logging; self-reliance; diligence; systems failure; data loss; oversight; attention to detail; standby resource; reliability; expected performance
#2 (13)	self-reliance; protect reputation; personality clash; diverse personalities; corporate politics; small ventures; self-serving individuals; corporate experience; freedom; independence; power; politics; exerting control
#3 (6)	word of mouth; marketing; reputation; individual reputation; group reputation; customer loyalty
#4 (16)	company reputation; individual reputation; outside perception; on-line presence; social media; on-line reputation; immaculate service; customer satisfaction; public scrutiny; on-line reviews; complaints; comparative ratings; onerous reviews; prompt response; power; survival measures
#5 (10)	recognised talent; privileged position; reputation; on public display; immediate broadcast; social media; forums; impact on reputation; on-line comments; enduring persistence
#6 (12)	trust sites; unregulated; longevity; on-line permanence; momentary lapse; warranty; guarantor; truth; fake reviews; ethical standards; code of conduct; publication accuracy
#7 (8)	accountability; personal choice; actions have consequences; guiding technologies; prompts accuracy; ensures compliance; enhances efficiency; builds reputation
#8 (14)	comparison sites; transformational; enhanced results; redefining tradition; negotiation; marketing approach; multiple reviews; aggregate impression; score system; point of failure; contingent; dubious intent; fake reviews; impact on bias
Total 91	

Reputation – SC9

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
builds reputation; company reputation; aggregate impression; forums; protect reputation; impact on reputation; reputation (x2); multiple reviews; group reputation; truth; standing; individual reputation (x2); warranty; on-line presence; on-line reputation; on-line reviews; onerous reviews; on-line permanence; on public display; unregulated; outside perception; immediate broadcast; public scrutiny; guarantor; score system; fake reviews (x2); trust sites; credibility; social media (x2); comparative ratings; comparison sites	*Reputation (35)*
power (x2); politics; privileged position; corporate politics; exerting control; diverse personalities; self-serving individuals; personality clash; corporate experience	*Dominion (10)*
dubious intent; attention to detail; accountability; diligence; enhanced results; enhances efficiency; ensures compliance; ethical standards	*Diligence (8)*
immaculate service; prompt response; expected performance; complaints; recognised talent; code of conduct; customer satisfaction; customer loyalty	*Service (8)*
freedom; personal choice; independence; self-reliance (x2); negotiation	*Freedom (6)*
point of failure; systems failure; reliability; standby resource; data loss	*Reliability (5)*
marketing approach; word of mouth; marketing; redefining tradition	*Marketing (4)*
momentary lapse; on-line comments; oversight; actions have consequences	*Misjudgement (4)*
enduring persistence; activity logging; longevity	*Persistence (3)*
guiding technology; transformational; impact on bias	*Digitisation (3)*
prompts accuracy; publication accuracy	*Proofing (2)*
small ventures; survival measures	*Survival measures(2)*
contingent	*Own referent (1)*
	Total 91

Privacy and identity – SC10

Source	Sample Narrative
RQ3:SC10 #1 **ST14**	*"When designing information-based software, which broadly includes anything that queries a database, then one must very carefully think about the implications – moral, ethical and legal – of any of that data being compromised. As no system can every claim 100% security, it is essential that you treat the data your system is privileged to handle with the utmost respect."*
RQ3:SC10 #2 **ST13**	*"Data breaches are so common place in the news, that one has to wonder whether any of the information we provide is ever going to remain private. Responsibility could be said to ultimately lie with the systems developers and network managers to ensure that unauthorised parties have no means of access, but as these 'ultra-secure' systems continue to be compromised, we need to consider on an individual level whether we choose to leave personal information with these systems. Time and time again it has been shown that these systems simply cannot be trusted to protect our data."*
RQ3:SC10 #3 **ST12**	*"Your entire web browsing history and other personal information is available for immediate download, somewhere on the internet. Unless you personally make a point of browsing the web via an anonymiser service and never provide any personal data on-line, I can promise you that you will have left a fully-traceable digital trail that tells me what you have been up to. As time progresses, the archive will of course expand, and it's only a matter of time before third parties begin to exploit this information to make decisions about you. The very nature of the internet means that this information will always be available, so the onus is on us users to ensure whether we disclose or not."*
RQ3:SC10 #4 **ST12**	*"The integrity and security of the data we process has not been breached yet. However, I live in fear of one of our many servers being compromised one day. Our operation runs a 100% open-source based desktop and development environment, which essentially means that we run everything on one or more varieties of the open source Linux operating system, and so have nothing whatsoever to do with Windows. Even the latest versions of Windows continue to be insecure and flaky, and I can't believe that the majority of global ATMs persist in relying on an unsupported and insecure version of Windows XP. Furthermore, whole governments, education boards and even hospitals continue to entrust their critical systems to similarly outdated systems that the original vendor has now conveniently washed their hands of. OK, Linux isn't 100% secure either, but I can't remember the last time I heard of a Linux-based server being compromised, either by an external hacker or a malicious virus. Our company is one of many fed-up with the licensing stranglehold that Microsoft software has over us all, and we're doing everything we can to change it; not just for our own benefit, but for the integrity and protection of sensitive data, and in turn to protect our customer's vital interests."*
RQ3:SC10 #5 **EX3**	*"We're about to witness a revolution in on-line personal data warehousing. Not many realise what's going on behind the scenes, but the more we engage with Facebook, Amazon, Twitter and other dominant on-line platforms, the more our data is being professionally mined and combined with other datasets obtained from the electoral roll, utility companies, the driving services agency etc. All of them make good money out of selling-on your private data to information aggregators, either directly or indirectly, and this means that adverts can be accurately targeted – some might say 'psychologically optimised' to specifically resonate with your interests and hobbies, without you even realising it."*
RQ3:SC10 #6 **ST11**	*"With the advent of increasingly distributed storage concepts like the cloud, and in a world where everyone is connected, the chance of your 'private' data remaining private diminishes by the day."*
RQ3:SC10 #7 **EX4**	*"I refuse to participate in the social media frenzy. LinkedIn, Facebook, Twitter, and all the other 'social media' platforms are now, so I am told, essential tools for keeping in touch, planning events, getting jobs, and well, staying informed. I don't want people to know every last detail of my personal, social and working life, and/or tracking if/when and where I may go on holiday, and who with. I resent any intrusion in to my privacy, and so I intend to keep my internet footprint undetectable for as long as I possibly can."*

Privacy and identity – SC10

Source	Sample Narrative
RQ3:SC10 #8 **ST14**	*"Colleagues look at me in astonishment when I tell them that I do not, and never will have, a LinkedIn, Facebook, Twitter or any other kind of social media profile. In the hope of being able to get increasing numbers to turn their back on what I consider now to be a menace, I explain how logs of their on-line activities are available to the highest bidder, and how, years from now, things that they do which they may later wish to forget about, will still be available as part of the permanent, public record."*

RQ3:SC10	Codes
#1 (8)	design consequences; information systems; moral; ethical; legal; security; integrity; respect for data
#2 (8)	privacy; data breach; responsibility; lack of security; frequent breach; personal choice; data storage; repeated failure
#3 (10)	web history; personal data; availability; digital footprint; record of activity; builds over time; exploitation; personal impact; permanence; disclosure
#4 (13)	integrity; security; breach; fear of compromise; open source infrastructure; platform security; vendor responsibility; complacency; open source security; vendor rejection; mistrust; lost confidence; customer protection
#5 (10)	data warehousing; on-line engagement; personal data; mining; merged data; data for profit; information aggregators; public record; consumer targeting; directed marketing
#6 (5)	cloud storage; distributed data; increased connectivity; global reach; risk of compromise
#7 (8)	social media participation; engagement; networking tools; privacy; identity safeguarding; personal information; resent intrusion; internet footprint
#8 (6)	social media participation; encourage rejection; perceived menace; sale of user data; permanence of record; public record
Total 68	

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
fear of compromise; identity safeguarding; disclosure; frequent breach; risk of compromise; customer protection; perceived menace; cloud storage; personal data (x2); personal information; public record (x2); resent intrusion; security (x2); platform security; lack of security; sale of user data; availability; privacy (x2); permanence of record; permanence; record of activity; legal; data breach; data for profit; data storage; data warehousing; breach	*Privacy & Identity (31)*
information aggregators; mining; internet footprint; on-line engagement; merged data; information systems; builds over time; web history	*On-line presence (8)*
consumer targeting; directed marketing; engagement; networking tools; social media participation (x2)	*Engagement (6)*
lost confidence; mistrust; exploitation; respect for data; complacency	*Lack of trust (5)*
ethical; moral; integrity (x2)	*Integrity (4)*
increased connectivity; global reach; distributed data; digital footprint	*Pervasive reach (4)*
personal choice; personal impact; responsibility; design consequences	*Responsibility (4)*
vendor rejection; vendor responsibility; encourage rejection	*Vendor choice (3)*
open source infrastructure; open source security	*Security (2)*
repeated failure	*Own referent (1)*
	Total 68

Ethics & morals – SC11

Source	Sample Narrative
RQ3:SC11 #1 **ST13**	*"Being 'investors in people' and whichever other recent fads you can think of do not - as most companies mistakenly believe - confer any kind of ethical or moral superiority. In other words, it doesn't make your company any better than the next. You shouldn't have to have plaques on the wall boasting how well staff are treated; nor should you need to show that your systems and processes are up to scratch with an ISO9001 certificate. All these things should be given, and come with the responsibility of a comprehensive ethical approach to start with. Just do the right thing to begin with, and everything else will fall in to place."*
RQ3:SC11 #2 **ST13**	*"You have to appreciate that businesses are organisations that are made by people, and to say that a business has no integrity is the same as saying that the people in charge have no integrity either. The two cannot be separated – everything always comes back to those in the driving seat."*
RQ3:SC11 #3 **EX5**	*"As a founding stakeholder responsible for overseeing everything that happens in my firm, I don't consciously try to be more ethical, as I'm happy that everything we do in the line of business is well within the boundaries of what others would see as being acceptable. We ensure that the products we manufacture overseas are assembled in clean, healthy environments; that the foreign staff are paid a good wage with the appropriate benefits, and we send a rep over twice each year to ensure that standards are maintained."*
RQ3:SC11 #4 **EX6**	*"Knowing when and where to draw the line in situations that could possibly have legal or morally questionable consequences is something that definitely comes with experience, and in the case of smaller firms run by inexperienced management, it's all too easy to take that short cut if things are tight…OK, it may lead to a bit of extra business and money in the short-term, but chances are it will always come back to bite later, wiping out the original gain many times over."*
RQ3:SC11 #5 **EX7**	*"Because large businesses have that much more going on in terms of departments, overseas branch offices and what-not, I guess it's easier for them to lose their way once in a while, despite the best of intentions, simply because one half of the firm has no idea what the other half is up to. I don't see this happening In smaller firms, as everybody usually knows what everybody else is up to, and as they have a full picture of what is happening at any one point in time, it becomes harder to get away with the kinds of shenanigans encountered in bigger business."*
RQ3:SC11 #6 **ST12**	*"Even if a company – large or small – was involved in some kind of ethically dubious activity, it's my experience that either a) they won't realise that what they're doing is in any way wrong; or b) they wouldn't admit it to anybody under any circumstances – even during an interview like this one."*
RQ3:SC11 #7 **ST8**	*"I am appalled at the way large software vendors are allowed to get away with shamelessly inciting children in to getting their parents to buy virtual gaming 'points' in order to participate more actively in their virtual platforms. These companies are going to have so much to answer for when these kids grow up socially deficient and unable to function in society."*
RQ3:SC11 #8 **EX1**	*"There is no doubt that the office and productivity solutions offered by a small number of software vendors dominate the market. This is no accident, as they target new users from an early age by giving their software away to schools and colleges, free of charge, knowing full-well that by the time those kids graduate and enter the workplace, the only software they will feel comfortable using will be guess what?"*

Ethics & morals – SC11

Source	Sample Narrative
RQ3:SC11 #9 **EX2**	*"Each industry or sector tends to have associated with it a set of unspoken standards and rules that tend to be generally observed. For example, among the tech ventures in Silicon Valley, we undertake not to steal staff from one another, unless by prior mutual agreement. We also agree to work collaboratively on complex problems that either of us would not be able to solve alone. These standards represent what I see as the moral fibre of the Valley, and goes some way to explain why the firms, products and people connected with the area tend to consistently thrive and do so well. We basically look out for one another, albeit against a friendly, yet fiercely competitive backdrop. Sure, there are exceptions, with the occasional bad apple here and there, but they are dealt with as and when they dare to upset the apple cart."*
RQ3:SC11 #10 **ST8**	*"Responsible decision making is one of the first aspects of proper business conduct that I inherited from my father, who was a factory floor manager at a large machine tools manufacturing company in the Midlands during the post-war decades. For him, hierarchy and structure were the glue that held everything together, and the rigorous execution of one's duties in a responsible and ethically sound manner helped to maintain the overall integrity of the organisation. In modern-day tech enterprise though, hierarchy and structure are all but absent, for the most part, and so we must rely solely on individual responsibility as the standard-bearer of good and proper conduct."*

RQ3:SC11	Codes
#1 (11)	ethical superiority; moral superiority; national accreditation; accreditation schemes; quality; validity; workplace environment; staff satisfaction; metrics; ethical approach to business; doing the right thing
#2 (4)	anthropomorphism; human constituents; human qualities; inseparable
#3 (10)	founding member; responsible; ethical approach; universal acceptance; boundaries; corporate and social responsibility; equality; standards; maintenance; quality
#4 (8)	drawing the line; experience; moral limits; ethical limits; survival measures; short-cuts; short term gains; consequences
#5 (7)	organization size; ethical awareness; internal communications; liability of size; small firms; ease of communication; firm-wide awareness
#6 (5)	ethically dubious; unaware; ignorant; conceal truth; denial
#7 (9)	software vendors; child safeguarding; unethical; marketing activities; gaming platforms; parental access; corporate responsibility; social consequences; social deficiency
#8 (11)	market dominance; youth marketing; child safeguarding abuse of position; strategic targeting; habit; ethical position; morally dubious; free of charge; builds dependence; resistance to change
#9 (13)	tacit rules; tacit standards; compliance; talent poaching; mutual agreement; mutual care; collaborative research; concentrates resources; moral fibre; mutual respect; competitors; community spirit; professional practice
#10 (10)	responsible approach; decision making; good conduct; parental influence; responsible; ethically sound; integrity; morals; individual responsibility; proper conduct
Total 88	

Ethical & morals – SC11

Like Groupings & Synonymous/Antonymous (dimensional) Properties	Conceptual Indicator
ethical approach to business; ethical approach; ethical awareness; integrity; ethical limits; ethical position; ethical superiority; ethically sound; unethical; compliance; proper conduct; doing the right thing; corporate responsibility; abuse of position; decision making; ethically dubious; mutual agreement; corporate and social responsibility; consequences; individual responsibility; mutual respect; community spirit; responsible approach; responsible (x2); mutual care	*Ethics (26)*
moral fibre; moral limits; moral superiority; morally dubious; morals; conceal truth; talent poaching; child safeguarding (x2); parental access; parental influence; social consequences; social deficiency	*Morals (13)*
professional practice; accreditation schemes; national accreditation; metrics; quality (x2); standards; good conduct; staff satisfaction; equality	*Quality (10)*
tacit rules; tacit standards; boundaries; drawing the line; inseparable human constituents; human qualities; anthropomorphism; habit; founding member	*Limitations (5)* *Human element (5)*
firm-wide awareness; internal communications; ease of communication; workplace environment marketing activities; youth marketing; strategic targeting; competitors organization size; liability of size; small firms; software vendor unaware; ignorant; denial; maintenance survival measures; short term gains; short-cuts; market dominance	*Work discourse (4)* *Marketing (4)* *Business size (4)* *Neglect (4)* *Survival measures (4)*
universal acceptance; resistance to change; validity collaborative research; concentrates resources; experience	*Compliance (3)* *Group effort (3)*
builds dependence; gaming platforms	*Addiction (2)*
free of charge	*Own Referents (1)*
	Total 88

Statistical Summary for RQs

Statistical summaries have been compiled with respect to each research question (RQ) alone, and

The summaries for each RQ provide the following detail:

- The Sub-category (SC*x*) reference
- The rank of each sub-category based on how many properties drive it
- The name of the sub-category, with the number of properties driving its expression shown in brackets   i.e. *Adapting to change (66)*
- The number of distinct conceptual indicators driving the sub-category, n (each consisting of multiple properties)
- The percentage of n as $\sum n$

The relationship between each is shown schematically in Fig 4.2.

S1

RQ1 – Statistical Summary

Ref	Rank	Sub-category	*n*	*%*
RQ1:SC1	2	Adapting to change	71	13.8
RQ1:SC2	5	Control	58	11.3
RQ1:SC3	9	Empowerment	36	7.0
RQ1:SC4	5	Making connections	58	11.3
RQ1:SC5	3	Locus of operation	66	12.9
RQ1:SC6	4	Competence	64	12.5
RQ1:SC7	8	Prior exposure	38	7.4
RQ1:SC8	1	Experimenting	79	15.4
RQ1:SC9	7	Cutting corners	43	8.4
			513	**100%**

Rank	Ref	Sub-category	*n*	*%*
1	RQ1:SC8	Experimenting	79	15.4
2	RQ1:SC1	Adapting to change	71	13.8
3	RQ1:SC5	Locus of operation	66	12.9
4	RQ1:SC6	Competence	64	12.5
5	RQ1:SC4	Making connections	58	11.3
	RQ1:SC2	Control	58	11.3
7	RQ1:SC9	Cutting corners	43	8.4
8	RQ1:SC7	Prior exposure	38	7.4
9	RQ1:SC3	Empowerment	36	7.0
			513	**100%**

S2

RQ2 – Statistical Summary

Ref	Rank	Sub-category	*n*	*%*
RQ2:SC1	12	Learning	41	4.4
RQ2:SC2	11	Confidence	45	4.8
RQ2:SC3	10	Thoroughness	48	5.1
RQ2:SC4	1	Access to information	137	14.6
RQ2:SC5	4	Creative thinking	111	11.8
RQ2:SC6	3	Co-dependent inquiry	126	13.4
RQ2:SC7	6	Reflection & reflexivity	58	6.2
RQ2:SC8	7	Diversity	54	5.8
RQ2:SC9	8	Habits of response	51	5.4
RQ2:SC10	8	Belief & doubt	51	5.4
RQ2:SC11	1	Inviting a future state	137	14.6
RQ2:SC12	5	Context	80	8.5
			939	**100%**

Rank	Ref	Sub-category	*n*	*%*
1	RQ2:SC4	Access to information	137	14.6
1	RQ2:SC11	Inviting a future state	137	14.6
3	RQ2:SC6	Co-dependent inquiry	126	13.4
4	RQ2:SC5	Creative thinking	111	11.8
5	RQ2:SC12	Context	80	8.5
6	RQ2:SC7	Reflection & reflexivity	58	6.2
7	RQ2:SC8	Diversity	54	5.8
8	RQ2:SC9	Habits of response	51	5.4
8	RQ2:SC10	Belief & doubt	51	5.4
10	RQ2:SC3	Thoroughness	48	5.1
11	RQ2:SC2	Confidence	45	4.8
12	RQ2:SC1	Learning	41	4.4
			939	**100%**

S3

RQ3 – Statistical Summary

Ref	Rank	Sub-category	*n*	*%*
RQ3:SC1	7	Principled action	61	8
RQ3:SC2	4	Ecology & sustainability	76	10
RQ3:SC3	11	Life-work balance	44	5.8
RQ3:SC4	10	Universal good	52	6.9
RQ3:SC5	8	Commitment	58	7.7
RQ3:SC6	9	Compliance	56	7.4
RQ3:SC7	5	Copyright & intellectual property	70	9.3
RQ3:SC8	1	Trust & respect	91	12
RQ3:SC9	1	Reputation	91	12
RQ3:SC10	6	Privacy & identity	68	9
RQ3:SC11	3	Ethics & morals	88	11.6
			755	**100%**

Rank	Ref	Sub-category	*n*	*%*
1	RQ3:SC8	Trust & respect	91	12
1	RQ3:SC9	Reputation	91	12
3	RQ3:SC11	Ethics & morals	88	11.6
4	RQ3:SC2	Ecology & sustainability	76	10
5	RQ3:SC7	Copyright & intellectual property	70	9.3
6	RQ3:SC10	Privacy & identity	68	9
7	RQ3:SC1	Principled action	61	8
8	RQ3:SC5	Commitment	58	7.7
9	RQ3:SC6	Compliance	56	7.4
10	RQ3:SC4	Universal good	52	6.9
11	RQ3:SC3	Life-work balance	44	5.8
			755	**100%**

S4

RQ1, RQ2, RQ3 – Combined Statistical Summary

Rank	Ref	Sub-category	N	n	%
1	RQ2:SC4	Access to information	18	137	6.2
1	RQ2:SC11	Inviting a future state	15	137	6.2
3	RQ2:SC6	Co-dependent inquiry	17	126	5.7
4	RQ2:SC5	Creative thinking	12	111	5.0
5	RQ3:SC8	Trust & respect	10	91	4.1
5	RQ3:SC9	Reputation	8	91	4.1
7	RQ3:SC11	Ethics & morals	10	88	4.0
8	RQ2:SC12	Context	8	80	3.6
9	RQ1:SC8	Experimenting	9	79	3.6
10	RQ3:SC2	Ecology & sustainability	9	76	3.4
11	RQ1:SC1	Adapting to change	17	71	3.2
12	RQ3:SC7	Copyright & intellectual property	8	70	3.2
13	RQ3:SC10	Privacy & identity	8	68	3.1
14	RQ1:SC5	Locus of operation	10	66	3.0
15	RQ1:SC6	Competence	9	64	2.9
16	RQ3:SC1	Principled action	9	61	2.8
17	RQ1:SC2	Control	11	58	2.6
17	RQ1:SC4	Networks	7	58	2.6
17	RQ2:SC7	Reflection & reflexivity	8	58	2.6
17	RQ3:SC5	Commitment	8	58	2.6
21	RQ3:SC6	Compliance	7	56	2.5
22	RQ2:SC8	Diversity	7	54	2.4
23	RQ3:SC4	Universal good	8	52	2.4
24	RQ2:SC9	Habits	8	51	2.3
24	RQ2:SC10	Belief & doubt	7	51	2.3
26	RQ2:SC3	Thoroughness	6	48	2.2
27	RQ2:SC2	Confidence	6	45	2.0
28	RQ3:SC3	Life-work balance	6	44	2.0
29	RQ1:SC9	Cutting corners	5	43	1.9
30	RQ2:SC1	Learning	9	41	1.8
31	RQ1:SC7	Prior exposure	6	38	1.7
32	RQ1:SC3	Empowerment	7	36	1.6
			293	**2207**	**100**

N = number of contributing narrative excerpts
n = number of constituting properties
$\%$ = n as percentage of $\sum n$

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