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Multi-level learning of a quality management routine: a UK housebuilder case study

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ABSTRACT

The UK Government currently pressurises and incentivises volume housebuilders to build more new homes annually, as current demand outstrips supply. However, accelerating the housebuilding production process negatively impacts new home build quality, resulting in defects that require rectification. The implementation of stringent quality management standards is recognised as improving build quality standards, as it removes a degree of uncertainty from the housebuilding process. Changes to organisational procedures in this way rely on individuals across Housebuilder organisations collectively learning new working practices from the top down.

While ample academic research has explored how ideas at the individual level become codified learning at the organisational level, there is little investigating how top-down learning unfolds across Housebuilder organisations over time, or the conditions that contribute to its success or failure. This thesis, therefore, aims to enhance the understanding of top-down multi-level learning in relation to UK housebuilder quality management standards.

It pursues an interpretive qualitative case study approach, using a practice view of organisational routines to inform the means of inquiry. Methods include participant observation, semi-structured interviews and document analysis. Fieldwork undertaken within three regional offices of a major UK housebuilder, studies how individuals in three different teams learnt to use a new quality management routine. An inductive approach to data analysis, using Gioia *et al.*'s methodology (2013), is adopted, which also includes an abductive element to determine the study's main findings.

This thesis is the first to consider multi-level learning from a housebuilder perspective and therefore contributes to both academic and housebuilder understanding of learning in relation to quality management standards. Findings here challenge several assumptions expressed in the organisational learning literature.

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CHAPTER 1. INTRODUCTION

The motivation for this thesis, which started in 2014, came from my desire as an architect to understand whether new home performance had improved following a UK Government investment programme. Funding was available to organisations who wanted to compare new home performance aspirations, at the design stage, against actual performance in use. However, it became clear as the thesis proposal developed that few UK housebuilders had any interest in improving the performance of their newly built homes. It was necessary to take a step back and look at an earlier point in the housebuilding process, and the Housebuilder organisations themselves. By examining the behaviour of individuals involved in the housebuilding process, it became possible to explore what determined new home performance, and a key factor was the quality of the construction process, or build quality.

1.1 Relevance of this research

This thesis focuses on how UK volume housebuilders learn to implement changes to build quality standards organisation-wide. In the UK, there is a continuous demand for new housing that social and private housebuilders are unable to meet (GBDCLG 2017). As private developers build approximately 81% of new homes annually in the UK, with the 15 largest UK volume housebuilders building 62% of these, the UK Government pressurises and financially incentivises volume housebuilders to build at a faster rate. However, accelerating new home construction negatively impacts build quality. Reports on new housing in England found that, as the rate of new home construction increased, the quality of workmanship, levels of customer satisfaction and dwelling environmental performance decreased (APPG 2016; Committee on Climate Change 2019) and that the current approach adopted by housebuilders potentially compromises occupant safety (Steering Group on Competence for Building a Safer Future 2019). These reports called into question the robustness of individual housebuilders' quality control procedures, suggesting inspection standards and practices were unable to cope with the required increase in new home production. Inspecting build quality standards through activities such as quality assurance and quality control is recognised as one way of improving build quality standards (Zero Carbon Hub 2014; APPG 2016).

By demonstrating a systematic production process, a degree of uncertainty is removed from the activities involved, resulting in a more uniform product (Heras-Saizarbitoria and Boiral 2013). Changes to organisational procedures in this way rely on individuals across the Housebuilder organisation collectively learning to change their working practices, enacting more stringent and systemic quality assurance and quality control procedures concerning build quality.

Learning in organisations is often considered a multi-level concept, studied from several levels of analysis, i.e. individual, group, organisational and inter-organisational levels. This was most notably proposed by Crossan *et al.* (1999) in their seminal 4I framework, which has subsequently been added to and amended by other scholars in the organisational learning field. The 4I framework describes how learning moves from the bottom (individual) level to top (organisational or inter-organisational) level through a specific set of learning sub-processes. Similarly, learning moves back down from top to bottom levels through a separate set of learning sub-processes.

For housebuilders, implementing new quality management standards requires top to bottom multi-level learning sub-processes. While ample academic research has been carried out exploring how ideas at the individual level become codified into learning at the organisational level, there are two gaps in the literature: Firstly, how top-down learning unfolds across the levels of analysis over time, alongside the conditions that contribute to its success or failure; Secondly, how top-down learning occurs in a UK volume housebuilder context, as the sector is distinct from other industry sectors.

1.2 Research question and objectives

This thesis aims to enhance understanding of top-down multi-level learning in relation to UK housebuilder quality management standards. Therefore, the thesis sets out three research objectives to determine *how learning occurs at multiple levels when an organisation institutionalises (i.e. implements) new quality management standards*. Table 1 overleaf outlines the study's research question and three objectives.

Table 1: Research questions and study objectives

Research Question:	<i>How does learning occur at multiple levels when an organisation institutionalises new quality management standards?</i>
<i>Applying this question to new home build quality, the study objectives are:</i>	
Objective 1	<i>Identify the conditions under which multi-level learning occurs</i>
Objective 2	<i>Explore how the multi-level learning sub-processes unfold under these conditions</i>
Objective 3	<i>Explain how, when and why these conditions are influential to learning</i>

The justification for each objective and the overall research question are explored in Chapters 2, 3 and 4.

1.3 Research justification and methodology overview

This study adopts an interpretive approach to answer the research question. As the emphasis is on multi-level learning processes over time, as opposed to multi-level learning outcomes, in a specific context, this study pursues a qualitative case study approach. A practice view of organisational routines is used to inform the means of inquiry. Therefore, learning sub-processes are ‘measured’ by observing routine-related processes, where the routine is identified at the start of the study. Methods include participant observation, semi-structured interviews and document analysis. An inductive approach to data analysis, using the Gioia methodology (Gioia *et al.* 2013), is adopted, which later changes to an abductive approach, and key contributions are developed from the study’s findings.

1.4 Scope of the thesis

This study is carried out in three regional offices of one major UK volume housebuilder. Most participants were employees of the Housebuilder organisation; however, the perspectives of individuals from organisations working on behalf of the housebuilder were gathered during the fieldwork period too. While the Housebuilder organisation had many routines and standard procedures in place, this study only focuses on the routine that determines organisation-wide build quality standards.

This thesis was originally designed and conducted as a two-wave longitudinal study. Wave 1 data were collected in 2015-2016, and Wave 2 data in 2017-

2018. However, as the Researcher had insufficient time to complete Wave 2 analysis before the thesis submission deadline, the study is abridged and focuses solely on Wave 1 data. Therefore, the study design has subsequently been amended to reflect this change.

1.5 Contribution

This study contributes to both academic and housebuilder understanding of multi-level learning in relation to quality management standards. Findings here challenge several assumptions expressed in the organisational learning literature. Three conditions are identified as influencing this top-down instigated, multi-level learning process, and how they interrelate adds richness to the learning literature. Consequently, a top-down sequence of learning sub-processes is put forward, describing how learning occurs under these conditions across the Housebuilder organisation, as well as the external organisations associated with the housebuilding process.

For UK housebuilders, this thesis suggests three ways to improve these conditions, thus supporting positive multi-level learning sub-processes when they occur. One idea posited is contradictory to the current housebuilder and construction literature; however, it offers housebuilders an opportunity to improve their understanding of project successes and failures for future projects.

1.6 Thesis structure

Following this introductory chapter, **Chapter 2 (Multi-level Learning)** explores the extant organisational learning literature and surmises that learning is a multi-level enterprise, with learning passing between the individual, group, organisational and inter-organisational levels. Crossan *et al.*'s (1999) 4I framework and subsequent scholarly adaptations that differentiate between bottom-up and top-down learning through feed-forward and feedback learning sub-processes, respectively, are explored and critiqued. The chapter also reviews influential multi-level constructs identified in the extant literature. A gap is identified, as more studies focus on the feed-forward rather than feedback of learning, along with a limited understanding of related influential constructs.

Chapter 3 (Learning and Quality Management in Housing) investigates how poor build quality through rapid construction increases the number of defects or

imperfections in new homes. Housebuilding scholars argue that the organisation-wide implementation of quality management processes reduces the number of new homes' defects. However, this chapter shows that the context in which housebuilders operate influences learning in different ways from organisations in other sectors.

Chapter 4 (Methodology and Research Approach) sets out the methodological basis for this study. The Researcher's position is established, along with a justification for the research strategy. This chapter also outlines the research question and objectives that guide this study. The case study, study routine and participant selection criteria are set down, along with methods chosen and research timeline. Chapter 4 also describes the inductive and then abductive analytic approach adopted to identify the study's three key aggregate dimensions. Lastly, the methodological limitations are defined and explored.

Chapter 5 (Case Study Context) outlines the complex contextual background of the case Housebuilder organisation. The hierarchical makeup and distribution of staff in the Head Office and three regional offices are illustrated. Team disciplines are described. The housebuilding process, from inception, design and construction is also described and illustrated. Finally, the study routine (the housebuilder's *quality management routine*) is explained, along with how it was implemented.

Chapters 6, 7 and 8 (Findings – Communication, Time and Trust) set out the study's key findings, with a chapter dedicated to each of the three aggregate dimensions found. Each chapter identifies several first-order concepts, which are grouped into second-order themes, in line with the Gioia methodology (2013). Each chapter ends with a summary of the second-order themes.

Chapter 9 (Discussion) draws on the second-order themes identified in Chapters 6, 7 and 8 to develop a number of contributions to knowledge. These contributions are positioned within the existing literature, as outlined in Chapters 2 and 3, to address the research question and objectives from Chapter 4.

Chapter 10 (Conclusion) summarises the outcomes of this study. The research question is also shown to be answered by satisfying the study's three objectives. The chapter then identifies the study's contribution to theory, followed by practical implications for UK housebuilders. Lastly, the chapter considers the study's limitations and suggests opportunities for further research.

CHAPTER 2. MULTI-LEVEL LEARNING

2.1 Introduction

This chapter begins by reviewing the extant literature in the field of organisational learning. As part of this, it explores key terminology, as well as relevant seminal organisational learning models. Particular emphasis is placed on the 4I framework proposed by Crossan *et al.* (1999), and then the chapter critiques work undertaken by scholars building on the 4I framework – thereby identifying ensuing adaptations to the learning sub-processes proposed by Crossan *et al.* (1999). Subsequently, influential constructs from across this body of literature are then identified and explored. The chapter finishes by positioning the study and its significance against gaps in the extant literature.

2.2 Approach to literature search

A search of the organisational learning literature was conducted in two stages: the first stage focused on a general search of the wider organisational learning literature, and used a ‘snowballing technique’ (Bernard 2006) to identify further relevant research.

The second stage of the search focused on multi-level learning literature, and specifically the studies that made a direct contribution to Crossan *et al.*'s (1999) 4I framework. This required a more systematic search approach. The search terms "4I framework", "4I learning framework", "Crossan, Lane and White", and "Crossan *et al.*" were typed into the database Scopus, specifically in articles' abstracts written in English; this returned 33 papers. The abstracts were read, and if they described changes to the four learning sub-processes, the paper was included here. The references section of these selected and read papers was also checked to identify further relevant papers; also employing a snowballing approach. Papers using the 4I framework to develop theories in other fields were ignored, as they did not relate directly to multi-level learning. This resulted in 15 papers, overall. These papers are discussed in more detail in Section 2.7.

In addition to the extra or altered learning sub-processes outlined in these 15 papers, the authors describe situations where something happened that helped or hindered multi-level learning sub-processes. Thus, these situations suggest wider constructs were in operation that led to the situations described and changed the way

learning sub-processes worked. In this chapter these influential situations described by scholars are grouped into five broad constructs for ease of reference: time, power, communication (from both social and geographic perspectives), trust and emotion.

2.3 Why learn?

Learning is essential to organisational life. Learning determines how an organisation adapts to changing environmental conditions (Berends and Lammers 2010; Argote and Miron-Spektor 2011), thus influencing an organisation's success and performance (Argote and Miron-Spektor 2011), survival (Casey 2005) and essential for strategic renewal (Crossan *et al.* 1999; Lumpkin and Lichtenstein 2005; Brix 2017). In a housebuilding context, an organisation's ability to continuously improve over time (Schulze *et al.* 2013) is key to improving new home build quality. First referred to in 1963 by Cyert and March, the field of organisational learning has rapidly become extensive and diverse (Easterby-Smith and Lyles 2011). Consequently, definitions of conceptual terms vary widely (Rashman *et al.* 2009). In an effort to put forward a contemporary definition of organisational learning for this study, this section regresses several steps to simultaneously examine the terms on which the definition is built and secondly explore the historical development of the literature within which the definition evolved.

2.4 Organisational-level learning

Argote and Miron-Spektor (2011) suggest most organisational learning definitions centre around a change within an organisation's knowledge base in relation to collective social experience accrued within the organisation. This highlights the vital role *knowledge* and *experience* play in the learning process. However, unlike the learning process at an individual level, organisational learning involves communication between individuals for collective sensemaking to occur (Brix 2019).

In terms of knowledge, Argote (2011) states that learning occurs when new knowledge is created, retained and transferred at the organisational level. These three knowledge-related components are initially discussed in turn, followed by Kim's 1993 seminal organisational learning model which posits that organisational-level learning occurs when knowledge, embedded in individuals' mental models, is transferred to the organisational level. The following sections then examine the relationship

between knowledge, experience and time, as organisations learn to balance exploration with exploitation efforts (March 1991).

2.4.1 Knowledge

Knowledge is distinguishable from information and data (Fortis *et al.* 2018), as information from the environment is, “what people or systems need to be able to carry out work practices” (Braganza 2004, p.347) and data constitutes factual snippets of information. Knowledge, on the other hand, is anchored in both time and space, making it context-critical (Nonaka and Toyama 2003). Therefore, knowledge is created through an individual continuously and dynamically sifting context-specific information and filtering it through their meaning structures (Nonaka 1994). Part of the sifting process involves seeking to justify the truthfulness of the information in light of an individual’s experience from interacting with the world (Nonaka and von Krogh 2009). As a result, meaning comes from a combination of organising, analysing and interpreting information against an individual’s beliefs and values (Fortis *et al.* 2018), i.e. sensemaking.

2.4.1.1 Sensemaking and beliefs

Individuals start to make sense of their ever-changing environment through a process referred to as bracketing: meaning is invented for an event that an individual has just noticed (Weick *et al.* 2005). Interpretation forms part of the sensemaking process, applying meaning in instances of ambiguity (Daft and Weick 1984). An interpretation of something new to existence is unnamed. Once the individual names the new phenomenon, they examine it retrospectively against similar events from their recollected experience. The individual detects mistakes at this point, but only over time; the enacted thought is not a mistake at first – it becomes a mistake as events unfold over time (Weick *et al.* 2005).

Time plays a crucial role in the sensemaking process; retrospectively drawing on the past helps individuals make sense of the current situation to inform possible actions (Berends and Antonacopoulou 2014). Retrospective sensemaking relies on memory as a way to compare current events against previous experiences (Morgeson and Hofmann 1999; Casey 2005). Also, retrospective sensemaking can change an individual’s most profound beliefs (Huy 2001). Therefore, time, through inward reflection and the subsequent emotional response, influences individual learning as part of the sensemaking process.

March and Olsen (1975) argue that individuals base their beliefs around sensemaking on a relationship between seeing and liking. As individuals do not personally witness all organisational events, they rely on others within the organisation to communicate an account of events based on their experiences. Therefore, inter-personal relationships are influential in the formation of individual beliefs and values, with aspects such as trust playing a role within an organisation's social structures (March and Olsen 1975). Thus, it is argued here that individual sensemaking and interpretation forms part of the knowledge creation process, and that it is a process built on a constant flux of changing emotions and levels of trust over time. This internal knowledge creation process can manifest as either tacit or explicit knowledge.

2.4.1.2 Tacit and explicit knowledge

Polanyi and Sen (2009) propose that there are two dimensions of knowledge: tacit and explicit, which Kim (1993) states as being widely accepted in the literature. Tacit knowledge is personal, hard to communicate or put across formally. It "is so deeply rooted in the human mind and body that it is difficult to codify and communicate and can be expressed only through action, commitment, and involvement in a specific context" (Kim 1998, p.508). Polanyi and Sen (2009) state that it "indwells" inside the head. Technical aspects of tacit knowledge refer to skills and skill development, such as riding a bicycle (Cook and Brown 1999).

Nonaka and von Krogh (2009) posit that explicit knowledge is knowledge codified into language through its conscious accessibility, and passed on to others through writing, drawing or speech, or encapsulated in machines (Kim 1998). Nonaka (1994) describes explicit knowledge as representing 'the tip of the iceberg' concerning the body of knowledge encapsulated within an individual. Tacit and explicit knowledge regularly interact, as individuals refer to one to inform the other, creating both new complementary tacit and explicit knowledge over time with which to inform an individual's potential actions (Nonaka and von Krogh 2009). Therefore, knowledge and learning are interrelated, as the former is the outcome of the latter (Argote 2013).

2.4.1.3 Knowledge creation

Nonaka (1994) posits that knowledge creation occurs within organisations with the amplification of individually-created knowledge to others within an

organisation. This amplification process stems from the relationship between an individual's tacit and explicit knowledge over time. Nonaka describes this relationship as generating a "knowledge creation spiral", of tacit to explicit knowledge iterations, building over time to escalate knowledge creation from the individual to group, organisational and inter-organisational levels.

Knowledge creation is therefore a crucial component of learning (Argote and Miron-Spektor 2011) but discrepancies exist between scholars around the terminology in this area. Huber (1991) uses the term *knowledge acquisition* and identifies five processes for this: Firstly, congenital learning from the organisation's inception to the current point in time; Secondly, experiential learning through direct experience following experimenting, self-appraisal, specialising in adaptability, learning by accident, and by going through a learning curve; Thirdly, vicarious learning from the experience of others; Fourthly, through grafting by employing individuals with specific skills absent from the organisation's skill set, or merging with another organisation; Lastly, through searching, noticing and performance monitoring.

Conversely, Castaneda *et al.* (2018) describe knowledge creation as knowledge generated within an organisation, and knowledge acquisition as where knowledge comes from external sources. These mixed descriptions blur the boundaries somewhat on what the difference is between knowledge creation and knowledge acquisition. In this thesis, the term *knowledge creation* refers to the processes that occur within an organisation to increase its knowledge base, whether through internal creation or external acquisition.

2.4.1.4 *Knowledge retention, organisational memory and routines*

One of the features that differentiates individual learning from organisational learning is the role of memory (Hedberg 1981). Whereas an individual's memory only comprises their mental models, organisational memory is made up of shared mental models and working practices (Antonacopoulou 2006) that outlast individual membership by being preserved in the organisation's procedural fabric (Kim 1993). While staff turnover erodes an organisation's long-term memory, as only a fraction of what has been learnt by individuals across an organisation is committed to paper and stored (Simon 1991), organisational experience is encapsulated in an organisation's formal routines (Dosi *et al.* 2017).

This shared and retrievable historical memory, captured as routines, is based on individuals' procedural memory, storing and recalling past decisions and facts, which can be drawn on when making current or future decisions in light of an organisation's current beliefs (Huber 1991; Walsh and Ungson 1991; Kim 1993; Akgün *et al.* 2003; Anteby and Molnar 2012). Organisations also develop their own belief structures and procedural rules to create a knowledge repository (Dosi *et al.* 2017) as well as forming and refining their identity (Anteby and Molnar 2012). However, the constant process of acquiring, retaining and subsequently retrieving or forgetting knowledge influences organisational memory, as well as whether the knowledge is stored centrally or scattered across an organisation for ease of later retrieval.

2.4.1.5 Knowledge transfer

Knowledge transfer refers to the process through which one unit of analysis, such as individuals within an organisation, can learn from the experience of another (Argote and Ingram 2000; Easterby-Smith *et al.* 2008) and forms a vital part of organisational learning. Conversely, the overlap or interrelation between knowledge creation and knowledge transfer is not clear-cut either, as knowledge transfer can create new knowledge (Argote and Miron-Spektor 2011). Also, the terms *knowledge sharing*, *exchange* and *flow* are used synonymously in the literature with regard to how learning transfers from one unit of analysis to another. However, each term carries with it a different notion of directionality and timeframe (Schulz 2001; Mom *et al.* 2007). Knowledge sharing and exchange suggest a general notion of knowledge flow reciprocity across a short, unspecified period, whereas knowledge flow identifies specific direction and exact period (Mom *et al.* 2007). To this end, Schultz (2001, p.662) defines knowledge flow as "the aggregate volume of know-how and information transmitted per unit of time". This concept of knowledge transfer direction, volume and time-stamp is relevant for organisational learning as learning relationships appear to be asymmetric transfers, rather than symmetrical exchanges (Borgatti and Cross 2003). Those with the knowledge are likely to seek something else from the recipient level in return (Škerlavaj *et al.* 2010) at the point in time of knowledge transmission. As a result, individuals or groups within the organisation may exchange knowledge over time; however, if the passage of time between transfers is lengthy, it may not be perceived as such an exchange. For organisational learning, this suggests the direction of knowledge flow, volume of knowledge transmitted in a

given period and overall timeframe of knowledge transfer events are fundamental factors surrounding communication behind the learning context.

2.4.1.6 *Organisational learning and knowledge*

Scholars of knowledge creation and organisational learning have developed respective theories in parallel to each other, as independent themes (Brix 2017). While reasons behind this separation are historic, scholars in the organisational learning field have suggested that more research is needed to explore multi-level knowledge creation, to better understand the broader process of organisational learning (Antonacopoulou 2009; Argote 2011; Lyles 2014; Brix 2017). Easterby-Smith and Lyles (2011, p.4) oversimplify the distinction by suggesting that knowledge relates to the ‘stuff’ an organisation has, and through the process of learning, the organisation acquires this ‘stuff’. As organisations are complex, organisational learning and knowledge creation are argued as being dependent on each other (Lyles 2014). To this end, Lyles (2014, p.133) puts forward an ‘integrated definition’ that succinctly identifies the relationship between the respective fields:

“Organizational learning is a process whereby the organization enhances its capacity to act (Huber 1991). The capacity to act, in turn presupposes knowledge which when growing presents new options. Organizational learning, therefore, is a dynamic process creating knowledge and transferring it where it is needed and used (Kane and Alavi 2007)). Organizational knowledge creation entails making knowledge created by individuals available, amplifying it in social contexts, and selectively connecting it to existing knowledge in the organization (Nonaka and von Krogh 2009).”

This thesis uses the definition above to underpin and clarify the relationship between organisational learning and knowledge. The specific process of how individual learning becomes organisational learning is examined next.

The notion that organisations learn through their members is not controversial; it is how individual learning becomes organisational learning that has generated much debate historically in the organisational learning field. One reason for literary debate stems from paradigmatic divergence in the academic community (Easterby-Smith *et al.* 2000; Karataş-Özkan and Murphy 2010), which started to

emerge in the 1990s and gain traction in the years that followed (Easterby-Smith and Lyles 2011). Early literature on organisational learning took more of a critical theorist stance, suggesting that learning takes place through cognitive workings within an individual's head, and when they share these cognitions with others, it constitutes organisational learning (Campbell and Armstrong 2013). However, this concept was challenged by scholars putting forward a social constructionist view, that organisational learning is instead co-created through the situated interaction of individuals at multiple levels of analysis within an organisation (Brown and Duguid 1991; Dutta and Crossan 2005). Easterby-Smith *et al.* (2000) indicate this notion of an organisation learning through its members' social interactions, situated in a specific time, space and context, overturned the cognitive learning model and changed the previously dominant epistemology around knowledge from 'possession' to 'practice'. Therefore, studies have suggested organisational learning occurs when individual or collective behaviour changes as routines are changed, organisational performance changes and an organisation's products or services change (Argote and Miron-Spektor 2011). To summarise, knowledge at the organisational level can be created from individual knowledge, stored (although the memories are partial) and transferred to other levels. The next fundamental facet of organisational learning is experience.

2.4.2 Experience

Experience is the result of living and the processes that living entails; the unfolding of transactions over time between an individual and their environment (Dewey 1994; Elkjaer 2004). Argote and Hora (2017) posit that individuals accrue experience directly and indirectly; the latter occurs through vicarious learning from observing others' behaviour. The dynamic interaction between an individual, *time* and *space* generates experience. These two factors are therefore influential for learning, and introduce the role of memory. Time plays a significant role for memory, as, over time, individuals can forget both experience and knowledge.

2.4.2.1 Exploration and exploitation

A key part of understanding organisational learning is how the learning processes manifest between the two levels, from individual to organisational and vice versa. March (1991) argues that organisations learn to remain competitive by trying to

balance the learning process that occurs from the bottom up (exploration), with the learning process that occurs from the top down (exploitation). However, the balance is hard to strike in reality (March 1991). The way in which knowledge flows across an organisation when trying to learn through exploring new options or exploiting what is already known, is how the vertical and horizontal structures of an organisation help to balance these processes. Knowledge transfer taking place from the top down, while ignoring horizontal or bottom-up flows is detrimental, as it results in exploitative learning taking place at the expense of explorative learning (Mom *et al.* 2007). March (1991) posits that organisations learn through experience following both exploration and exploitation activities. Together with Johan Olsen in 1975, he posited that there are limits to what an organisation can learn from experience, based on its choice situations.

2.4.3 March and Olsen's (1975) seminal organisational learning model

In 1975, March and Olsen put forward a seminal cyclic learning framework. They state that changes to an organisation's behaviour originate from individual experience, stemming from choices made, and how the organisation interprets that experience. However, contrary to what previous scholars suggested, March and Olsen argue that interpretation does not end in rational outcomes, as individual interpretations are in fact influenced by unclear causality. Therefore, changes in organisational behaviour stem from ambiguous individual interpretation. Their four-step cyclic model (Figure 1) comprising interactions between individual and organisational levels, describes the process of learning from experience over time. As an individual attempts to close the gap between how they believe the world should be and what it is, firstly, their personal beliefs impact their actions. Secondly, their actions have a knock-on effect, influencing the choices made at the organisational level. Thirdly, the choice made by the organisation results in one, or a series of outcomes playing out over time and space within the environment in which the organisation is situated. Lastly, how the environment responds to the organisational action or inaction subsequently impacts an individual's beliefs. The learning cycle then repeats over time.

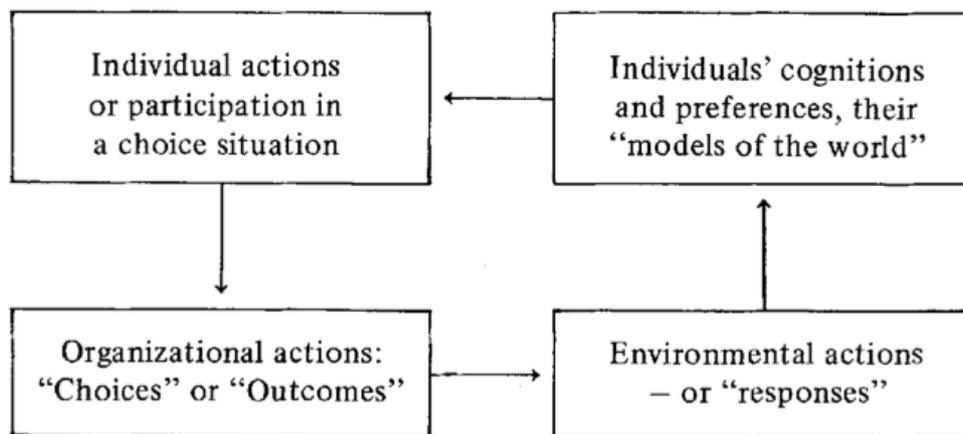


Figure 1: March & Olsen's model (1975, p.150)

March and Olsen (1975) argue that the sequence of steps can be disrupted, leading to an incomplete learning cycle. A disrupted relationship between an individual's beliefs and actions can result in individual learning no longer influencing individual behaviour, as an individual's role constrains their actions. The severed relationship between individual action and organisational action can cause 'audience experiential learning'. This is where individual learning has no effect on the organisation's choices and therefore is unable to change organisational level behaviour. Such a disrupted relationship between organisational action and environmental response can lead to 'superstitious learning'. This is where any learning that occurs is based on an imperfect individual interpretation of the environmental response consequences, meaning that any subsequent behaviour changes and organisational actions have no impact on the environmental response. Lastly, the disconnected relationship between environmental response and individual belief can result in 'experiential learning under ambiguity'. An individual attempts to learn based on outcomes from the environment but reasons behind the environmental changes are ambiguous. Therefore, learning at both the individual and organisational level is based on assumed causality. March and Olsen state that for learning under ambiguity, "learning takes place and behaviour changes; but a model of the process requires some ideas about the imputations of meaning and structure to events" (1975, p.160).

March and Olsen's (1975) key argument was that individuals and organisations only learn from experience when information is clear, resulting in

correct inferences and appropriate behaviour modification within a stable environment. However, these conditions are scarce. Despite this, individuals strive to make sense of what they experience, imposing an artificial order to understand what has happened to them. March and Olsen posit that learning hinges on individual beliefs and attitudes which are influenced by “timing, order, and context of information” (1975, p.160). Individuals’ interpretation relies on being able to access relevant information when they need it; therefore, the point in time an individual seeks knowledge is a focused, not random activity, rooted in time. The ability to learn depends on an individual’s timely seeking and access to the relevant records or memories store within the organisation’s knowledge repository. If no historic organisational knowledge is available, or what is retrievable is incomplete, individual beliefs become skewed, and learning is ambiguous. This identifies time and memory as relevant, not only to learning at the individual level, but at the organisational level as well.

2.4.4 Kim’s (1993) seminal organisational learning model

Others have built approaches to sensemaking on a collective scale as a way to explain how individual learning becomes organisational learning. Kim (1993) explored the notion that individual and shared mental models act as the key mechanisms by which learning transfers. Kim’s (1993, p.40) model of organisational learning is built on March and Olsen’s (1975) seminal model (described above). Kim posits that individual beliefs are the combination of individual learning from experience, which an individual accomplishes through continuously repeating an internal conceptual and operational learning cycle. This process generates mental models, or non-verbal images in the head of an individual concerning their understanding (Kim 1993), which the individual then tries to communicate to others in the organisation, resulting in the collective sharing of multiple mental models. Mental models comprise providing, “a general class of cognitive constructs that have been involved to explain how knowledge and information are represented in the mind” (Klimoski and Mohammed 1994, p.405). Kim (1993) argues that multiple individual mental models need to align for learning to transfer beyond a single individual, and proposes this happens through shared mental models that sit within the organisation’s cultural stance. Kim further argues that more effective organisational learning occurs when organisational actions are based on shared

mental models (i.e. collective beliefs), as opposed to individual mental models (i.e. individual beliefs). The success of organisational learning relies on an individual's ability to accurately communicate their mental model to others, but individuals may not be particularly good at doing this, or have reasons not to do this, such as maintaining a competitive advantage.

Within this learning framework, additional breakages can also occur in links, on top of those identified by March and Olsen (1975) (March and Olsen's four breaks in the learning cycle are labelled 1 to 4 in Figure 2). These lead to: quick problem-solving where nothing is remembered for later use (situational learning – 5 in Figure 2); siloed learning where individuals learn but collectively the organisation does not (fragmented learning – 6 in Figure 2), or standard organisational protocols being side-stepped to quickly achieve a goal that serves the needs of a few, not the organisation as a whole (opportunistic learning – 7 in Figure 2).

Kim's (1993) model however, is weak in terms of how the learning cycle is completed. Outcomes from the environment (box labelled *Environmental Response* in Figure 2) feed into the individual learning cycle in Kim's model, not into shared mental models. Collective discussions of observations are argued by others as more effective in terms of learning, because individuals can be disinclined to reflect on past events and fail to pass learning on to others (Von Zedtwitz 2002).

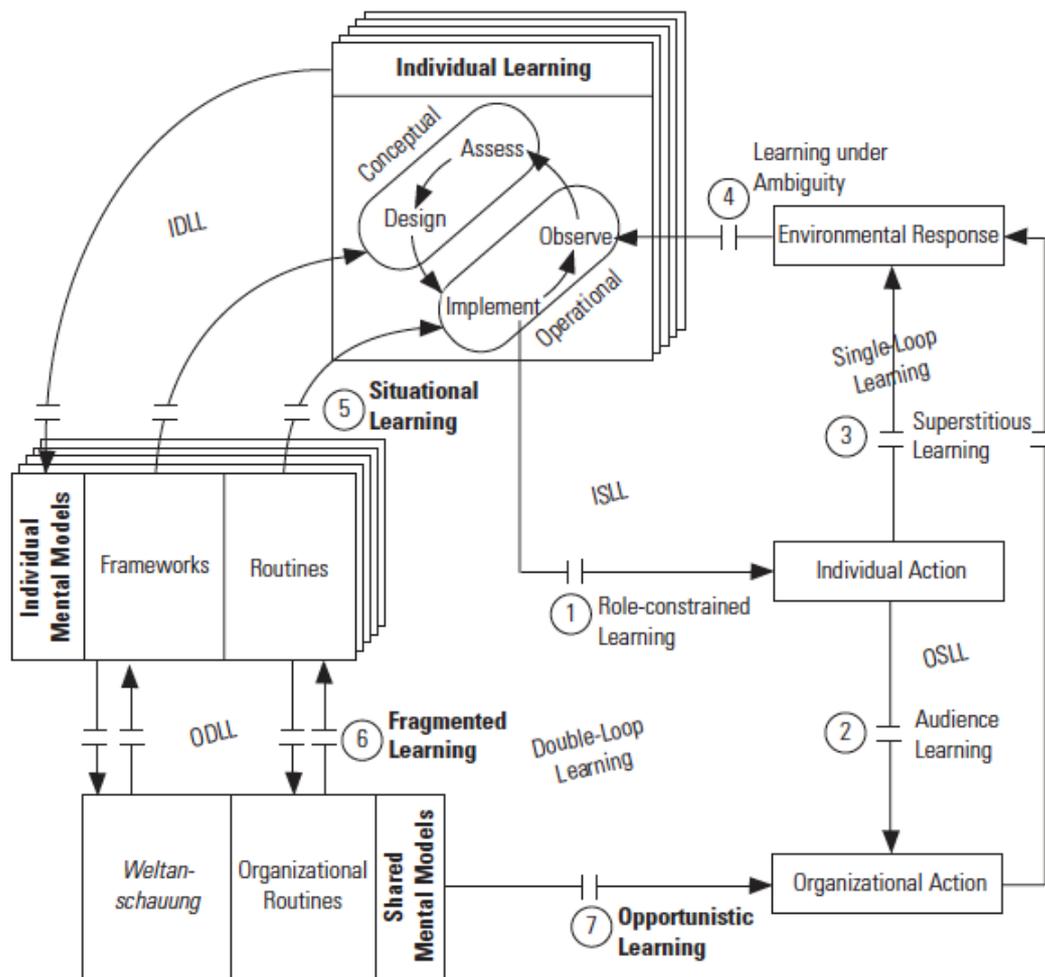


Figure 2: Kim's integrated model of organisational learning (1993, p.47)

Both March and Olsen (1975) and Kim's (1993) models omit a group level, suggesting that learning at the individual level simply transcends straight to the organisational level. However, other scholars consider learning to be a multi-level enterprise, comprising four levels of analysis; individual, team or group, organisational and inter-organisational. This led Crossan *et al.* (1999) to put forward their seminal 4I multi-level learning framework that sought to explain how individual learning became organisational learning via group learning and vice versa. However, scholars argue that the 4I learning framework does not consider constructs such as time (Berends and Lammers 2010) and power (Lawrence *et al.* 2005), and therefore simply provides a structural mechanism by which learning moves across levels but not the conditions in which learning occurs.

2.5 Organisational learning as multi-level concept

Elkjaer's (2004) notion of a 'third way of learning' combines the metaphors of *acquisition* (a critical theorist view) with that of *participation* (Sfard 1998) (a social constructionist view). This treats new skills and knowledge as products learnt through the process of participating in *communities of practice*, where organisations are social worlds, not closed systems. Therefore, this study defines multi-level learning as: *the transformation of collective social experiences at the group level through learning sub-processes, facilitating the creation, retention and transfer of knowledge. These learning sub-processes feedforward and feedback learning through an organisation's social structure across time and space to other levels.* This suggests two different, yet interconnected mechanisms simultaneously at work for multi-level learning to occur: firstly, the way in which new knowledge becomes known, and secondly, how that newly created knowledge becomes experience through the process of living (Elkjaer 2004). By examining the 4I framework and constructs that scholars have found influential to multi-level learning, it is possible to understand how collective social experiences are formed and subsequently feed-forward and back across levels over time. Hence, Crossan *et al.*'s (1999) 4I framework is examined next.

2.6 Crossan *et al.*'s (1999) 4I organisational learning framework

Published in 1999, this paper has been cited nearly 2000 times in peer reviewed journals. The paper outlines a basic theoretical premise for multi-level learning, specifically in relation to strategic renewal. The authors posit that organisational learning occurs through a reciprocal relationship between action and cognition. At the same time, when new learning, absorbed into an organisation, is balanced by what the organisation already knows, there is a tension between the activities of exploration and exploitation respectively (March 1991).

For an organisation to learn, individuals and groups must also learn, and this occurs through the act of four sub-processes: *intuiting*, *interpreting*, *integrating* and *institutionalising*. The dynamic relationships between these four sub-processes over time balance organisational exploration and exploitation. This is achieved through the *feed-forward* of learning up structural levels from individual to organisation (from *intuiting* to *institutionalising*), and *feedback* of learning down them (the same learning sub-processes and levels in reverse).

Examining the 4Is from a feed-forward perspective, *intuiting*, described as a human characteristic, is an activity carried out at a sub-conscious level by an individual, where patterns in information are recognised based on the individual's previous personal experience and images they have seen. However, these ideas stay in the individual's mind. If the individual wishes to communicate their intuitions to others, they need to articulate them into language before they can be understood. In this sub-process, the individual uses names and metaphors to share meaning with others and start the interpretation sub-process.

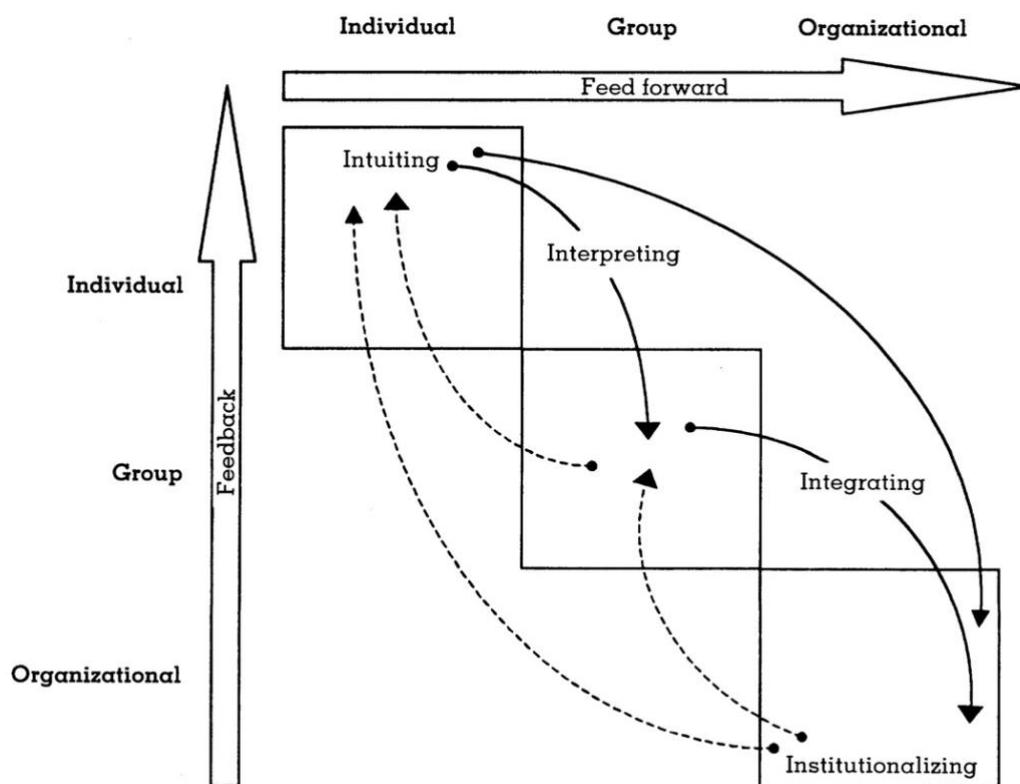


Figure 3: Crossan et al.'s 4I framework (1999, p.532)

Crossan et al. (1999) describe *interpreting* as the communication of ideas between individuals using language to reach a shared understanding. Through this sub-process, groups develop collective mental models which use language. However, every individual has their own set of personal experiences, beliefs and perspectives. This means that individuals can have different interpretations of the same thing. Communicating as a group develops a shared meaning as individual perspectives

overlap. Once a group finds common ground, the cognitive map is refined to reduce ambiguity.

Integrating is the reaching of a common consensus amongst a group; numerous individual understandings align through collective communication. A defining feature of this sub-process is sharing, albeit informally. Groups distil an idea down to its essence through language, but the language used develops. Storytelling becomes intrinsic to learning, as a group conveys the contextual complexities of real life effectively through its narrative. These stories form part of an organisation's collective wisdom or memory.

Institutionalising takes place when the organisation formalises the ideas distilled in earlier sub-processes. Concreting ideas into rules and routines embeds the learning. Therefore, the fluidity of ideas at the individual level becomes set in stone at the organisational level. Crossan *et al.* (1999) suggest that while the routines, established through *institutionalising*, can evaluate organisational performance, they hinder spontaneity. This makes the organisation slow to adapt to external changes, creating a gap between what the organisation needs to learn and what it has learnt already. When this happens, individuals use their intuition, thus learning to achieve the desired result without necessarily following the organisation's formal routine.

The 4I framework identifies, names and assigns functions to the learning sub-processes between levels; however, it has been argued as being simplistic, when in reality learning across multiple levels of an organisation is complex and messy (Berends and Lammers 2010). As a result, numerous scholars have built on the framework to add empirical meat to the framework's conceptual bones.

2.7 Review of Crossan *et al.*'s 4I framework development

Following its publication, several scholars have used Crossan *et al.*'s (1999) seminal 4I framework as a starting point in their research. This section gives an overview of the articles that both specifically build on the 4I framework and further explore the feed-forward and feedback learning sub-processes associated with multi-level learning. The systematic literature search (described in Section 2.2 on page 6) identified 15 papers that made a direct contribution to the 4I framework. These are listed in Table 2 below. In addition, Crossan *et al.*'s (2011) work, that reflected on their 1999 paper, was also used to identify subsequent relevant research.

Table 2: List of papers that develop the 4I framework

<i>Authors who change the 4I diagram</i>	<i>Authors that identify constructs influential to multi-level learning</i>
(Zietsma et al., 2002)	(Lunnan and Barth, 2003)
(Lawrence et al., 2005)	(Othman and Azuan Hashim, 2004)
(Jones and Macpherson, 2006)	(Schilling and Kluge, 2009)
(Lionzo and Rossignoli, 2013)	(Berends and Lammers, 2010)
(Akinici and Sadler-Smith, 2018)	(Benn et al., 2013)
(Zeimers et al. 2019)	(Goldman et al., 2014)
(Limba et al., 2019)	(Zhou et al., 2018)
	(Nielsen et al., 2018)

Seven of these papers made changes to the 4I framework diagram (Figure 3) by introducing and illustrating new learning sub-processes or relabelling the ones introduced by Crossan *et al.* (1999). This section summarises the seven papers taken from the left hand column in Table 2 and then examines the learning sub-process changes at each level.

Zietsma *et al.* (2002) followed the change in logging practices by the largest and oldest forestry organisation in British Columbia, as the company faced ongoing resistance from environmental protesters. Their findings support the concept of *intuiting, interpreting, integrating* and *institutionalising* taking place in that order but introduce *attending* and *experimenting* as two additional feed-forward learning sub-processes.

Lawrence *et al.* (2005) posit that political power drives organisational learning, and revise Crossan *et al.*'s (1999) 4I framework by adding four social-political processes (*influence, force, domination* and *discipline*) alongside the learning sub-processes of *intuiting, interpreting, integrating* and *institutionalising*.

Jones and Macpherson (2006) add an inter-organisational extension to Crossan *et al.*'s (1999) 4I framework. The 4I framework describes how new knowledge is often introduced from external sources yet does not describe or illustrate how this happens. Learning enters one organisation through the transference of another organisation's knowledge and experience (Easterby-Smith *et al.* 2008; Argote and Miron-Spektor 2011). Jones and Macpherson's (2006) 5I model expands Crossan *et al.*'s work to explore this relationship, as *intertwining* takes place between small and

medium-sized enterprises (SMEs) and their customers or suppliers. Learning between organisations is thought to be more challenging due to contextual conditions changing as organisational boundaries are crossed, where cultures and processes differ, and conflicting motivations to learn, power factors, risk taking and geographic location play a role in influencing learning processes (Easterby-Smith *et al.* 2008).

Lionzo and Rossignoli's (2013) research also focuses on SMEs; however, the 4I framework was used as a way to study strategic renewal in family-run SMEs. They identify the group level as *communities of practice*, or "groups that emerge spontaneously in organisations" (2013, pp.587-8) connected through social interactions. However, their study identifies *communities of practice* within families, rather than organisations. Lionzo and Rossignoli therefore suggest the organisational level similarly comprises *communities of practice* but that they may be both family and non-family members.

Akinci and Sadler-Smith (2018) study multi-level learning within senior police teams. The authors found that learning sub-processes between levels act as loops. They posit the individual to group loop comprises *inquiring* and *intuiting*, at the individual level, and *integrating* at the group level with *interpreting* and *reinterpreting* connecting the two. Between group and organisational levels, *institutionalising* takes place at the organisational level with *internalising* and *re-internalising* connecting the two levels. They also identify a learning sub-process, *collective intuiting*, as occurring at the group level, which is described later in Section 2.7.3.3 on page 36.

Zeimers *et al.* (2019) examine multi-level learning across a field hockey association after *institutionalising* a new corporate social responsibility strategy. Inter-organisational relationships with external stakeholders formed part of this process, as they brought new learning into the organisation. Individuals (described as *boundary spanners*) developed formal and informal relationships with external stakeholder individuals, and, through *intertwining*, passed learning into the organisation.

Limba *et al.* (2019) studied the *institutionalising* process in government organisations. They identify *quasi-institutionalising* as a support mechanism for the *institutionalising* process, and define it as "the organizational state that occurs when organizations institutionalize change without innovation (no feed-forward), or when

institutionalization of innovation has occurred without intuition (no feedback)” (Limba *et al.* 2019, p.108). By committing to change through *institutionalising*, an organisation triggers the learning sub-process of *quasi-institutionalising*.

By combining the learning sub-processes identified in the seven papers above into three summary tables (Table 3 on page 27, Table 4 on page 30, and Table 5 on page 42) and illustration (Figure 4 on page 31), it is possible to explore the feed-forward and feedback learning sub-processes level by level.

2.7.1 Feed-forward learning sub-processes

2.7.1.1 Individual level

Crossan *et al.* (1999) describe *intuiting* at the individual level as a subconscious activity. However, Zietsma *et al.* (2002) argue that *intuiting* is a cognitive aspect of learning which is supported by action-based learning sub-processes *attending*. The latter is the act of an individual seeking new knowledge from their environs. Akinici and Sadler-Smith (2018, p.10) refer to this as *inquiring* – where individuals “formed judgements by attending to the situation more deliberately (i.e. ‘inquiring’) through scanning and analysing”. They posit that the 4I framework lacks a way to capture both conscious and subconscious sensemaking. Both additional learning sub-processes describe a similar activity; one where the individual chooses to be actively engaged in learning.

Crossan *et al.* (1999) also state that the multi-level learning process starts with *intuiting* at the individual level. Lawrence *et al.* (2005) challenge this by positing that the multi-level learning process starts with *interpreting* between the individual and group levels but instead ends with *intuiting*.

2.7.1.2 Individual to group level

Between these two levels, Crossan *et al.* (1999) suggest *interpreting* occurs. Akinici and Sadler-Smith (2018) support this notion. However, Zietsma *et al.* (2002) posit that again, *interpreting* is a cognitive aspect of learning, which is supported by the action-based learning sub-process of *experimenting*. This is a collective activity of testing shared interpretations – a learning sub-process also supported by Jones and Macpherson’s (2006) findings.

Lawrence *et al.* (2005) infer that *interpreting* requires injections of sponsor *influence* to succeed, as the feed-forward of an idea is fragile while being justified for legitimacy. They argue *influence* is resource-dependent, where the promoting sponsor

needs to have resource control and informal social network connections. Therefore, *interpreting* comprises a degree of trial and error learning supported by periods of political influence.

2.7.1.3 Group level

In Crossan *et al.*'s (1999) 4I framework, learning sub-processes take place between the levels adjacent to the group level, not within it. Conversely, Akinci and Sadler-Smith (2018) suggest the learning sub-process of *integrating* is in action within the group level, not between group and organisational levels. This is when a collective of individuals share their learning to influence group-level actions, as opposed to that learning being fed forward to the organisational level. This notion has parallels to Lionzo and Rossignoli's (2013) assertions that small groups behave as *communities of practice* to share learning informally yet effectively. Also, Zeimers *et al.* (2019) identify groups of individuals (described as *boundary spanners*) who facilitate learning feed-forward from the individual to organisational levels. In effect, they sit at the group level, mediating intra-organisational multi-level learning.

2.7.1.4 Group to organisational level

Crossan *et al.* (1999) identify *integrating* as occurring here. In contrast to this, Akinci and Sadler-Smith (2018) posit instead that *internalising* takes place. The difference between these learning sub-processes is the formality of the learning. *Integrating* the way Crossan *et al.* (1999) describe it suggests a distillation of learning towards a formal outcome. Conversely, Akinci and Sadler-Smith (2018) describe *internalising* as a non-formal learning outcome that takes place within a *community of practice*. Also, Lawrence *et al.* (2005) suggest *integrating* requires episodes of *force* to accompany the learning sub-process, as the idea being crystallised needs to be seen by the right people at the right point (or points) in time. The promoting sponsor champions the idea through the formal channels for it to progress to the organisational level. Even with political pressure, learning that reaches the organisational level may not be formalised into an organisational routine. It may be fed back down the organisation in an informal capacity.

2.7.1.5 Organisational level

In the 4I framework, Crossan *et al.* (1999) imply *institutionalising* is the top point of the intra-organisational learning, where learning is formalised into organisational routines. This concept is supported by Akinci and Sadler-Smith (2018). Also, Lionzo and Rossignoli (2013) identified social networks through *communities of practice* as crucial to multi-level learning at the organisational level.

2.7.1.6 Organisational to inter-organisational level

The feed-forward learning processes associated with the 4I framework cease at the organisational level. However, Jones and Macpherson (2006) draw on Holmqvist's (2003) notion of *intertwining*, where two organisations' processes of exploitation and exploration change over time, resulting in their becoming intertwined. This *intertwining* process was similarly depicted by Zeimers *et al.* (2019) where individuals representing the organisation (again described as *boundary spanners*) facilitate a learning exchange between the organisation and external stakeholders. In effect, they sit at the organisational level, mediating inter-organisational multi-level learning. Table 3 summarises the level by level feed-forward learning sub-processes listed above. Following this, the subsequent feedback learning sub-processes are examined in the same way.

Table 3: Feed-forward learning sub-processes

Author	Focus	Individual level	Individual to Group level	Group level	Group to Organisational level	Organisational level	Organisational to Inter-Organisational levels
Zietsma <i>et al.</i> , 2002	Multi-level learning in logging company	Attending in addition to intuiting	Experimenting in addition to interpreting				
Lawrence <i>et al.</i> , 2005	Power in relation to multi-level learning		Interpreting supported by social-political process of influence		Integrating supported by social-political process of force		
Jones and Macpherson, 2006	Inter-organisational multi-level learning in SMEs	Attending in addition to intuiting	Experimenting in addition to interpreting				Intertwining
Lionzo and Rossignoli, 2013	Multi-level learning in family SMEs			Networks through communities of practice		Networks through communities of practice	
Akinci and Sadler-Smith, 2018	Multi-level learning in senior police teams	Inquiring in addition to intuiting	Integrating	Integrating takes place here, not between levels	Internalising rather than integrating	Institutionalising	
Zeimers <i>et al.</i> , 2019	Multi-level learning in field hockey association after institutionalising CSR strategy			Group-level boundary spanners			Inter-organisational-level boundary spanners
Limba <i>et al.</i> , 2019	Multi-level learning in government organisations following institutionalising						

2.7.2 Feedback learning sub-processes

Many multi-level learning studies focus on and explore the feed-forward learning processes, with far fewer looking at feedback learning sub-processes (Nielsen *et al.* 2018). Nielsen *et al.* (2018) argue that, as there is such a bias towards understanding feed-forward learning sub-processes in Crossan *et al.* (1999), the 4I framework cannot confidently be applied to explaining the relationship between exploration and exploitation. They posit exploration and exploitation activities exhibit both temporal and spatial elements, unfolding one after another in time and across different units of analysis within or between organisations which may be geographically separate. As a result, the assumption that the learning feedback sub-processes are exactly the same as feed-forward learning sub-processes in reverse is called into question (Akinci and Sadler-Smith 2018).

2.7.2.1 *Inter-organisational to organisational level*

Conversely, Jones and Macpherson (2006), found that the learning sub-processes of *integrating*, *interpreting* and *intuiting* take place in reverse, when prompted through the feedback learning sub-process of *intertwining* at the inter-organisational level.

2.7.2.2 *Organisational to group to individual level*

The feedback learning sub-processes from the organisational down to the individual level are discussed together here, as they have been developed differently by scholars. In the 4I framework, the process of *institutionalising* is somewhat vague, with the learning sub-processes not labelled in the same way as interpreting or integrating (see Figure 3 on page 20). This implies all associated learning sub-processes represent *institutionalising*, and indeed some scholars share this assumption, and annotate their revised framework diagrams thus (Lawrence *et al.* 2005; Schilling and Kluge 2009). Other scholars describe the process of *institutionalising*, i.e., when the organisational level communicates learning to lower levels, but without illustrating it in a diagram.

Also, Zietsma *et al.* (2002) identify a *legitimacy trap*. This is when an organisation relies too heavily on existing formalised knowledge to be able to respond to changing external conditions that challenge the organisation's environmental status quo, preventing *institutionalising*.

Jones and Macpherson (2006) identify three different types of learning associated with *institutionalising*: *normative learning* where *institutionalising* involves adopting industry standards, *mimetic learning* where *institutionalising* centres around mirroring the best practice behaviour observed in others, and lastly *coercive learning* where constant pressure is exerted and threats uttered to non-conforming individuals to achieve *institutionalising*. These authors view the first two types of learning positively, in comparison to the negative connotations assigned to *coercive learning*.

Lawrence *et al.* (2005) posit that *institutionalising* is a crucial step in the overall process of multi-level learning; however, they state it is hard to achieve in practice, as resistance to changes in working practices is often encountered at the group and individual levels. Consequently, Lawrence *et al.* (2005) argue that the systematic application of power through *domination* and *discipline* effectively overcomes this resistance. *Domination* is enacted at the organisational level through

technological means to improve practice efficiencies. By continuously managing working practices, domination does not change a group or an individual's beliefs, but shapes their actions to enact the learning. *Discipline* supports *intuiting* by building individual expertise over time, linking understanding to individual identity.

Alongside this assertion, Limba *et al.* (2019) again suggest quasi-*institutionalising* takes place before full institutionalisation but that the process is fragile. Limba *et al.* (2019) argue that for full *institutionalising* to occur, learning from feedback needs to feed-forward back up to the organisational level. This suggests a complete cycle down and back up of all the learning sub-processes, starting from the organisational level. Also, the authors argue that the feedback learning sub-processes need support through the application of power but not for the feed-forward part of the cycle, as this is far easier – although, the reasoning behind this reduction in power is not clear.

In contrast to the scholars above, Akinci and Sadler-Smith (2018) state that feedback learning sub-processes are not necessarily the same as those responsible for feed-forward simply taking place in reverse, or take place through *institutionalising*. Instead of learning feeding forward up one level after the next, they assert that learning completes loops of feed-forward and feedback between two adjacent levels. As a result, the feedback learning sub-processes have similarities but perform distinct functions. Between the organisational and group levels, the learning sub-process of *re-internalising* occurs. This is a process that supports *internalising*, as collectively, *communities of practice* can reflect on, and share, their learning experiences. Between the group and individual levels, the sub-process of *reinterpreting* occurs, as individuals can collectively discuss their actions to reflect on, and refine their own beliefs. The cycle of *integrating*, *internalising*, *institutionalising* and *re-internalising* forms one learning loop. The cycle of *intuiting* and *inquiring*, *interpreting*, *integrating* and *reinterpreting* forms another loop (see red boxes in Figure 4).

Therefore, Table 4 summarises the feedback learning sub-processes.

Table 4: Feedback learning sub-processes

Author	Focus	Organisational to Inter-Organisational levels	Organisational level	Group to Organisational level	Group level	Individual to Group level	Individual level
Zietsma et al., 2002	Multi-level learning in logging company		Legitimacy trap				
Lawrence et al., 2005	Power in relation to multi-level learning			Institutionalisation supported by social-political processes of discipline and domination		Institutionalisation supported by social-political processes of discipline and domination	Intuition rather than intuiting
Jones and Macpherson, 2006	Inter-organisational multi-level learning in SMEs	Intertwining		Not explicitly labelled – suggests institutionalising		Not explicitly labelled – suggests institutionalising	
Lionzo and Rossignoli, 2013	Multi-level learning in family SMEs			Not explicitly labelled – suggests institutionalising		Not explicitly labelled – suggests institutionalising	
Akinci and Sadler-Smith, 2018	Multi-level learning in senior police teams		Institutionalising	Reinternalising	Integrating	Reinterpreting	Inquiring in addition to intuiting
Zeimers et al., 2019	Multi-level learning in field hockey association after institutionalising CSR strategy	Inter-organisational-level boundary spanners			Group-level boundary spanners		
Limba et al., 2019	Multi-level learning in government organisations following institutionalising			Quasi-institutionalising		Quasi-institutionalising	

Using the information in Table 3 and Table 4, an amended 4I, or 5I, framework diagram is shown below in Figure 4.

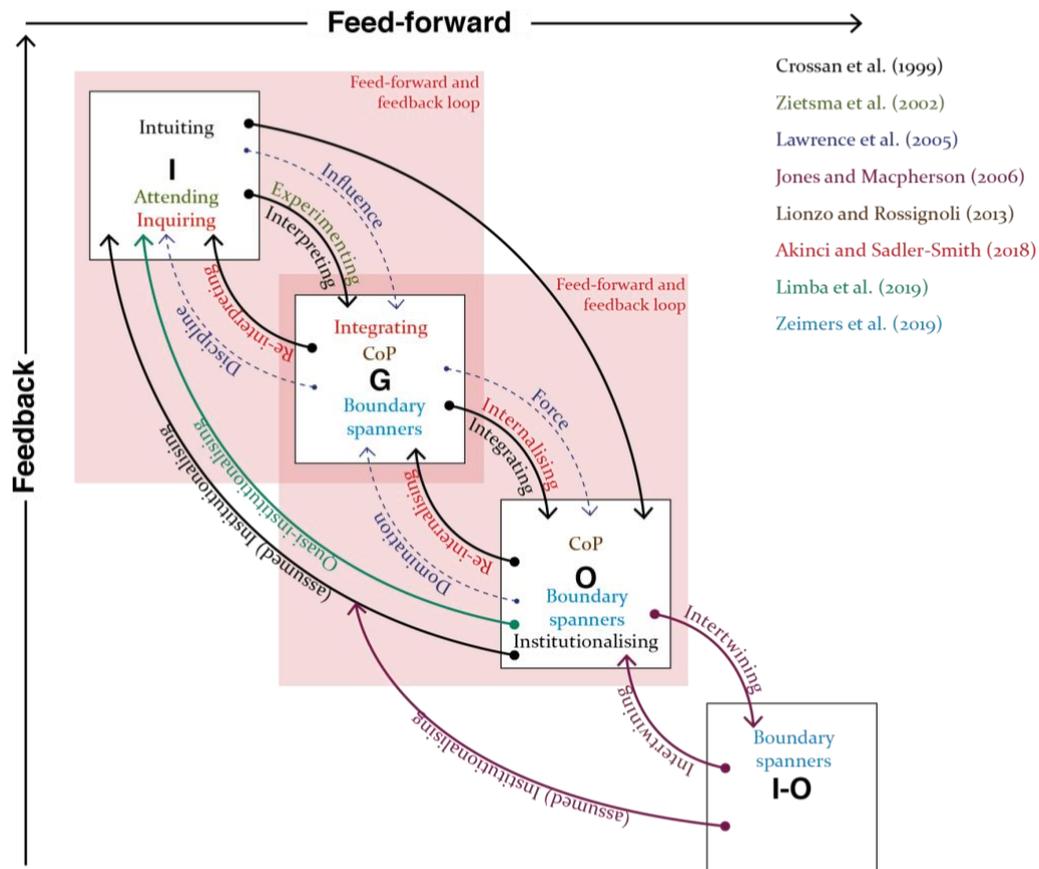


Figure 4: 4I framework with amended learning sub-processes

To sum up, as the feedback learning sub-processes have received less attention across the academic community compared to feed-forward learning sub-processes, there is less empirical evidence of how they work. For example, studies suggest organisational level communication of formal routines to group and individual levels takes place, usually through *institutionalising*. However, with the exception of Akinci and Sadler-Smith’s (2018) research, how learning from the organisational level is received at the individuals’ level once it has been re-communicated by the group level is not clear. However, in Akinci and Sadler-Smith’s (2018) revised framework, there is no direct link between the organisational and individual levels as suggested by Crossan *et al.* (1999) – thus warranting further investigation.

2.7.3 Influential constructs

The right hand column in Table 2 (on page 22) lists eight papers that use the 4I framework to study multi-level learning. Alongside this, the authors describe constructs they found influenced multi-level learning sub-processes during their studies. Subsequently, this chapter groups these constructs into five broad categories: time, power, communication (from both social and geographic perspectives), trust and emotion. These are examined next.

2.7.3.1 Power

Starting with the construct of power, Lawrence *et al.* (2005) describe the four social-political processes necessary to support multi-level learning, i.e. *influence*, *force*, *dominance* and *discipline*, and that these occur through episodic or systemic power, or both, over time. Examples of episodic power take place through, “discrete, strategic political acts initiated by self-interested actors”, whereas systemic power, “work[s] through the routine, ongoing practices of organization” (Lawrence *et al.* 2005, p.182). However, Lawrence *et al.* (2005) state that episodic power supports the successful feed-forward of learning and systemic power supports the successful feedback of learning across multiple levels of an organisation.

Conversely, Limba *et al.* (2019) suggest that in government settings, relying on domination alone to support multi-level learning is insufficient. They imply that, as many change initiatives are instigated in a top-down manner, they receive little enthusiasm at the individual level. Thus, they suggest learning through feed-forward needs to flow freely from the individual up to organisational levels for *institutionalising* to occur. This suggests open, as opposed to restrictive, multi-level communication channels, and for individuals to be free to express themselves without persecution. Schilling and Kluge (2009) found the learning process stalls if learning, fed forward up the levels, contradicts the beliefs of individuals in positions of power. Therefore, where conflict occurs between learning fed forward and the organisation's culture and values, learning is rejected at the organisational level.

Consequently, power inequality between levels influences the emotional state of individuals at lower levels. Schilling and Kluge (2009), found that an organisation's blame culture negatively impacts psychological safety, stopping individuals from speaking up about their ideas (Vince 2001; Edmondson 2002).

Lionzo and Rossignoli (2013) highlight the relationship between power and trust, as families often include individuals in influential positions, who are trusted by others in the family. The combination of power and trust influence multi-level learning as the individual in power is trusted and, as the relationship between the two individuals is permanent through a shared family connection, may be able to exercise some inescapable control over other individuals' behaviour.

Jones and Macpherson (2006) describe how SME owners had to exert power over external organisations to support *institutionalising*, while simultaneously ceding power and responsibility to others within the organisation, for *intertwining* to take place. This changes the nature of power relations within the organisation by creating opportunities for other individuals within the organisation to grow into more senior roles, thus supporting multi-level learning.

Zietsma *et al.* (2002) posit that *attending*, *experimenting* and *integrating* are controlled by power and political forces exerted by individuals within the organisation. They found that, at the group level, feed-forward from *experimenting* was tightly controlled. *Experimenting* could only occur if the individuals or groups actively *experimenting* were acting autonomously or supported by an individual in a position of power within the organisation.

While the social-political processes between power and multi-level learning have already been described in Lawrence *et al.* (2005), other scholars have investigated the relationship between power and multi-level learning. Power is a construct scholars frequently identify as shaping multi-level learning within and between organisations. For example, power influences how organisations distribute time, and control communication channels across social networks and geographic proximity, thus facilitating or limiting an individual's participation in *communities of practice* (Fahy *et al.* 2014). The consequential effects guide trust between levels and emotions at the individual level.

2.7.3.2 Time

Berends and Lammers (2010) found that learning cycles do not naturally occur in line with organisational timescales. If organisational performance or outcome was not as expected, political rank was used at the organisational level to intervene and change the tempo of activity at lower hierarchical levels. This had unintended consequences on learning sub-processes. Crossan *et al.* (1999) describe

the relationships between *intuiting*, *interpreting*, *integrating* and *institutionalising* as generally constant and dynamic, but not specifically whether one learning mechanism has to take place after its predecessor. However, Berends and Lammers (2010) posit that learning is not recursive or continuous (as Crossan *et al.* (1999) imply). Instead it is messy and fragmented, with learning sub-processes pausing, ceasing altogether, accelerating or bypassing each other over time, depending on the organisation's social structure. They likened multi-level learning to the flow of a delta in a river; with influence from one direction or another, some paths stopping, others going faster, thus changing the nature of the delta. Drivers for tempo change often come through a change of social structure; new individuals come in at positions of power and influence the project in another way, disrupting the learning that has gone before and leading to discontinuity of overall multi-level learning. This suggests a negative relationship between time available to learn and the social aspect of power controlling time as a resource.

Berends and Lammers (2010) suggest the dichotomy between "clock" time, i.e. that time comprises a linear trajectory of equal measurable units, and "event" time, which describes the elastic cycles at which events naturally take place repeatedly to their own timescales, i.e. seasonal cycles (Ancona *et al.* 2001; Crossan *et al.* 2005), was partly responsible for learning being discontinued over time. The artificial adjustment of event time cycles to match clock time deadlines negatively influences learning as it encourages individuals to improvise.

Improvisation, defined as "intuition guiding action in a spontaneous way" (Crossan and Sorrenti 1997, p.156), is a coping mechanism for individuals when clock time and event time conflict (Crossan *et al.* 2005). Depending on the level of improvisation taking place, any learning associated with this has been described as situational and often used in times of crisis (Kim 1993; Crossan *et al.* 2005). Therefore, improvising suggests an organisation is experiencing crisis conditions, which are detrimental to multi-level learning.

The time it takes to learn is influential to the multi-level learning process. Othman and Azuan Hashim (2004) explore multi-level learning and organisational amnesia, suggesting that learning is hindered when an organisation cannot recall a lesson learned, as the reference has been lost or that it remained at the individual level, rather than *integrating* into the organisational level. This means learning takes

longer. Jones and Macpherson (2006) mirror this sentiment by noting that organisational learning is a slow process. Therefore, it takes time to identify the organisation-wide benefits of learning, as they emerge slowly over time. Nielsen *et al.* (2018) found that individuals and groups used learning from previous experiences to inform future actions; however, as each group disputed the best way to collectively enact this learning, the process was slow, as individuals took time to consider alternative options.

Kerno (2008) posits that one of the benefits of being part of a *community of practice* at the group level, is the speed that learning can move between members. However, reaching that point and operating as a *community of practice* takes time. This time element can be problematic in an organisational context where there is pressure on all members within an organisation to perform. This pressure may negatively impact the effectiveness of the *community of practice*, ultimately making it difficult for the collective to demonstrate their value within a hierarchical organisation that is subject to time constraints (Kerno 2008).

How individuals relate to time also affects potential future behaviours. Zhou *et al.* (2018) studied how multiple levels learnt from natural disasters. They also found that learning took time, as each level had to examine the learning against the organisation's past behaviour and how that may determine any future behaviour. This relates to an individual's perception of 'inner time', or temporal modality, which is described as the simultaneous reliving of past events and pre-living of future events at the present point in time (Huy 2001; Berends and Antonacopoulou 2014).

Goldman *et al.* (2014) and Lawrence *et al.* (2005) explore the relationship between time and power, as they argue both constructs are influential to learning but not accounted for in the 4I framework. How power is applied alongside multi-level learning sub-processes relates to time. Goldman *et al.* (2014) found that learning transferred between levels in short bursts, when experiences were shared between individuals on their own and collectively, and repeated when an organisation's routine was repeated. Therefore, episodic power is applied in short bursts on an ad hoc basis, compared to systemic power, which is applied consistently through daily work practices. Episodic power relies on repeated power exertions at specific points in time, making the *institutionalising* process more unstable than applications of systemic power (Lawrence *et al.* 2005). As systemic power relies on longer-term

initiatives to improve efficiency investments, *institutionalising* is a more stable process. This becomes relevant to multi-level learning, as the overall process of learning is unlikely to succeed where the learning environment is unstable (Lawrence *et al.* 2001). The relationship between communication and multi-level learning is examined next.

2.7.3.3 *Communication*

The 4I framework literature highlights two aspects of communication that influence multi-level learning: firstly, communication across social networks, therefore drawing attention to the communication infrastructure between individuals at multiple levels; and communication across geographic distance, drawing attention to how communication takes place. These are looked at in turn.

At the group level, Akinci and Sadler-Smith (2018) found that individuals collectively made sense of their experiences through communication. This was fundamental to the activity they describe as *collective intuition*, and defined as “independently formed judgement based on domain-specific knowledge, experience and cognitive ability; shared and interpreted collectively” (2018, p.16). They argue that *collective intuition* facilitates a group’s ability to think prior to acting, thus linking *communities of practice* to multi-level learning literature. In their study, collective intuition is used by individuals within a specific *community of practice*, seeking views from those across its membership. Therefore, individuals communicated across a social network where the language used is common to all members. This commonness relates to theories of homophily, where “contact between similar people occurs at a higher rate than among dissimilar people” (McPherson *et al.* 2001, p.416). It also suggests that learning is likely to occur at a faster rate between groups of individuals with similar interests than across groups with dissimilar interests.

Examining feed-forward learning sub-processes, Lionzo and Rossignoli (2013) argue that *communities of practice* act as a tool to facilitate learning, allowing a shared language to develop that make *interpreting* and *integrating* to the organisational level easier. This suggests the communication infrastructure of ascending levels in their study was open and unhindered.

Conversely, for feedback learning sub-processes across social networks, Goldman *et al.* (2014) found that multi-level learning takes place in a formal and informal capacity across individuals at each level, therefore, highlighting the role that

informal social networks play in developing an intricate vertical and horizontal communication infrastructure. Schulz (2001) argues that, while vertical communication channels are effective for *institutionalising* learning across an organisation, horizontal social networks help individuals within organisations to develop a uniform understanding of how new institutionalised knowledge can be applied in practice.

Benn *et al.* (2013) found that *institutionalising* formal sustainability routines down levels of analysis from the organisational level is difficult. For *institutionalising* to occur, individuals need to reach a consensus, but in their study, this did not happen. The authors believe this stemmed from stakeholder group leaders being unable to share common understandings around sustainability. The authors posit that inter-organisational *communities of practice* form at the group level to overcome this. Boundary objects (“flexible epistemic artifacts” (Bechky 2003, p.326) that “inhabit several intersecting social worlds and satisfy the information requirements of each of them” (Star and Griesemer 1989, p.393)) are useful for feed-forward learning sub-processes but there is nothing similar to assist feedback learning sub-processes. Benn *et al.* (2013) highlights the formation of horizontal social networks accompanied with boundary objects as a way of facilitating collective sensemaking at the group level. Bechky (2003) found that boundary objects, such as machinery parts, were useful when individuals from two different *communities of practice* (engineers and machine operators) communicated. She argues that language is integral to a group’s *community of practice*, and without common ground negotiated by boundary objects, understanding between *communities of practice* is incomplete. This leads into communication across geographic distances, as boundary objects facilitate communication across distance too.

Individuals in positions of power stop individuals from *interpreting* and *integrating* learning when they are remote from their peers. Zietsma *et al.* (2002) found that individual beliefs are more susceptible to change through the learning action sub-process of *attending* when individuals, low down in the organisation’s hierarchy, are geographically remote from their organisational offices. When individuals in positions of power across the organisation become aware of changes to the lower level individuals’ beliefs, they use their power to control the social networks within the organisation to stop them communicating these non-conforming views to

others within the organisation. Therefore, individuals that sit centrally within a social network, in positions of power, can act as network gatekeepers (Barzilai-Nahon 2008; Škerlavaj *et al.* 2010), controlling feed-forward learning sub-processes and developing social network structures both within and beyond a single *community of practice* (Macpherson and Antonacopoulou 2013). This suggests when individuals are geographically apart, they cannot communicate informally face-to-face for collective sensemaking. It must take place using different communication methods, which others in positions of power may have control of.

Similarly, Lunnan and Barth (2003) found that *integrating* is hindered by the geographic distance groups are from each other. While diverse cultural groups draw much new learning into an organisation, being separated from each other slows the *integrating* process. This is because individuals at the organisational level rely on formal rather than informal communication methods. Groups are also less visible to the individuals centrally managing them, who are therefore less likely to support the learning sub-process of *integrating*.

Pritchard and Symon (2014) examine how technological developments have allowed digital imagery to supersede the notion of 'mental images' in relation to reducing misinterpretation when knowledge is communicated over a geographic distance. While it could be argued a photograph may not represent an absolute in terms of 'truth' (Pritchard and Symon 2014), its use as a boundary object to create collective common ground was beneficial when conveying technical complexities from a party in one discipline to another (Bechky 2003).

Scholars have also looked at relationships between multi-level learning, communication and time, surmising these impact on memory at multiple levels. Zeimers *et al.* (2019) describe how learning is stored within both formal and informal networks, illustrating how social networks act as repositories for learning. An organisation's formal memory comprises the storage of files, routines and rules for retrieval at the organisational level (Antonacopoulou 2006); however, informal collective memory is different, and defined by Halbwachs (1992) in Anteby and Molnar (2012, p.517) as "a reconstruction of the past that adapts images of ancient facts to present beliefs". They go on to argue that collective memories form the heart of a community and that a community is not a 'real community' without its memories. This implies that through both formal and formal communication

networks, the concept of memory, and what is stored, is fundamentally different at every level of analysis for multi-level learning.

Finally, Othman and Hashim (2004) suggest that organisations also suffer from ‘space-based’ amnesia, where learning captured in reference to one geographic location cannot be moved to another for *institutionalising*. They argue that, as an organisation’s memory is scattered across many places, retrieving learning for future use is impossible, when it cannot be physically located.

2.7.3.4 Trust

Trust within a social relationship influences the openness of communications between the two parties, assisting or hindering knowledge sharing (Rousseau et al., 1998, 395). There is yet to be an agreed definition of trust, although there is scholarly agreement on the meaning of trust (Seppänen et al., 2007). Mayer *et al.* (1995) posit that trust and risk are closely related; individuals with a trusting relationship can adopt risk-taking behaviour, where the level of risk relates to the level of trust. Therefore, Rousseau *et al.* (1998) suggest trust is “the willingness to be vulnerable under conditions of risk and interdependence”. Trust is based on one party’s (the trustor’s) expectation that another party (the trustee) will act positively on something the trustor deems important (Mayer *et al.* 1995). In their model of trust, Mayer *et al.* (1995) identify precursors essential to trust. Firstly, the trustee needs to demonstrate trustworthiness through *ability* (possess the necessary competencies and skills), *benevolence* (that the trustee will act in good faith) and *integrity* (both trustor and trustee share agreeable principles) towards the trustor. Then the trustor’s *propensity to trust* (willingness to trust) becomes a factor, as well as the perceived risk from establishing a trusting relationship with the trustee.

Trust influences learning at multiple hierarchical levels. In addition to Lionzo and Rossignoli’s (2013) findings that trust between family members encourages multi-level learning by creating an open communication culture, Jones and Macpherson (2006) imply that trust is essential between two organisations for *intertwining* to occur. As crises trigger *intertwining*, SME owners open up and trust other organisations to provide sound sources of new knowledge. Trust and risk are closely related. Zeimers *et al.* (2019) suggest *intertwining* relationships between organisations require careful management, as there are risks associated with each party having expectations that do not align with the other’s. Also, external

organisations have conflicting views with those within the organisation, suggesting a need to mediate fundamental cultural differences.

Where there is no trust between individuals, Schilling and Kluge (2009) found that both *integrating* and *institutionalising* are obstructed. Between the group and organisational levels, as resources are scant, groups compete against each other, damaging cross-group trust and the motivation to collaborate. When feeding back learning, individuals and groups and lower levels resist changing their behaviour if they have no faith in the idea the organisational level is *institutionalising*.

The passage of time also gives each party the opportunity to demonstrate that they have the ability to meet the other party's expectations in tandem with both parties' benevolence being established and integrity examined (Mayer *et al.* 1995). Mayer *et al.* (1995, p.722) also posit that, "the effect of integrity on trust will be most salient early in the relationship prior to the development of meaningful benevolence data". This changes over time as benevolence builds. Therefore, how relationships between parties begin are integral to initial trust development (Schoorman *et al.* 2007). Also, as time elapses, the outcomes from previous trusting relationships go on to inform future ones (Mayer *et al.* 1995).

The trust literature identifies two main types of trust; *inter-personal*, (thus identifying trust as a multi-level concept), and *inter-organisational*, referring to social relationships in and between organisations, respectively. *Presumptive trust*, or "positive social expectations that increase individual willingness to trust members of an organisation" (MacDuffie 2011, p.38), is a type of *inter-personal* trust where members are linked through shared characteristics. Therefore, a high degree of homophily forms the foundation of trust in those social relationships (McPherson *et al.* 2001; MacDuffie 2011).

Research into trust between organisations suggests that both *inter-personal* and *inter-organisational* trust exists between individuals within and between organisations. *Boundary spanners* (Zaheer *et al.* 1998) (identified by (Zeimers *et al.* 2019) as relevant to multi-level learning) are individuals that straddle organisational boundaries. However, as the relationships between organisations exist between *boundary spanners* in each organisation, the individuals and inter-organisational levels need to be considered at the same time (Zaheer *et al.* 1998). Summing up, trust

and risk are influential in multi-level learning primarily at the individual and inter-organisational levels, and this affects trust at the other levels.

2.7.3.5 *Emotion*

Schilling and Kluge (2009) identified barriers to *interpreting*, learning sub-processes that are centred around emotion. For example, individuals could generate insecurities around the fear of peer ridicule. These negative emotions stopped individuals from communicating ideas to their group-level peers. The negative emotion generated through structural blame restricts the way in which reflection takes place (Vince and Saleem 2004). A blame culture is described as, “the political and emotional nature of relations within a system, and processes of blaming are a reflection of the problems of the organisation as a whole...If something goes wrong it is identified as the fault of an individual or group rather than as a consequence of a system that has institutionalised defensiveness” (Vince and Broussine 2000, p.26). They become defensive and limit communication to others by being silent (Kish-Gephart *et al.* 2009) or focusing on individual defensiveness (Vince 2001). In this kind of environment, individuals have no appetite for risk and limit their learning. Vince and Saleem (2004) imply that blame triggers vicious circles where negative and unwanted emotional responses from individuals fuel caution. This drives them to blame others. The fear of reflecting on previous actions dissuades individuals from communicating their mistakes to others, inducing a more cautious negative emotion, and the cycle starts again.

Schilling and Kluge (2009) found that, at the individual level, *intuiting* is impeded when linked to emotions: individuals with low levels of psychological safety, fear what they communicate. When individuals experience a high degree of psychological safety, they are more willing to take part in the disruption of practices that comes with learning a new routine (Tucker *et al.* 2007). Linking psychological safety and power, Liu *et al.* (2017) found that the positive behaviour of individuals in power has a positive effect on individuals’ psychological safety, and as a result, individuals are more likely to talk openly to their superiors. Similarly, Edmondson (2002) found that individuals are more likely to voice concerns to others when they have a high degree of psychological safety. In summary, individual and collective emotions, which include psychological safety, influence feed-forward learning sub-processes.

Table 5: Summary of influential construct identified in papers using the 4I framework and at each level of analysis

Author	Influential construct	Individual level	Group level	Organisational level	Inter-organisational level
Zietsma et al., 2002	Power	X	X	X	
	Communication - Social networks	X	X		
Lunnan and Barth, 2003	Communication - Geog proximity		X	X	
	Communication - Geog proximity		X	X	
Othman and Azuan Hashim, 2004	Time	X	X	X	
	Communication - Geog proximity		X		
Lawrence et al., 2005	Power	X	X	X	
	Time	X	X	X	
Jones and Macpherson, 2006	Trust				X
	Power			X	X
	Time	X	X	X	X
Schilling and Kluge, 2009	Trust	X	X		
	Power	X	X	X	
	Emotion	X			
Berends and Lammers, 2010	Power	X	X	X	
	Time	X	X	X	
Lionzo and Rossignoli, 2013	Communication - Social networks		X		
	Power	X	X	X	
	Trust	X			
Benn et al., 2013	Communication - Social networks		X		
Goldman et al., 2014	Time				
	Communication - Social networks		X		
Akinci and Sadler-Smith, 2018	Communication - Social networks		X		
Nielsen et al., 2018	Time	X	X	X	
Zhou et al., 2018	Time	X	X	X	
Limba et al., 2019	Power	X	X	X	
Zeimers et al., 2019	Communication - Social networks		X		X
	Trust	X	X	X	X
	Time				

2.8 Positioning this study in the literature

Looking at the section above, authors have described numerous situations where multi-level learning sub-processes were facilitated or interrupted by factors not accounted for in Crossan *et al.*'s (1999) original 4I framework. In this thesis, the ideas or forces behind these situations in the literature are labelled as 'constructs'. For example, at the individual level, scholars found emotions, and trust were found to be relevant to the sensemaking process. At the group level, communication across social

networks in different geographic locations became relevant to how learning occurred. At the organisational level memory played a role in storing formal collective experiences. Between organisations, trust and risk became important as organisational boundaries were crossed. Scholars frequently found time and power influenced learning sub-processes at all levels of analysis. Individuals in privileged positions were able control their environment, affecting how, when and where the social interactions that formed part of the learning process, took place. While single constructs are often considered in isolation in the literature, how, when and why learning moves between levels over time under the influence of multiple constructs is less understood in the literature (Morland *et al.* 2019).

There is a real drive by academics to understand how organisations learn; however, efforts are hindered through the lack of empirical evidence around learning sub-processes in action and their subsequent relationship to knowledge (Easterby-Smith and Lyles 2011). Therefore, gaps in the literature suggest that feedback learning sub-processes such as *institutionalising* (using Crossan *et al.*'s (1999) terminology) are under-studied, along with discerning whether one or multiple constructs are also influential in the process. In a housebuilder context (to be discussed in the next chapter), understanding how *institutionalising* is followed once a new routine is introduced is key to improving build quality. This thesis aims to understand how learning takes place, once *institutionalising* a new routine has commenced. It also considers whether learning sub-processes are indeed influenced by any of the constructs identified in this chapter, or whether something else is responsible for shaping multi-level learning sub-processes for housebuilding – thus, addressing this gap in the literature and adding new empirical evidence from the housebuilding sector.

2.9 Chapter summary

In this chapter, organisational learning literature has been introduced and described, exploring the relationship between learning, knowledge and experience in organisations. Three seminal learning models, developed by March and Olsen (1975), Kim (1993) and Crossan *et al.* (1999), have been examined to understand how scholarly thinking has evolved over time to culminate with multi-level learning as the combination of *acquisition* and *participation* metaphors (Sfard 1998); thus, treating

new skills and knowledge as products learnt through the process of participating in *communities of practice*, where organisations are social worlds, not closed systems (Elkjaer 2004). Consequently, multi-level learning is defined as: *the transformation of collective social experiences at the group level through learning sub-processes, facilitating the creation, retention and transfer of knowledge. These learning sub-processes feed-forward and feedback learning through an organisation's social structure across time and space to other levels.*

Crossan *et al.*'s (1999) 4I framework is used as a starting point to identify the learning sub-processes (*intuiting, interpreting, integrating and institutionalising*) across the four levels of analysis: individual, group, organisational and inter-organisational. Research that builds on the 4I framework has been reviewed, highlighting amendments to both feed-forward and feedback learning sub-processes. However, the 4I framework is criticised for not acknowledging the wider conditions under which multi-level learning occurs. The framework purely provides a multi-level learning structure and only identifies certain mechanisms to indicate how learning moves up or down levels. Numerous other broad and specific constructs have been identified by scholars as being influential to multi-level learning.

Many studies focus on feed-forward learning processes, with far fewer looking at feedback learning sub-processes (Nielsen *et al.* 2018). As a result, it cannot be assumed that learning feedback sub-processes are simply feed-forward learning sub-processes in reverse (Akinici and Sadler-Smith 2018). This gap in the literature suggests that feedback learning sub-processes and the conditions in which learning sub-processes operate are under-studied. Therefore, this study aims to understand how learning takes place, once a new routine, aimed at improving build quality, has been fed back across a Housebuilder organisation. Accordingly, it addresses the gaps identified in the literature and adds new empirical evidence from the housebuilding sector.

CHAPTER 3. LEARNING AND QUALITY MANAGEMENT IN HOUSING

3.1 Introduction

In Chapter 2, the field of organisational learning literature was reviewed, culminating with the argument that organisational learning is a multi-level enterprise. Crossan *et al.*'s (1999) 4I framework and subsequent adaptations were explored with a focus on understanding the feedback learning sub-process of *institutionalising*. However, an understanding of multi-level learning in a construction context is required to understand housebuilding practices in the UK.

This chapter comprises two parts: the first explores aspects of new home build quality, the second studies learning in relation to housebuilding. Therefore, this chapter begins with a UK housebuilding overview that explains the reasons why declining build quality standards in new homes is a concern. Quality management processes are introduced and explored as a mechanism to manage build quality.

This leads into the second part of the chapter, which investigates how UK volume housebuilders could learn new quality management processes or routines from a multi-level perspective. The chapter concludes by identifying how *institutionalising* (using Crossan *et al.*'s (1999) 4I framework terminology) takes place in a housebuilding setting, considering the same broad constructs identified in Chapter 2. This sets up the research questions and approach put forward in Chapter 4.

3.2 Approach to literature search

A systematic search of the organisational learning literature in housebuilding was initially conducted. The search terms "Organizational learning" OR "Organisational learning" AND "house build*" OR "housebuild*" AND "construction" AND "housing projects." were typed into the database Scopus, specifically in articles' abstracts written in English. This returned three relevant papers. To gain further insight, the search was expanded to include papers that, in addition to organisational learning, included "construction sector" or "construction industry" in the abstract, title or keywords and cited Crossan *et al.* (1999), or included "construction project" or "housing project" in the abstract, title or keywords. This returned a further 38 papers. The abstracts were read, and if they described changes to the four learning sub-processes, or influential constructs, the paper was included in this thesis. The references section of these selected and read papers was also checked

to identify further relevant papers, therefore using the same snowballing technique as in Chapter 2.

There is little on housebuilder quality management in the organisational learning literature. Only three relevant journal articles were found (Knauseder *et al.* 2007; Jansson *et al.* 2015; Hopkin *et al.* 2016). In contrast, numerous studies explore organisational learning in the construction industry; however, much of it develops other theories. For example, Walker (2016) cites von Krogh *et al.* (2012) as a key source of organisational learning literature. However, von Krogh *et al.* (2012) use organisational knowledge creation theory as the basis for their research. This suggests that theory development around organisational learning in construction may be masquerading under other terms. Numerous studies explore organisational learning in project-based organisations, but only a few relate to the construction sector. Others also explore the role of *communities of practice* in the construction industry. Therefore, Crossan *et al.*'s (1999) 4I framework was used as a literature search parameter to establish which papers shared a similar theoretical underpinning in a housebuilding or wider construction sector context. Only one paper, Jansson *et al.* (2015), drew on the multi-level aspects of the 4I framework. Other authors cited the 4I framework when giving an overview of the literature.

It is worth noting that the most cited organisational learning works in this chapter's literature pool are Argyris and Schön (1978), Fiol and Lyles (1985), Garvin (1993), Huber (1991), Nonaka (1994) and Senge (1999). Crossan *et al.* (1999) and Kim (1993) were cited only a handful of times in peer reviewed journals. Therefore, it appears the focus within the industry has historically been on the organisational pursuit and possession of knowledge, rather than on the processes behind it. This may explain the divergence in the literature towards *communities of practice* research to better understand learning that results from individual, collective and organisational behaviour changes, as opposed to cognition (Kokkonen and Alin 2015). As a result, the learning literature around housebuilding is extensive in some areas but diversely spread and disparate.

3.3 UK housebuilding

3.3.1 Overview of new home production in the UK

UK housebuilders are under pressure to build new homes as quickly as possible. Between April 2017 and March 2018, 192,000 new homes were completed

across the UK (GOV.UK 2018). In contrast, Government assessments of need estimated between 225,000 and 275,000 more new homes were required annually on top of those built (GBDCLG, 2017). As a result, the demand for new housing still exceeds supply (Construction Industry Council 2010). The number of new homes has increased steadily since 2013, when the annual number of new homes built dropped to an all-time recorded low of 133,000 (GOV.UK 2018).

Large volume housebuilders must meet the challenges of building more new homes every year, as they build most of the UK's new homes. Between April 2017 and March 2018, 155,960 were built by private developers which accounted for 81% of new properties completed that financial year (GOV.UK 2018). Approximately 62% of those privately financed homes were built by the 15 largest UK volume housebuilders (brand-newhomes.co.uk 2019). The output across each of these 15 organisations varied considerably; with the largest UK volume Housebuilder organisation building over 17,500 new homes that year (Barratt Developments PLC 2018), and the 15th largest building around 1,900 (Avant Homes 2018). Since 2012, the annual figures for each of the UK's top 15 volume housebuilders have gradually increased. However, speeding up the new home production process has adverse consequences.

3.4 New home build quality

Accelerating new home construction negatively impacts build quality, and the housebuilder industry practices associated with rapid construction adversely affect occupant safety (Steering Group on Competence for Building a Safer Future 2019). Poor build quality leads to: firstly, an increasing number of defects in new homes; secondly, a reduction in new home environmental performance; and lastly, a decrease in the levels of customer satisfaction (APPG, 2016; Hopkin *et al.* 2016; Committee on Climate Change 2019). These factors are examined in turn.

3.4.1 Defects in construction

When part of a house is not built as designed, it no longer meets the original requirements set out by the housebuilder. These discrepancies have been described as *defects* or *items of non-conformance* (Love 2002), and identify a relationship between three types of organisations relevant to this thesis: Consultant organisations responsible for designing the houses; Trade organisations, responsible for building the houses; and Housebuilder organisations that manage the process of turning land

into saleable homes. Both Consultant and Trade organisations work for Housebuilders.

In the UK housebuilding context, 'defect' is the term frequently assigned to building work that requires subsequent reworking or rectification with extra time and effort required (Ashford 1989). The commonly used definition of defect is defined by the National House Building Council (NHBC) and each new house has to meet build quality standards set by the NHBC (NHBC 2019) as these standards incorporate statutory UK Building Regulations. Most defects occur in how a new house is finished, through technical or functional errors, omissions, or aesthetic imperfections, or as a result of poor workmanship (NHBC Foundation 2011). The almost universal application of the NHBC's mandatory requirements would seem to suggest that those working within the housebuilding industry are familiar with the standards set down by the NHBC and how to meet them. In reality, this is not the case, as even the statutory minimum of UK Building Regulations are not always met by individuals from Trade organisations on site (Baiche *et al.* 2006).

Housebuilder organisations may have their own quality standards that exceed, differ slightly from, or achieve the NHBC's requirements in ways other than the method expressly stated by the NHBC. Thus, defects can occur in two different orders of severity: firstly, when something does not conform to an NHBC requirement, thus meaning a new house does not meet UK statutory building regulations; or secondly, and less severely, when something does not conform to a housebuilder's own requirements, but with no statutory regulations breached.

However, an individual working in the housebuilding industry is more motivated to learn the NHBC's regulatory requirements, than each housebuilder's specific requirements. If an individual from a Trade organisation fails to meet a housebuilder's own standards, the penalty is the housebuilder withholding monies owed to the Trade organisation, rather than a criminal sentence following a breach in statutory regulations.

3.4.2 The performance gap in housebuilding

The residential sector was responsible for 15% of greenhouse gas emissions in 2017 (Department for Business, Energy and Industrial Strategy 2017), having increased by 1% from the previous year (Committee on Climate Change 2019). The

performance gap relates to the significant discrepancy that has been identified between housing energy design targets, calculated prior to construction, and in-use energy consumption once a home is up and running (Zero Carbon Hub 2014). Currently, there is no regulatory mechanism requiring housebuilders to demonstrate how well a new home is performing against design-stage assumptions. This means actual greenhouse gas emissions are both underestimated and unrecorded.

In their report, the Zero Carbon Hub (2014), identify four issues affecting the construction stage performance gap: Firstly, the incorrect construction of walls and windows and doors within those walls, as well as how walls meet roofs, compromises the thermal efficiency of a house; Secondly, the incorrect installation and checking of building services, such as heating and ventilation systems, prior to occupation compromises the airtightness of a new home; Thirdly, unclear responsibilities for ensuring home performance, is complicated by housebuilder site staff – often, they do not have the skills to challenge individuals from Trade organisations, who fail to meet set quality standards; Lastly, Consultant organisations responsible for the design work have limited input during the construction stage to assist the housebuilder and Trade organisations on site when problems arise. Also, Consultant organisations are unaware of problems when they do occur, as individuals from the housebuilder do not communicate with them after the design stage.

These points highlight learning deficiencies within the construction industry, as individuals from Trade organisations are unable to build houses to the correct air-tightness, suggesting a skills gap (Committee on Climate Change 2019), and Consultant individuals at the design stage of the housebuilding process are not part of the construction stage. This lack of continuity between housebuilding projects severely obstructs learning and the continuous improvement of build quality standards.

3.4.3 Homeowner satisfaction

Defects require rectification, which is disruptive for new homeowners and has a bearing on overall customer satisfaction. The most commonly employed mechanism for measuring customer satisfaction in UK-based new homes comes from the NHBC National New Homes Survey (Auchterlounie 2009). The levels of satisfaction from the first survey (at eight weeks post-occupation) are sent to the Home Builders Federation (HBF) - a membership organisation representing

housebuilders who produce over 80% of new homes in the UK (HBF 2019). The survey results are used to create a public annual customer satisfaction rating score (Boothman *et al.* 2018) across the scheme's 41 members (HBF, 2019). HBF member housebuilders use a star embellished HBF logo on all their promotion literature to communicate their rating to potential customers quickly.

Boothman *et al.* (2018) raise concerns about this survey process. They argue that the HBF and NHBC serve their membership, and are not impartial. This is observable when it comes to the results from the second survey, taken at nine months post-occupation. The initial survey taken at eight weeks covers a 'honeymoon period' in the occupation process where customers are unlikely to notice defects. Defects and quality issues reported in the later survey are not publicly available and do not affect the housebuilder's star rating, despite being a more useful indicator of the housebuilder's quality standards to potential customers (BBC Radio 4 2017). Boothman *et al.* (2018) found that despite housebuilders routinely handing over substandard homes, their star ratings rarely declined.

This suggests that there is no motivation for housebuilders to learn to improve their quality standards in the long-term, as they do not need to. The HBF customer satisfaction survey star rating system is a useful promotion tool for housebuilders; as it is not a mandatory requirement, if it were not beneficial, the housebuilder would not be a member. Housebuilder learning centres around achieving and maintaining a high star rating, as this attracts customers. Any learning beyond this remit is argued here as superfluous.

3.4.4 Improving build quality through defect reduction

Comparisons are frequently drawn between the housebuilding and manufacturing industries in efforts to streamline production processes, improve efficiencies and reduce defects (Gann 1996). Arditi and Gunaydin (1997) outline differences between the two industries as: each housing project is unique; site conditions always vary and are never constant; the life cycle of a house is far longer than other products; overall project build quality is assessed in isolation by humans; the project owner, i.e. the housebuilder, influences production; and the individuals involved in each project vary every time. Therefore, some, but not all, learning from manufacturing activities is applicable to the housebuilding process.

A common recommendation for dealing with defects, applicable to both housebuilding and manufacturing industries, is constant throughout the literature. Implementing a quality management system across the design and construction stages (Love 2002; Baiche *et al.* 2006; Davey *et al.* 2006; Jingmond and Ågren 2015) improves build quality standards (Zero Carbon Hub 2014; APPG 2016). In addition, Auchterlounie (2009) posits that “new house builders are not addressing the underlying problems of lack of supervision on housing sites. They are still employing the end-of-line inspection methods, and expecting the untrained customer to do the inspections” (2009, p.249). He argues that defect reduction results from the development and enforcement of robust quality inspections, as these support the challenges of housebuilder staff supervising individuals from Trade organisations on site.

3.5 Quality management processes in housebuilding

While following NHBC Requirements results in a house that is safe and legally habitable, this does not mean it is necessarily finished to a high standard. In this study, the term "quality management standard" refers to the housebuilder's own set of requirements, rather than those set by the NHBC. Quality management standards provide a way for organisations to set out and thus demonstrate a systematic production process, removing a degree of uncertainty and leading to a more uniform quality of product (Heras-Saizarbitoria and Boiral 2013). There are several options open to organisations who wish to adopt a quality management system.

Quality Assurance (QA) was introduced to the construction industry in the 1980s through British Standard BS5750 on Quality Systems, and gave organisations the ability to devise and document their quality management procedures, in the hope that through reporting them, errors would reduce over time (Shammas-Toma *et al.* 1998). Since then, the British Standards Institution, that set the BS5750, became a member of the International Organization for Standardization (ISO). Consequently, BS5750 was reclassified as BS EN ISO 9000 in 1994 (ISPO 2019).

As a result, the most well-known certifiable quality management standard in the UK is ISO9001 (ISO 9000:2015 2015). Quality management is defined in ISO9001 as “management with regard to quality” (ISO 9000:2015 2015, cl 3.3.4), where quality is defined as, the “...degree to which a set of inherent characteristics of an object fulfils

requirements”, and management is defined as, “...coordinated activities to direct and control an organisation” (ISO 9000:2015 2015, cl 3.6.2 and 3.3.3). An organisation is defined as “...person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives.” (ISO 9000:2015 2015, cl 3.2.1). Quality assurance and quality control form part of the quality management process, with quality control focusing on ensuring that set quality requirements are met, and quality assurance “...providing confidence that quality requirements will be fulfilled” (ISO 9000:2015 2015, cl 3.3.6). These definitions of quality management terms are used throughout this study.

However, ISO9001 accreditation is not a prerequisite for housebuilders, and it does not automatically guarantee quality. Pratt (1995) posits that, given the target standards are determined by the organisation carrying them out, it is unlikely the bar will be set too high to achieve them. Instead of delivering quality, all that improves under ISO9001 is the paper trail for auditors to follow.

The literature explored above implies that the number of defects in new homes should fall if the housebuilding industry implements new quality management standards or processes. However, for this to happen, individuals at all levels of the housebuilding industry need to learn the acceptable standards and how to achieve them. Therefore, an understanding of multi-level learning in this context is crucial. Against this backdrop, the second part of the chapter explores how multi-level learning in housebuilding takes place.

3.6 Multi-level learning in housebuilding

The cultural emphasis in housebuilding which centres on rapid task completion, irrespective of quality standards, increases the chance of defects occurring (Roy *et al.* 2005). Emphasis is placed on ‘get it right first time’, as once an individual from a Trade organisation has been on site to do something once, physically getting them back on site to rectify a defect is incredibly hard, as new jobs being undertaken by the Trade organisation become a priority, not correcting a defect (Love 2002). Despite this ‘get it right first time’ culture, defects occur on site all the time, suggesting there is little learning taking place at all levels in housebuilding.

Three studies from the literature search (described in Section 3.2) focus specifically on organisational learning in housebuilders (Knauseder *et al.* 2007;

Jansson *et al.* 2015; Hopkin *et al.* 2016) but only Hopkin *et al.* (2016) focuses on learning in relation to build quality. These studies are examined in turn.

Each of the three papers has a different focus; Hopkin *et al.* (2016) explore the relationship between organisational learning and defects detection within Housing Associations, as opposed to private housebuilders. Jansson *et al.* (2015) study various feedback communication channels used by a Housebuilder organisation when developing new custom ordering technology. Knauseder *et al.* (2007) investigate how different sectors in the construction industry (housebuilder, infrastructure and service organisations) capture and share their experiences. Also, Hopkin *et al.* (2016) and Jansson *et al.* (2015) approach organisational learning from different theoretical standpoints. Hopkin *et al.* (2016) draw on the dynamic capabilities of an organisation as expressed through routines developed by Zollo and Winter (2002). Conversely, Jansson *et al.* (2015) initially draw on Crossan *et al.*'s (1999) 4I framework; however, the former state that the 4I model does not include motivators for why learning moves between levels, adding that there is no way to identify 'supply push' or 'demand pull' to encourage multi-level knowledge flow. Instead they draw on Argyris and Schön's (1978) notion of single- and double-loop learning together with Rogers' (2003) diffusion of innovation theory to examine their findings.

However, each paper outlines key findings that need to be taken into account in this thesis. Hopkin *et al.* (2016) found that: firstly, build quality improves if it is constantly monitored by an independent party; secondly, feed-forward between lower hierarchical levels and the organisational level in Housing Associations is selective, and carried out by a few specific individuals; thirdly, formal learning between projects is not taken seriously, as improvements to quality are made through informal inter-organisational conversations on site during construction, not in advance; and lastly, Housing Association organisations do not consider defects important enough to warrant regular assessment.

Jansson *et al.* (2015) argue that for a Housebuilder organisation to improve its production processes, it needs to adopt a variety of feed-forward communication channels during a project's life cycle, as each channel serves a purpose, rather than relying on one channel as a catch-all. Therefore, this implies that a Housebuilder organisation should facilitate multi-level learning by having a varied and complex communication infrastructure. Knauseder *et al.* (2007) conclude that, as each sector

has different characteristics, they learn in different ways, meaning a blanket approach cannot be applied to the construction industry. Therefore, beneficial multi-level learning strategies for housebuilders are only suitable for Housebuilder organisations.

The next part of the chapter explores organisational learning literature from the across the construction industry, which includes housebuilding. The focus is on identifying key differences between the more general multi-level learning literature described in Chapter 2, and multi-level learning in a construction context.

3.6.1.1 *Organisational learning*

Build quality relies on human skills as part of a craft, rather than machine-based techniques (Roy *et al.* 2005). Therefore, all individuals involved in housebuilding cause defects. The bespoke nature of housetype designs, i.e. a proposed house design has never been built in that configuration before, means items are likely to be built incorrectly (Davey *et al.* 2006). At the construction stage, poor workmanship and defects result from individuals from Trade organisations on site not having the correct skills for the job, or not knowing the standards to meet (Love 2002; Baiche *et al.* 2006).

Subsequently, scholars suggest learning in construction frequently occurs at an individual level, as organisations in the construction industry place an over-reliance on an individual with a specific skill set and associated experience to repeatedly complete a task, rather than allowing others up the hierarchical levels to benefit from that individual's learning (Scott and Harris 1998; Senaratne and Malewana 2011). As a result, knowledge and experience accrues unequally by individuals involved in construction projects (Styhre *et al.* 2004; Hopkin *et al.* 2016).

In housebuilding and construction, the literature uses common phrases, such as “feedback” and “lessons learned”, so while not describing the development of organisational learning theories per se, much research in the construction field relates to improving communication across a multi-disciplinary industry to avoid the mistakes made in one project being repeated in future projects. However, feedback and lessons learned relate here to what Crossan *et al.* (1999) describe as *feed-forward*. This links to the formation of organisational memory, or the lack of formal recording of learning, which is often described as problematic for housebuilders. Reporting feedback, through the feed-forward learning sub-process, has been advocated by a growing number of researchers in the field (Way and Bordass 2005; Leaman *et al.*

2010; Stevenson and Rijal 2010; NHBC Foundation 2012; Eaton 2014) to close the performance gap. Scholars assign the lack of feed-forward to the project-based nature of construction work. This is because mechanisms, such as post-project reviews, to pass learning from a finished project to the start of a new one rarely happen, despite a number of studies highlighting the value of the practice (Von Zedtwitz 2002; Kululanga and Kuotcha 2008; Opoku and Fortune 2011; Paranagamage *et al.* 2012; Shokri-Ghasabeh and Chileshe 2014). However, feedback is rarely reported as individuals on construction sites struggle to keep formal records of build progress (Davey *et al.* 2006), and decisions made influence formal memory formation at an organisational level. As capturing construction-related learning is challenging, some studies suggest using a “lessons learned database” (Senaratne and Malewana 2011) or “project histories” (Maqsood *et al.* 2006), and storing lessons-learned centrally for all levels to access in future. However, without the formalisation of project-based learning at the organisational level, quality standards cannot be assessed in practice, or changes made clearly fed back to lower levels (Roy *et al.* 2005). This suggests that knowledge management plays a significant role in acting as a formalised cross-project memory repository, given the complexity of projects and number of individuals involved in the housebuilding process.

Many construction-based learning studies focus on inter-organisational learning. Love *et al.* (2011) describe how individuals in a construction context collectively share knowledge across organisational boundaries, therefore forming inter-organisational *communities of practice*. However Ruikar *et al.* (2009) assert that competition between organisations hinders the knowledge sharing and learning process. Shamas-Toma *et al.* (1998) identify poor coordination between construction organisations as a major barrier to multi-level learning. Part of this stems from disagreements about who is ultimately responsible for quality management (Shamas-Toma *et al.* 1998). In housebuilding, this could be the Consultant organisation designing the project, the Housebuilder organisation overseeing the build, or Trade organisations appointed to build the homes. Similarly, Roy *et al.* (2005) argue that the top-down implementation, or *institutionalisation*, of new quality management processes is challenging when the responsibility for building each part of a house is sub-contracted to multiple Trade organisations, who are unlikely to be familiar with the housebuilder’s quality management processes within

their own organisation, and therefore unable to educate their staff accordingly. This implies that *institutionalising* is not limited to the Housebuilder organisation but extends to Consultant and Trade organisations too as, for quality standards to be maintained and defects minimised, these external organisations also need to learn those standards. However, Hopkin *et al.* (2016) assert that the organisational level needs to make changes to standard organisational procedures, rather than individuals at lower hierarchical levels making the decision to change procedures and then implement the changes. Implementation in this thesis is therefore synonymous with *institutionalising*, as outdated working practices relating to a quality management process are superseded by new ones within a Housebuilding organisation and the Consultant and Trade organisations it works with.

To sum up, learning in construction centres around individuals with specific skills. As a result, learning stays at lower hierarchical levels and hinders the formation of any formal lessons learned being captured at the organisational level for wider learning. Also, for a housebuilder to implement new quality management standards, the learning sub-process of *institutionalising* needs to occur across multiple inter-organisational relationships, rather than just within the Housebuilder organisation.

3.6.2 Influential constructs

Chapter 2 identified and explored five broad constructs influential to multi-level learning. This section re-examines these constructs from a housebuilder perspective. As with the previous section, the focus in this section is on identifying key differences between the more general multi-level learning literature described in Chapter 2, and multi-level learning in a construction context.

3.6.2.1 Power

Power is an influential construct between individuals across multiple organisations, as when one organisation becomes over-dependent on another, which is typical in housebuilding, these asymmetrical relationships carry financial repercussions. Peters *et al.* (2009) suggest power relations change when inter-organisational collaboration turns acrimonious. As the relationship is essential to one organisation, more senior individuals become involved and take control of the relationship, investing time and effort into negotiating a new stance from which the relationship can proceed. Before collaboration can recommence, the power imbalance

in the relationship disrupts the functionality of inter-organisational relationships going forward.

Financial costs within inter-organisational relationships are linked to power, as defect rectification is expensive and has to be paid for by one or both organisations. Love (2002) found that the indirect costs from one project were estimated to be three times the cost of actually rectifying the work. However, the external organisations did not explicitly record these indirect costs; they absorbed them. As external organisation efforts to recover costs can lead to conflicts between organisations, to maintain a positive working relationship and the promise of future work, external organisations often learn to absorb the indirect costs instead of learning how to avoid accruing them in the first place.

3.6.2.2 *Time*

A key differentiating factor between studies of mainstream organisations in Chapter 2 and the housebuilding industry, is how organisations achieve tasks over time. The chunking of time into projects converts clock time into event time (Ancona *et al.* 2001). Davey *et al.* (2006) posit that defects are caused by project timescales being too short. Consequently, on-site staff from the housebuilder tolerate workmanship quality that fails to meet the minimum standards set, as there is insufficient time within a project window for the Trade individual to go back and put it right.

Swan *et al.* (2010) found that organisational learning from housing projects only took place through an accrual of individual and group learning and in organisations where similar projects were repeated and required a high degree of project management. This suggests that, as volume housebuilders design and build the same product repeatedly, multi-level learning occurs. Henry Ndoni and Elhag (2010) argue that no learning takes place between projects, as there is a disconnect between the individuals involved at the end of one project and those that form the start of the next. This links to Styhre *et al.*'s (2006) assertion that the temporal separation between individuals involved at the design and construction stages is problematic. They state that, as there is a substantial difference between how Consultant individuals and Trade individuals learn, neither group learns from the other over time. Styhre *et al.* (2006) conclude that Trade individuals rarely codify their knowledge and skills into writing, as they prefer to learn through face-to-face

verbal communication with others, rather than read written information. As a result, the authors suggest opportunities for both *communities of practice* to communicate verbally at specific points in time during a project facilitate learning; e.g. prior to construction work starting and at the end of a project.

3.6.2.3 *Communication*

While aspects of communication are critical to learning in a housebuilding context, there are notable differences. For example, in Chapter 2, scholars focus on intra-organisational social networks, whereas inter-organisational communication is seen as more crucial in housebuilding studies (Barlow and Jashapara 1998; Love 2011).

Similarly to Zietsma *et al.* (2002), Senaratne and Malewana (2011) posit that the centrality of specific individuals in social networks influences the effectiveness of learning in housing; however, this was across a multi-organisation construction team. These individuals provided the relationship link between organisations, thus exerting an exceptional degree of power over what is communicated across a Project Team. This relates to Zeimers *et al.*'s (2019) assertion that *boundary spanners*, or individuals in a *community of practice*, broker boundary relationships (Karrbom Gustavsson and Gohary 2012). Conversely, in their study, Karrbom Gustavsson and Gohary (2012) found that learning around collaborative construction projects was not communicated between organisations through a single *boundary spanner* but by multiple individuals in different organisations interacting. This created a power balance rather than asymmetry that supported collaboration. The first instance (Senaratne and Malewana (2011)), suggests *institutionalising* took place, whereas the second instance (Karrbom Gustavsson and Gohary (2012)) implies *intertwining* occurred.

The length and duration of social relationships are particularly important for organisations involved in construction. Håkansson *et al.* (1999) found that learning is most prevalent where relationships already exist between construction organisations. Henry Ndoni and Elhag (2010) found that where relationships are collaborative across organisations, cost and time savings are made concurrently with quality standard improvements.

In Chapter 2, the *feed-forward* of multi-level learning was found to occur at a slower rate when organisations were located in different offices, as communication between individuals relied on indirect communication methods (Lunnan and Barth

2003). In a housebuilding environment, this geographical separation and distribution of a housebuilder's workforce also hinders the *feedback* of learning sub-processes. Roy *et al.* (2005) argue that each regional office, over time, develops its own version of the housebuilder's centrally developed routines and associated practices. They posit that this geographic distribution makes implementing and enforcing new standardised procedures challenging, as individuals are not just in separate offices but scattered further across multiple housing sites, creating a diverse environment of an organisation's standard practices.

3.6.2.4 *Trust*

In Chapter 2, trust was identified as influencing multi-level learning. However, trust between individuals and organisations is less likely to be established in construction, project-based settings, as the individuals involved on a housing project are always changing (Swan *et al.* 2010). Barlow and Jashapara (1998) suggest trust improves between organisations, who continuously work together over time. They found that trust was built between individuals as they got to know each other at informal but project-related events, as individuals built trust between themselves through face-to-face communication (Ruikar *et al.* 2009).

3.6.2.5 *Emotion*

As in Chapter 2, an individual's emotions are influential to multi-level learning in housebuilding. However, Love and Smith (2016) posit that there is also a relationship between construction errors, emotion and learning. When an individual makes a mistake, it generates an uncomfortable emotional response in the individual. However, if they view the mistake as disastrous, they struggle to process how they are going to put it right, generating more negative emotions. Love and Smith (2016) argue that while errors make individuals question their own competence, and self-doubt suppresses learning, they need to take responsibility for their actions. The authors suggest that organisational leaders adopt a positive approach to error management and embrace the learning opportunities that arise from errors.

However, Knauseder *et al.* (2007) found that Housebuilder organisations are not seen as particularly supportive in this way. Individuals within large Housebuilder organisations perceive themselves as less valued by the organisation and not looked after in the same way their counterparts in Infrastructure or Service organisations are. Their participants also describe Housebuilder organisation leaders as less

encouraging, less open to new ideas and less likely to reward individuals than leaders of their counterparts in the other two sectors.

In an inter-organisational context within housing projects, an individual from a Trade organisation rushing work due to a lack of time can do a poor job. However, they dislike having to do it again, suggesting a negative psychological barrier to learning (Love 2002). Also, the offending individual may not rectify their own work and learn from it, as the Trade organisation may send a more capable colleague to do the rectification works instead. Love (2002) posits this too has a negative psychological effect on the second individual carrying out the work, as rectifying a defect is more challenging for the second individual than completing the task correctly first time around. Thus, demotivating the second individual, and heightening their stress levels.

3.7 Positioning this study in the literature

Having examined the additional construction sector literature, in the section above, it appears multi-level learning in housebuilding appears to differ from other sectors in the following ways: Firstly, learning occurs primarily at the individual level, on a selective basis, and across inter-organisational relationships, between multiple individuals acting as *boundary spanners*. These relationships have a power asymmetry, as the housebuilder commissioning the project is over-reliant on the organisations doing the design or building work. The power is therefore weighted in the Consultant or Trade organisation's favour; however, this imbalance is counteracted by the financial power held by the commissioning organisation, i.e. the housebuilder. When the power in the relationship between the housebuilder and an external organisation balances, *intertwining* occurs, when the housebuilder has the upper hand, *institutionalising* takes place. Secondly, dividing time into projects affects quality standards in the run up to housebuilder imposed deadlines, with no project-to-project continuity to understand lessons learned. This is exacerbated as project-related learning needs to include Consultant and Trade organisations, who are involved in housebuilding projects at different points in the life cycle of a housing project. Also, as Project Team membership changes so much over the life cycle of a housing project, it is challenging for multi-level learning to encompass lessons learned from across the duration of a project's life cycle, and for trust to build between Project Team members. Thirdly, *institutionalising* in housebuilding is

difficult as dividing a workforce up into housing sites adds another level of geographic separation beyond the regional office umbrella, further diversifying understanding of quality management standards. Lastly, individuals feel discomfort when they make mistakes, especially as housebuilder are not supportive of individuals who make mistakes. This may account for why individuals in construction dislike going back to rectifying defects they caused. The three points underlined above are considered most relevant to housing-related multi-level learning in this thesis in relation to Chapter 2, and are discussed next.

3.7.1 Institutionalising vs. intertwining

In housebuilding as a particular context, it appears that *institutionalising* follows a different pattern of learning sub-processes than suggested in Crossan *et al.* (1999), and the subsequent amendments suggested in Chapter 2. When a new routine has been codified, *institutionalising*, as opposed to *intertwining* subsequently takes place between the organisation and associated external organisations. This is posited as the expertise and knowledge of the external organisation not being sought by the housebuilder at this point in time. Instead the external organisation is asked to put aside their knowledge and experience, and follow the new routine as expressly communicated (Figure 5).

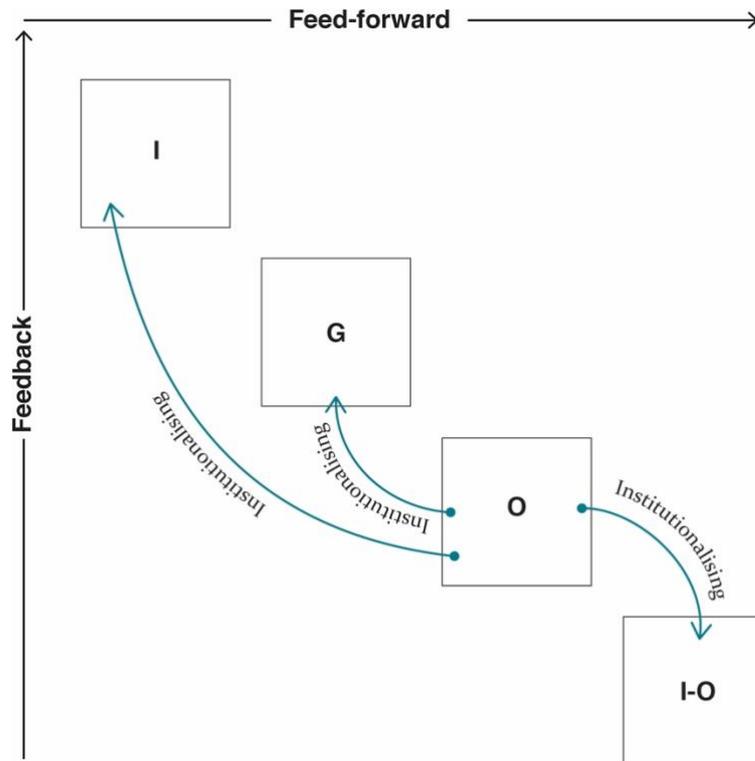


Figure 5: Quality management routine institutionalising learning sub-processes.

Standards are communicated at the organisational level to all levels required to enact them

3.7.2 Housebuilder, Consultant and Trade organisations

Unlike organisations referred to in Chapter 2, the social conditions created by intra- and inter-organisational groups within the housing sector may specifically influence the manner in which multi-level learning sub-processes function between projects in two ways. Firstly, construction-based learning literature suggests that learning new quality standards through a codified routine is likely to be a continuous process for the Housebuilder organisation, as *institutionalising* the routine can be most effectively conducted from within the organisation. In contrast Consultant and Trade organisations do not have the same continuity. Consultant individuals communicate learning to Trade individuals using written communication, and therefore do not engage Trade individuals in a way that necessarily suits their learning style (Styhre *et al.* 2006). Also, Trade individuals do not communicate learning back to Consultant individuals at the end of a project. This suggests a specific absence of feed-forward learning sub-processes that connect learning across time and

space, resulting in history repeating and construction organisations ‘re-inventing the wheel’ for every project (Keegan and Turner 2001; Bresnen *et al.* 2003).

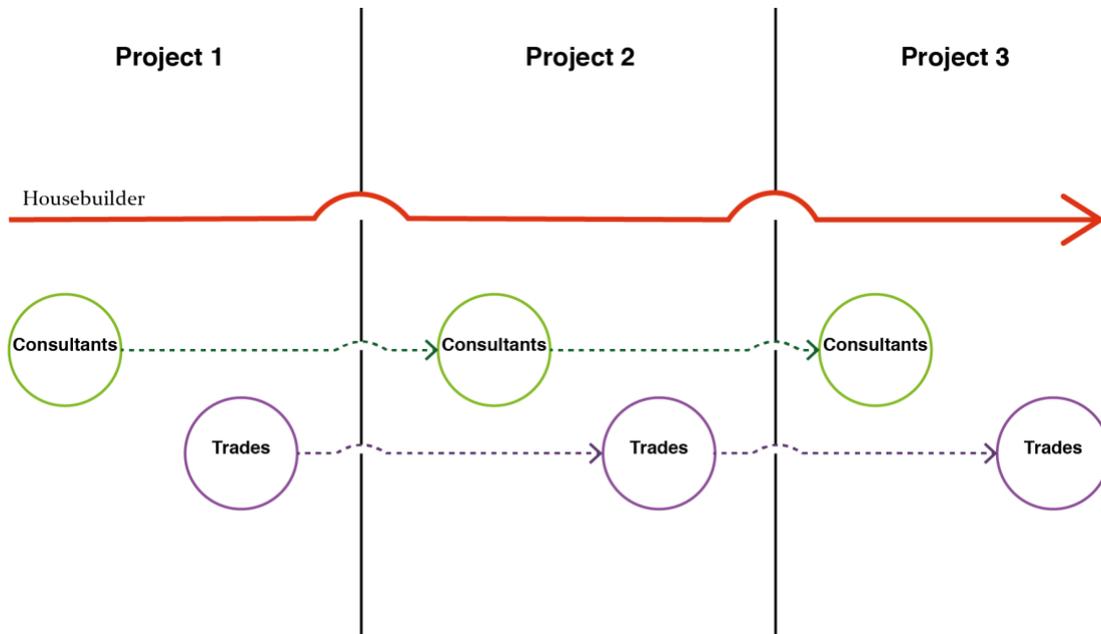


Figure 6: Housebuilder, Consultant and Trade organisations project-to-project learning.

The Housebuilder learning is continuous, while the other two do not learn effectively from each other from project to project.

Secondly, the way in which two disparate groups of external organisations (individuals within multiple Consultant and Trade organisations) learn through distinct types of communication method is argued as specifically influencing Housebuilder organisations’ memories. Styhre *et al.* (2006) suggest storing knowledge through writing builds a more accurate memory of organisational events and facilitates an ability to set, remember and achieve goals, whereas a lack of written events results in myth creation and shorter-term recollection. Therefore, learning stored by the Consultant organisation may not reflect the learning in practice, as it does not include a written record of learning accrued by the Trade organisation.

3.7.3 Geographic separation

Another difference from the literature in Chapter 2 relates to the further geographic separation of organisational parts and functions, which means that different intra- and inter-organisational groups form. Individuals from within each

region of the housebuilder share the same organisational routines but have non-identical working practices around their enactment (Roy *et al.* 2005). Alongside this, the relationship each housebuilder regional office group has with individuals from their Consultant and Trade organisations forms multiple groups with the same constituent parts; however, they are non-identical.

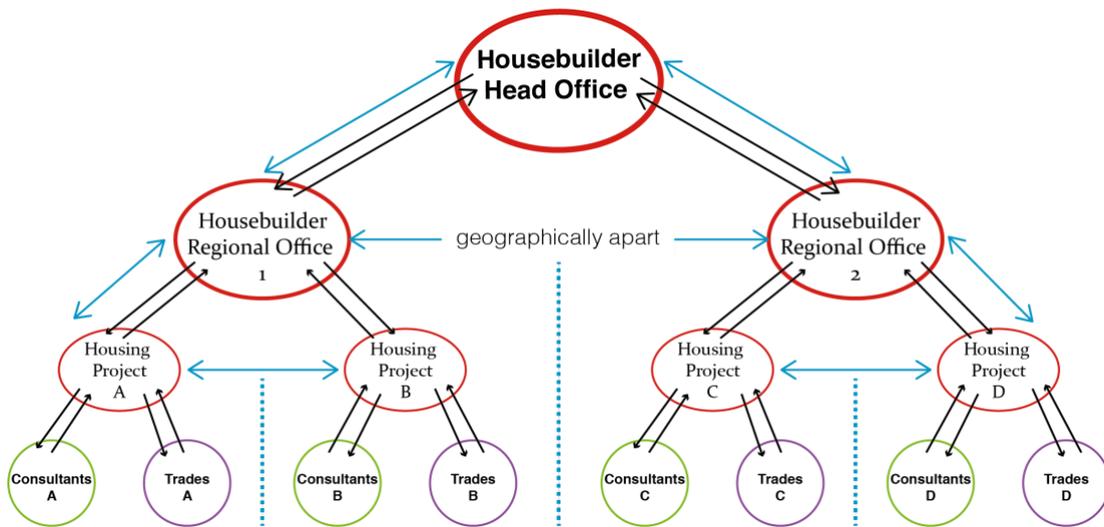


Figure 7: Further geographic separation into non-identical groups.

By Housebuilder organisations being split into geographically distinct Project Teams within geographically distinct regional offices, they develop similar yet non-identical working practices of organisational routines

Therefore, the *institutionalising* of a *quality management routine* across a Housebuilder organisation, and the external organisations they work with, becomes more difficult and less uniform, as the number of housebuilding sites operated by regional offices (and *quality management routine* enactment possibilities) increase.

To summarise, the research highlighted in this chapter has specifically identified that organisations within the construction industry (Housebuilder, Consultant and Trade organisations included), struggle to learn from past mistakes and collectively improve build quality, despite having *quality management routines* in place to help.

Hopkin *et al.* (2016) also argue that learning in relation to housebuilding emphasises changes to organisational processes and routines. Implementing changes to quality standards and associated practices project-wide (i.e. inter- and intra-

organisational levels) requires teamwork and communication, where the notion of standardisation is supported (Roy *et al.* 2005). This suggests the focus is placed on the learning sub-process of *institutionalising*; however, there is little empirical evidence of how the multi-level *institutionalising* actually takes place and what happens after a group or individual has been made aware of changes to a routine. Therefore, this thesis seeks to understand, post the *institutionalising* of a new *quality management routine*, what happens in terms of the multi-level learning sub-process (based on Crossan *et al.*'s (1999) 4I framework with subsequent refinements), and what influences how they occur in relation to UK housebuilding practices.

3.8 Chapter summary

In this chapter, an overview of UK housebuilding was given, showing that current supply does not meet demand, and that UK volume housebuilder efforts to accelerate the construction process have detrimental implications for quality. The issues highlighted relate to the increased numbers of defects, lower home environmental performance and reduced levels of customer satisfaction.

Three groups of organisations were identified as influential to both build quality and defects: Consultant organisations that design new homes, Trade organisations that build them, and Housebuilder organisations that manage the overall housebuilding process. Quality standards were explained and two different standards described; firstly, statutory regulation and secondly, the housebuilder's own standards. This thesis investigates the latter. Implementing a quality management system across the design and construction stages was described as a way to reduce defects, through supporting housebuilder staff when supervising external organisations.

Relevant housebuilder learning studies were discussed, highlighting how quality inspections, defect analysis, the use of specific social networks, and reviews that used different communication methods across intra- and inter-organisational social networks facilitated multi-level learning; also, how the use of multiple feed-forward communication channels supported housebuilder learning. Likewise, housebuilders learning in a distinct way to other types of organisations in the construction industry, render blanket approaches to construction-based learning inappropriate. These are specific insights that build on the generic organisational learning concepts highlighted in Chapter 2.

Studies of construction-specific multi-level learning were reviewed to draw out any theoretical and practice differences from Chapter 2 in relation to housebuilders. It was shown that learning is privy to a select group of individuals with the necessary skills, whom Housebuilder organisations repeatedly rely on to perform, reduce defects or improve quality standards. Therefore, learning tends to occur at lower hierarchical levels in an informal capacity as opposed to formally at the organisational level, and most importantly, at the inter-organisational level, individuals within Consultant and Trade organisations learn through different communication methods, hindering learning over time.

Following this, feed-forward and feedback learning sub-processes were found to occur differently at the inter-organisational level. For new quality management standards to be learnt, the feedback learning sub-process of *institutionalising* takes place, as opposed to *intertwining*. Power was specifically linked to cost; time to working in housing projects; communication to the extensive inter-organisational focus, as well as further geographic separation between parts of the Housebuilder organisation on housing sites; trust was linked to inter-organisational relationships despite their being of shorter duration; and emotion to an individual's mistakes in an organisational environment that is not supportive of mistakes being made.

The chapter finished by identifying three further gaps in the literature relating to: firstly, *institutionalising* and feedback learning sub-processes at the inter-organisational level; secondly, cross-project continuity when individuals in Consultants and Trade organisations learn using different communication methods; and lastly, how the geographical relationship between the regional offices of a single housebuilder creates multiple similar, but distinctly different, inter-organisational Project Teams, which are all geographically separate.

In Chapter 2, it was argued that the 4I framework solely provided a multi-level structure and mechanism to illustrate how multi-level learning occurred in and between organisations. Therefore, there is a gap in the literature regarding how *institutionalising* actually occurs, and the conditions that affect the associated learning sub-process. This chapter explored the contextual conditions surrounding multi-level learning in housebuilding and suggested there are gaps in the literature around *institutionalising* and the fundamental relationships between housebuilders

and external organisations from structural, temporal and spatial aspects. Therefore, this thesis seeks to understand how, given these multi-faceted hindrances, individuals within and beyond Housebuilder organisations actually learn new quality management standards.

CHAPTER 4. METHODOLOGY

4.1 Chapter introduction

This chapter sets out the methodological basis on which post-*institutionalising* multi-level learning in a UK Housebuilder organisation context is studied here. Firstly, the research question is set out, followed by an outline of the Researcher's philosophical beliefs and approach to epistemology. Secondly, the research strategy and case study approach is described and justified. Thirdly, an overview of the methods and data collection process is given. Finally, the inductive and abductive analytic strategies are described, and methodological limitations discussed.

4.2 Research question and study objectives

This research aims to further understand the conditions under which multi-level learning sub-processes occur, following the feedback process described by Crossan *et al.* (1999) of *institutionalising*. In this instance, the subject of study is a new set of quality management standards, devised, codified and institutionalised by the organisational level of a UK volume housebuilder. Therefore, the research question and associated objectives are outlined in Table 6 below.

Table 6: Research questions and study objectives

Research Question:	<i>How does learning occur at multiple levels when an organisation institutionalises new quality management standards?</i>
<i>Applying this question to new home build quality, the study objectives are:</i>	
Objective 1	<i>Identify the conditions under which multi-level learning occurs</i>
Objective 2	<i>Explore how the multi-level learning sub-processes unfold under these conditions</i>
Objective 3	<i>Explain how, when and why these conditions are influential to learning</i>

The question and objectives have been refined over time to suit the methods employed to study multi-level learning. Figure 8 sets out the overall research design strategy, identifying how the question and each objective have been approached.

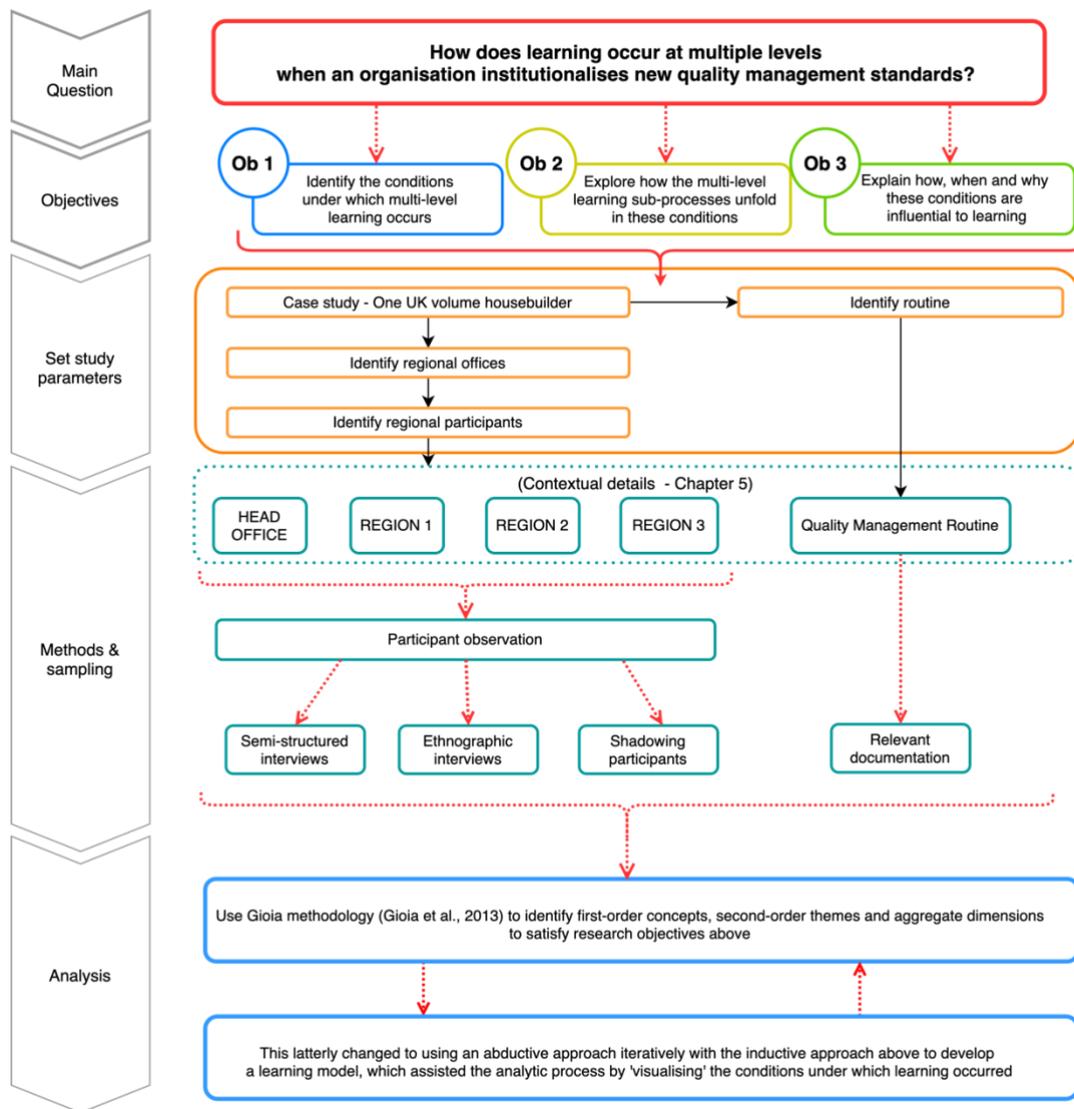


Figure 8: Research design diagram

4.3 Research position

When examining the research methods available to best answer the research question, much depends on the question itself together with the Researcher's ontological and epistemological beliefs of what constitutes reality, its construction and how to study it. The understanding sought here explores three facets of the phenomena under study: firstly, learning processes over time, rather than establishing specific learning outcomes, i.e. the dynamic and temporal nature of the phenomena. Chia (2002) argues that a Parmenidean ontology of *being* is a relatively stable absolute reality, compared to a Heraclitean ontology of *becoming*, which is a fluid and

constantly changing reality. Moving from the former to the latter shifts emphasis from outcomes and end results to the process itself. This suggests *becoming* ontology best suits this study's learning sub-process focus. Secondly, a multi-level emphasis on learning, i.e. abstract social constructs made up of numerous intra- and inter-organisational interactions, constructing meaning and interpreting multiple perspectives of the phenomena (Robson and McCartan 2016), both within and beyond a single organisation. Therefore, the epistemological mindset drawn on for this study is not an objective one, but one of constructivism, where meaning is socially constructed, not discovered, in an ever changing reality (Gray 2014).

In addition, the study aims to understand the phenomena from its interior, drawing on the epistemological principle of *verstehen*, i.e. "understanding" first posited by German psychologist Wundt in 1928 (Flick 2009). Continuing from a theoretical perspective, this study adopts an interpretive approach to answer the research question by exploring "culturally derived and historically situated interpretations of the social life-world" (Crotty 1998, p.67). Therefore, views from multiple diverse perspectives are captured as a way to increase the credibility of researcher insight into multi-level learning sub-processes (Langley and Abdallah 2011). Thirdly, the organisational context within and surrounding the housebuilder is explored and explained, i.e. the environment in which learning occurs in light of influential factors (Argote 2013). Therefore, to gain a holistic understanding of the phenomena, a naturalistic inquiry approach, or "studying people in everyday circumstances by ordinary means" (Beuving and de Vries 2014, p.15) is proposed (Lincoln and Guba 1985; Armstrong 2010). In light of these three aspects, the rationale behind this study's research strategy is discussed.

4.4 Justification of research strategy

This section outlines the rationale for a case study approach. This is followed by case selection criteria.

4.4.1 Case study as the research strategy

Case studies have been used as a way of explaining complex organisation-based phenomena to others as they describe real life situations (Eriksson and Kovalainen 2011). Therefore, case studies are considered suitable for empirical research where a phenomenon under study cannot be removed from the context, i.e.

the time, place and social structure, in which it operates, and where the context is rich in detail (Yin 2009; Creswell 2013). For this study, understanding the context in which multiple levels of an organisation operate is essential to answering the research question. A case study approach was therefore adopted, with a single Housebuilder organisation being identified as a bounded system, unit of analysis, or “case” (Bernard 2006; Yin 2009; Creswell 2013).

Historically, using cases for research has been criticised, citing an inability to make generalisations from a single set of findings as a reason (Yin 2009). However, Stake (2005) argues that the purpose of case study research is to optimise a researcher’s understanding of a specific case, not to imply meaning in more general terms, or indeed generate theory. Therefore, he posits that case study selection fundamentally stems from the opportunity to learn about a phenomenon, where the triangulation of findings through different methods informs researcher understanding, rather than facilitating the study’s repeatability in future.

There has also been much debate as to whether investigating a single case is sufficient to stand up to rigorous theory building in contrast to comparing multiple cases (Eisenhardt 1989; Dyer and Wilkins 1991; Flyvbjerg 2006). Eisenhardt (1989) advocates comparing between four and 10 cases, with less than four providing insufficient complexity to generate theory beyond the idiosyncratic. However, Piekkari and Welch (2018, p.345) describe Eisenhardt’s view as representing a form of ‘qualitative positivism’, where a case study “adopts qualitative methods and methodologies, but accompanies them with positivistic assumptions about the nature of social reality (ontology) and the production of knowledge about this reality (epistemology)”. This notion, put forward by Prasad and Prasad (2002), is particularly relevant in relation to generalisability, as the context argued essential by some scholars to understand a single phenomenon’s structure in depth, is dismissed by Eisenhardt and Graebner in the pursuit of determining over-simplified causality (Piekkari and Welch 2018). Other qualitative researchers argue that the aim of studying a single case is to gain an in-depth understanding from within (Flyvbjerg 2006; Creswell 2013). Dyer and Wilkins (1991) propose that better theory is generated from a single rich description rather than comparing multiple “thin” ones. By preferring to make comparisons between cases, Dyer and Wilkins argue that a deeper understanding of a social phenomenon is lost. However, they, along with others

(Stake 2005; Thomas and Myers 2015), support Eisenhardt's notion of appraising "mini-cases" as it provides a holistic insight into different aspects of the same environment.

Adopting a naturalistic inquiry approach, it could be argued that, as context is crucial to understanding a phenomenon, any generalisation beyond these contextual boundaries may be limited due to unforeseen real-world complexities (Lincoln and Guba 1985; Gray 2014). Thomas and Myers (2015) elaborate on this by arguing that removing the context surrounding a phenomenon to make the findings generally applicable in all situations makes them mundane and uninteresting. They suggest that the strength of the case study lies in developing knowledge within a set of contextual conditions, but that this knowledge could be transferable elsewhere. However, any transference depends on the interpretations of both the researcher and reader. This knowledge needs to be understood within a specific context to be of value beyond a studied case, but that value is only realisable in the context of an individual's own experience and interpretation, be it researcher or reader. Thomas and Myers (2015) state that it is the links made by the reader, through seeing the connections between their own experience and the researcher's, that makes this 'exemplary knowledge' transferrable. In summary, Ward Schofield (2000, pp.92–93) suggests that,

"A consensus appears to be emerging...generalisability is best thought of as a matter of the 'fit' between the situation studied and others to which one might be interested in applying the concepts and conclusions of that study. This conceptualisation makes thick descriptions crucial, since without them one does not have the information necessary for an informed judgement about the issue of fit."

Therefore, generalisability or the transferability of exemplary knowledge, from a single case is achievable as long as sufficient information about the context and phenomenon is presented. It then becomes the reader's decision as to whether the findings are applicable elsewhere. The argument of fit is crucial here, as while the majority of large UK volume housebuilders have similarities in their structural make-up, for example are public liability companies (PLCs), operate across multiple

regional offices, employ individuals within discipline-specific teams to perform a specific set of functions within the housebuilding process, and follow similar statutory steps to turn land into saleable homes, the way in which each organisation does this is nuanced. Therefore, the findings from this study may be relevant to other large UK volume housebuilders. However, the purpose of this thesis from the outset is to observe the way in which one specific organisation operates, understand the rich and interrelated contextual conditions, and develop theory that explains this case's findings.

4.5 Criteria for case selection

4.5.1 Organisation

The Housebuilder organisation approached for this study was willing to participate, as they had worked with one of the Researcher's PhD Supervisors extensively in the past. In terms of a sampling strategy, a single large volume Housebuilder organisation was selected purposively for this study, with the aim of the developing theory, as opposed to being representative of a larger population for later generalisation (Elliott *et al.* 2008). Any more than one organisation stretched beyond the Researcher's resources both in terms of time and budget. However, due to the geographic spread of large volume housebuilders, the Housebuilder organisation operated numerous regional branches across the UK. Three regional offices were selected as "mini-cases" (Dyer and Wilkins 1991), or cases within a case (Yin 2009). This struck a balance between the resources available while endeavouring to develop defensible theory.

4.5.2 Regional offices

Selecting the cases was based on trying to understand behaviour across the organisation, gaining an insight into whether learning was uniform. Therefore, polar opposites were sought to explore the maximum variation in learning between a regional office that readily adopts top-down instructions to adopt new organisation-wide processes, with one that does not (Flyvbjerg 2006; Eriksson and Kovalainen 2011). A third regional office was selected that was considered to represent the middle ground to achieve an even spread of behaviours from across the organisation.

Each region chosen (employing approximately 150 staff apiece) best exhibited maximum differentiation in terms of procedural compliance across all the

regions (Flyvbjerg 2006). From a Head Office level perspective, Region 1 was deemed to follow quality management procedures; Region 2 was described as endeavouring to follow quality procedures but often abandoned them under time pressure; and Region 3 was viewed as being autonomous, selectively adhering to organisationally imposed procedures.

Once the three regions were selected, attention turned to identifying how to study and measure multi-level learning sub-processes around quality management standards in action. A practice view of organisational routines was used to inform the means of inquiry.

4.6 Organisational routines as a method of inquiry

Defined as “repetitive patterns of interdependent organisational actions” (Parmigiani and Howard-Grenville 2011, p.414), research highlights the fundamental role routines play in how organisations accomplish work (Feldman and Pentland 2003). In Chapter 3, organisational routines are identified as a way of housebuilders communicating and therefore *institutionalising* standardised changes across the organisation (Bresnen *et al.* 2005).

Here, using organisational routines served three functions. Firstly, they provided a mechanism with which to lift the “black box” lid of organisational learning, thus allowing an investigation into the internal dynamics and relationships of the parts within (Pentland and Feldman 2005; Parmigiani and Howard-Grenville 2011); therefore, changes across multiple levels of an organisation and associated learning sub-processes could be observed on a day-to-day basis by focusing on a defined and repeatable organisational routine in a given timeframe. In other words, ‘measuring’ learning by observing the routine-related processes. Secondly, routines are argued as having well-defined boundaries (Rerup and Feldman 2011); a set pattern of repeatable organisational actions. Therefore, it was possible to identify learning sub-processes associated specifically with one routine. Lastly, the three methods of data collection associated with routines sit within the interpretivist paradigm drawn on for this study: interviewing, participation observation and reviewing documentation, as described later.

Elaborating on this last point, Feldman (2000) and Feldman and Pentland (2003) describe a routine as comprising three aspects. An *ostensive* aspect is, “the abstract, generalised idea of the routine, or the routine in principle” (Feldman and

Pentland 2003, p.101), and relates to an individual's perception of what a routine involves. The *performative* aspect relates to the specific enactment or performance of a routine (i.e. when, where and by whom). Feldman and Pentland (2003) state that routines are influenced by the dynamic and cyclic relationship between ostensive and performative aspects, which is driven by the agency of those enacting the routine; change to one aspect has a generative effect on the other (Rerup and Feldman 2011). A third aspect examines the role of *artefacts*; the routine's formal associated documentation (i.e. standard operating procedures).

The three methods used here to study organisational routines are rationalised now in turn: an individual's interpretation of a routine can be understood by talking to them (interviewing), capturing the ostensive aspect; secondly, the routine's performance can be observed in practice through the actions and interactions of key players (participation observation), thus giving insight into the performative aspect; and lastly, seeing routine related artefacts shows how the organisational level communicates its formal stance around routine enactment (documentation review). By comparing findings from these three methods, it is possible to compare whether the routine guidance has been interpreted as intended by individuals and subsequently carried out in practice as originally envisaged, and in addition, to explore learning relationships across and between each method (Pettigrew 1990; Pentland and Feldman 2005; Flick 2009).

4.7 Methods

An overview of each method is discussed in this section followed by a detailed account of how each method was employed.

4.7.1 Participant observation

Participant observation is defined as “a field strategy that simultaneously combines document analysis, interviewing of respondents and informants, direct participation and observation, and introspection” (Denzin 1989, pp.157–8). It is characterised by “a prolonged period of intense social interaction between researcher and subjects, in the milieu of the latter...[where] the researcher participates in the everyday life of the people and situation [s]he wishes to understand...[and the] goal is to see the world as the subjects conceive it” (Bogdan 1972, p.3). Here it is employed as the phenomenon of multi-level learning sub-processes are little understood in this

context. Participant observation also focuses around social meaning, and gaining an understanding of the phenomenon requires observing it from the inside (Jorgensen 1989). When studying organisational routines, observing participants in their working environment provides the Researcher with a performative insight into routine enactment, i.e. what happens in everyday practice (Parmigiani and Howard-Grenville 2011). It also allows the Researcher to learn the local language, or terms specific to the organisation's operations (Becker and Geer 1957).

Observing key participants entails shadowing them during office hours, writing notes on all activities attended by that individual, attending events they attend, interviewing them and potentially others encountered, and reading the documentation available to them related to daily work practices, that may represent organisational routine artefacts (Czarniawska-Joerges 2007). The aim is to observe the work practices of participants, i.e. a performance of the routine that was unaffected by researcher presence, without too much disruption to their work. Therefore, the Researcher will use discretion to ascertain when is the best time to participate in activities or ask questions, and when it is most appropriate to observe and let participants carry on with their work.

The participant observation literature identifies a continuum of participation that spans from *complete outsider* to *complete insider* where the researcher can become more involved with the phenomenon under study. Jorgensen (1989, p.56) disputes claims that increasing participation hinders effective observation, thus skewing researcher "objectivity", and argues instead that a researcher's increased direct involvement results in more accurate findings through "subjective involvement [giving] direct access to what people think, do, and feel from multiple perspectives". Shortcomings of participant observation as a method are often attributed to researchers becoming emotionally conflicted, losing the ability to analytically question the phenomenon under study and "going native" (Jorgensen 1989). In addition, members of the population under study can look to the researcher as an outsider "expert", or when in the field ask the researcher for assistance with day to day tasks as if an insider, resulting in conflicting emotions for the researcher as to what their role is in relation to what it is perceived to be (Jorgensen 1989). However, as the researcher's role is not to change the lives of those within the organisation at that point in time (Kersen 2016), if either instance arises, the researcher will re-assert

their position as an outsider and remain neutral. In other words, they will politely not answer the questions posed that put them in a conflicted position.

As the researcher is seen as a data gathering instrument, using observation and listening skills to develop an understanding of the phenomenon under study (Rubin and Rubin 2005; Creswell 2013), their reflexive and analytic insight of observations also make up a proportion of the data collected. The product, or data, of observing participants in their day to day environment is daily fieldnotes of the researcher's observations (Bogdan 1972). As interviewing, both formal, i.e. semi-structured, and informal, i.e. ethnographic in approach, form part of participant observation together with document review, these methods are described in this section.

4.7.1.1 Formal semi-structured interviews

Interviewing is a way of collecting in-depth explanations about what participants think and how they interpret the world around them. This therefore allows the researcher to understand experiences or reconstruct key events that the researcher did not witness (Rubin and Rubin 2005). Interviews are conducted on a continuum, which ranges from unstructured in format (where the questions are open-ended, participants can be interviewed on multiple occasions and time is not limited), to fully structured (where interviewers ask a few pre-agreed questions with a limited range of answers to a large sample of participants, with the aim of expedient analysis that quantifies the findings). Semi-structured interviews sit in between these and are a common approach, using pre-prepared questions with probes to explore leads that arise in more depth (Bernard 2006; Qu and Dumay 2011). This last method is chosen here because it gives the researcher a degree of flexibility to pursue more in-depth answers to one or more questions posed to participants.

Choosing knowledgeable participants enhances the credibility of interview findings as well as providing a sound base on which to build theory (Rubin and Rubin 2005). Therefore, the sampling strategy adopted is crucial to ensure relevant ostensive views around the studied routine are captured.

The questions developed for semi-structured interviews will depend on who the interviewee is, and when during the fieldwork period they are interviewed. For example, at the beginning of the study, when little is known about the organisation's working practices and organisational routine under study, a few open-ended

questions will be asked to help understand the world of the interviewee, given they share a different worldview to that of the researcher (Qu and Dumay 2011). Once the researcher gains a better insight into the housebuilder's working practices and study routine, the interview questions will become more focused. However, as some individuals are more involved on a daily basis with the study routine than others, the same questions cannot be blanket applied to all interviewees. Instead interviews will start off by trying to understand the interviewee's role within the organisation and how they interact with the study routine. Once this is established, the researcher will ask a number of open-ended questions around the parts of the study routine specific to the interviewee as a way to improve data collection accuracy (Bernard 2006).

The limitations of the method hinge around participants' ability to answer researcher's interview questions honestly. For example, individuals under study may behave differently from how they normally would, or give responses they assume the researcher expects to hear. This suggests the participant is under the influence of the Hawthorne effect (Davies and Shackleton 1975; Chiesa and Hobbs 2008). While participants can choose to lie or exaggerate an answer, using other methods, such as observation or reviewing documentation, it is possible to cross-reference the inconsistency and explore potential reasons behind these differences in perspectives.

Participant views can also be skewed by the researcher: firstly, through an inaccurate interview transcription; researcher substituting their opinions for those of the participant, thus putting the words of others into a participant's mouth; or the researcher misunderstanding something a participant has said (Rubin and Rubin 2005). However, carrying out participant observation in tandem with interviews is a way of being able to rectify researcher misinterpretation errors. This is due to the researcher gaining a better insight into the organisation's working practices, as well as having further opportunities to discuss previous participant responses with them (Becker and Geer 1957).

When considering participant numbers, Qu and Dumay (2011) argue that there is no obvious way to determine optimum sample size; rather, that a larger sample size suggests a quantitative study and smaller sample size, a qualitative one. Ultimately the study scope and resources guide the selection, in tandem with gathering sufficient data to answer the research questions (Emmel 2013).

4.7.1.2 *Informal ethnographic interviews*

While participant observation can employ formal interview approaches, for example, unstructured, semi-structured and fully structured interviews, ethnographic interviews are also conducted. These share “many features with a friendly conversation... [and] is one strategy for getting people to talk about what they know” (Spradley 1979, p.9). Used in the field, ethnographic interviews build both trust and rapport with participants so that they feel comfortable with the researcher’s continued presence when answering questions.

4.7.1.3 *Document analysis*

In this context, document analysis refers to collecting and reviewing organisational documentation that represent artefacts, i.e. “are physical manifestations of organisational routines” (Pentland and Feldman 2005, p.797), thus aiding the researcher’s understanding of both the organisational routine and phenomenon under study (Bogdan 1972). Documents, such as procedural guidance, can be viewed as a socially constructed endeavour to codify the *ostensive* aspect of the routine; equally, documentation that records work processes can be viewed as a way of communicating routine *performance* (Pentland and Feldman 2005).

Reviewing the documentation means that rather than interrogating a document’s contents for implied meaning, it is analysed at face value for “tracing the chronological development of issues over time, and providing a fact base for later interviews” (Langley 1989, p.601).

These three methods of data collection were deployed in a number of different ways throughout the fieldwork period.

4.8 Research timeline

Data collection comprised two parts: firstly, information gathering prior to fieldwork commencing; and secondly, fieldwork. These are outlined in Table 7 below:

Table 7: Overview of data collection prior to, and during fieldwork

Overview	Dates			
Part 1: Information gathering, region, routine, project and participant selection	03 Aug 2015	Conference call with two Head Office participants		
	18 Aug 2015	Conference call with two Head Office participants		
	11 Sept 2015	Semi-structured interview with one Quality Team participant – overview of quality management standards, housebuilding process and standard operating procedures		
	21 Sept 2015	Conference call with two Head Office participants		
Part 2: Fieldwork		Semi-structured interview	Semi-structured interview & participant observation	Ethnographic interview & participant observation
Head Office & Quality Team	09 Oct 2015	1		1
	03 Nov 2015	1		
	12 Nov 2015*			1
	16 Dec 2015*			1
	13 Jan 2016			1
	18 Feb 2016	1		
	19 Feb 2016	1		
Region 1	09 – 13 Nov 2015	1	3	4
	16 – 20 Nov 2015			
Region 2	30 Nov– 04 Dec 2015	1	2	7
	07 – 11 Dec 2015			
Region 3	11 – 15 Jan 2016	4	2	3
	18 – 22 Jan 2016			
Notes	*Same participant	White circles on Figure 9	Red circles on Figure 9	Blue circles on Figure 9

4.8.1 Information gathering, routine and participant selection period

In this study, an initial stage of data collection was carried out before the main body of fieldwork. This was to provide a preliminary understanding of the housebuilding process and how quality management standards were codified into routines and *institutionalising* occurred across and beyond the organisation.

Initial conversations with two senior Head Office Managers, and a semi-structured interview with one of the Quality Team members, provided insights into to the organisation, its structure, newly introduced organisational processes for improving quality management standards and organisational learning ambitions (see Appendix 9 on page 346). These conversations shaped: firstly, the study routine, defining and bounding the parameters for clarity of focus; secondly, the sampling strategy for study regions, identifying which offices to compare and why; thirdly, the

key participant and housing development project sampling strategy; and fourthly, how long each participant would be observed for, before those individuals were invited to participate in the study.

4.8.1.1 *Routine selection*

Selecting an appropriate routine for study was not straightforward. The internal workings of the organisation's processes were not known in detail by the Researcher at the start of the information gathering stage but became more apparent after several explorative conversations with two Head Office members of staff, one of whom was responsible for revising, implementing changes to, and enforcing quality management standards. They were therefore interviewed using a semi-structured format to gather information around the organisation's activities. Questions were open-ended around the theme of controlling and maintaining build quality standards. Following these interviews and conference calls, a *quality management routine* was identified. This is outlined in Chapter 5.

4.8.1.2 *Selecting participants*

To understand learning across the organisation, views from both the top and bottom of the organisational hierarchy were captured (Rubin and Rubin 2005). Therefore, participants were selected from both Head Office, as they were responsible for drafting routine guidance, and from within the study regions, as they carry out the routine in practice.

To continue with the theoretical sampling strategy being adopted, participants at project level needed to be working on housing projects where the *quality management routine* was being followed. The criteria hinged on a project site being at a specific stage of construction during the study period where it was possible to observe the *quality management routine* being adhered to. Therefore, three suitable projects were identified by Head Office staff – one in each study region.

Then, key participants working on those three projects were identified. It was envisaged that in each region, individuals would be in the same type of roles, resulting in a wide range of comparative views of the same phenomenon. Therefore, to be able to compare a range of perspectives, three individuals were selected from each of the three projects. The *quality management routine* was considered by Head Office staff as primarily involving one team; the *Build Team*, but also being used by the *Commercial* and *Technical Teams* to a lesser extent. In the *Build Team*, Site

Managers and Build Managers (Site Managers' superiors) were viewed as potential participants, as were Technical Managers in the Technical Team and either Surveyors or Commercial Managers in the Commercial Teams (see Chapter 5). Here, the term "Project Team" generally referred to a core membership of Site Manager, Build Manager, Technical Manager and Commercial Manager or Surveyor for a specific project responsible for new housing production. Head Office staff responsible for supporting and enforcing the routine were part of the Quality Team.

One member from each team was invited to participate and be shadowed continuously during office hours for between two and four days, depending on their workload. This resulted in a total of 12 semi-structured interviews with participants across the organisation, nine of whom were shadowed. This number was envisaged to provide a range of perspectives across the organisation, and deemed to be sufficient to answer the research question, while keeping the amount of data produced to a manageable level, given the study parameters (Emmel 2013). The initial sampling strategy is illustrated in Figure 9.

Once key participants were identified in each study region, they were contacted via email by a member of Head Office staff who then sent an email to both the key participant and Researcher, as a formal introduction. Once the Researcher and key participants became acquainted via email, the Researcher arranged convenient dates with the participant to shadow them.

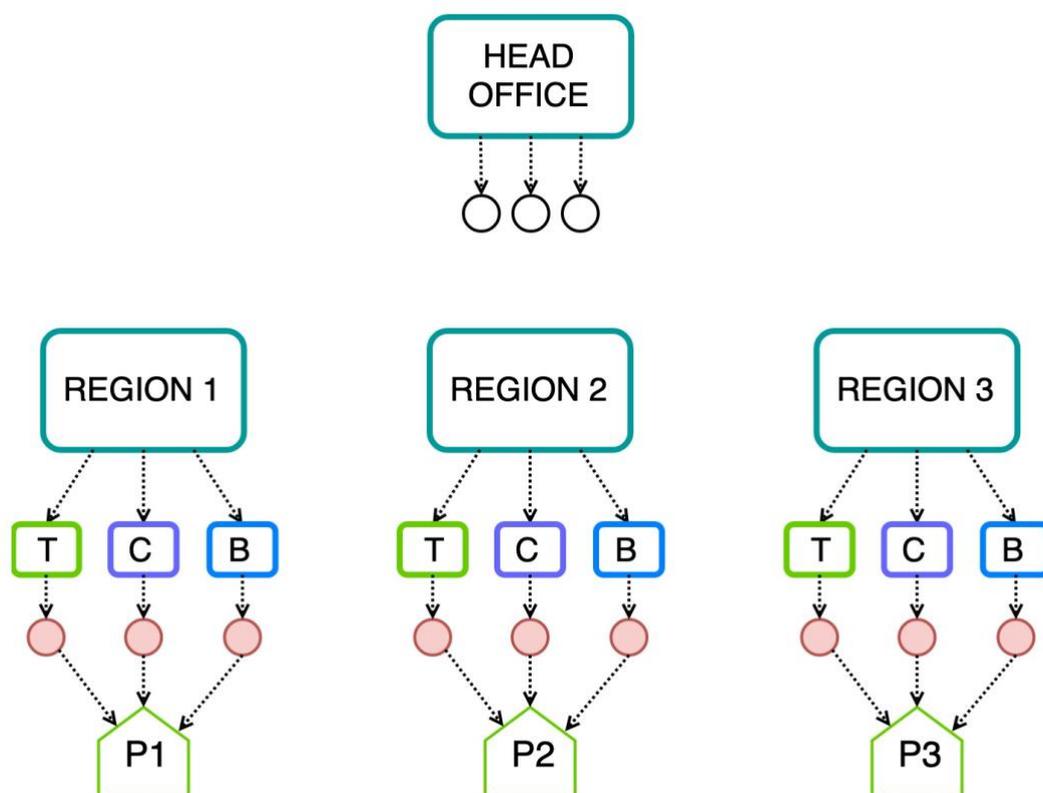


Figure 9: Initial sampling strategy

Head Office staff being interviewed (white circles), and a key project (P1, P2, P3) team member from the Technical (T), Commercial (C) and Build (B) teams being interviewed (semi-structured) and shadowed through participant observation in each region (red circle)

4.8.2 Fieldwork period

4.8.2.1 Head Office and Quality Team

In October 2015, there was a timely opportunity to observe a meeting between numerous representatives of Technical Consultants that worked for the housebuilder and a member of the Quality Team. This increased the Researcher's familiarity with the organisation, as well as witnessing first-hand how the housebuilder interacted with the external organisations they worked closely with. On the same day, and after the meeting just described, a semi-structured interview was conducted with a member of the Quality Team. This helped the Researcher to obtain a clearer insight into how the Quality Team members envisaged *quality management routine* enactment across the rest of the organisation and therefore understand the *quality management routine* from the Quality Team's perspective, given that individuals in the team developed it (see Appendix 9 on page 346 for interview

questions). An ethnographic interview was also conducted with the Quality Team member observed in the earlier meeting. This informal interview provided an insight into inter-organisational and organisational level relationships. In November 2015, a semi-structured interview took place with one Head Office member of staff responsible for learning aspects of the organisation.

4.8.2.2 *Regional Office participants*

Each region was visited in turn; Region 1 first for two weeks, then Regions 2 and 3 (see Table 7 for dates). The two weeks were initially planned to be with three participants; one in the Commercial Team, one in the Technical Team and one in the Build Team for each study project in that order.

The first day of shadowing each participant followed similar steps; after initial introductions, a semi-structured interview was attempted (Roulston 2010). In favourable circumstances (i.e. an office environment where the participant had a clear diary), these typically lasted from between 45 minutes to an hour and a half. In contrast, on a busy construction site, a formal interview was often abandoned shortly after initiation in favour of shorter bursts of *quality management routine* related conversation sporadically captured throughout the day, i.e. through ethnographic interviews (Flick 2009). After this initial semi-structured interview, participants would continue with their work and subsequent dialogue would be more informal.

It became apparent after a day or two, that interviewing participants while driving to sites from the office was an effective way of being able to talk to them without disrupting their work. This meant introducing personal safety measures; always ensuring the dictaphone was recording while alone with a participant, having a mobile phone to hand, and creating a shared diary with PhD Supervisors to alert them to journeys being taken and with whom.

In the first week at Region 1, a list of open questions (see Appendix 10 on page 348 for interview questions) was developed to maintain some consistency between participants. It related to the *quality management routine* and the participant's relationship to it, job roles, relationships to other teams and other regions, process improvement, feedback and learning, work-related issues being dealt with at that point in time, *quality management routine* adherence, as well as how staff achieved their goals in other ways, e.g. participants' daily practices. Work practice

activities were also observed; for example, meetings between numerous team members, Senior Management, and individuals from Trade organisations.

For periods in the office, the Researcher generally sat in the key participant's vicinity and observed interactions and conversations with colleagues, asking questions where it was possible. When on housing development sites, the Researcher followed them around observing the activities and conversations that took place and again asking questions about the routine alongside daily work practices.

4.9 Data collection

4.9.1 Semi-structured interviews

Data from semi-structured interviews was captured (where permitted) as audio recordings on mp3 files, so the interviews could flow freely, as the opportunity to stop and write notes rarely presented itself (Bogdan 1972). Audio data were recorded through the use of a dictaphone and microphone placed on the table in front of the participant. Audio was preferred to video as it was quicker to set up, less intrusive, produced smaller files that required less time to analyse and the data captured were sufficient to answer the research question (Flick 2009).

Only one semi-structured interview was not recorded as an audio file, at the request of the participant. Therefore, handwritten notes were made during the interview instead to capture their responses.

4.9.2 Participant observation

Several semi-structured interviews took place during periods of participant observation, as a way to gather comparable data from a larger number of participants. Data from these interviews were captured as outlined in Section 4.9.1 above. For ethnographic interviews and recording *quality management routine* related activities, data were captured (where permitted) as audio recordings on mp3 files. The microphone was worn on the lapel by the Researcher at all times.

In addition to an audio recording, depending on the activities that took place, handwritten or typed fieldnotes were also captured. For example, where large strategic meetings were observed, handwritten or typed notes were made. Handwritten notes were made on a tablet into password protected Microsoft OneNote files or typed up notes of activity observations were made on a mobile phone also into password protected Microsoft OneNote files. (See Appendix 11 on

pages 349 for an example of the Researcher’s typed fieldnotes). For two people talking to each other, where permission was given, an audio recording was made. Few opportunities arose for the Researcher to participate in formal meetings. Activities that the Researcher facilitated were primarily walking plots with Site Managers and identifying defects in finishes. Photos of development site activities were also taken where permitted to provide: firstly, a visual record of the event; and secondly, to help the Researcher to create a memory of the activity. Therefore by reading the fieldnotes alongside looking at the photograph, the Researcher can re-live and reflect on the day (Jorgensen 1989; Pink 2011). The empirical evidence collected is summarised in the table below.

Table 8: Illustration of empirical evidence collated during fieldwork period

Data type		
<i>Audio files (Including semi-structured interviews)</i>	<i>Total time</i>	<i>62 hrs 19 min</i>
	<i>Total time transcribed verbatim (hrs)</i>	<i>17 hrs 45 min</i>
<i>Documentation</i>	<i>No. pages</i>	<i>1262</i>
<i>Images</i>	<i>No.</i>	<i>46</i>
<i>Fieldnotes and reflective journal entries (made electronically in OneNote and WordPress)</i>	<i>No. files</i>	<i>71</i>

Fieldnotes were compiled in an A3 spreadsheet, which summarised the day’s events: who was present, who was spoken to, salient points that were made, what data were captured, and lines of inquiry to pursue.

Documentation relating to communicating the routine’s intended interpretation or enactment to individuals across the organisation was collected to ascertain what reference material had been given to key participants to communicate aspects of the *quality management routine* (Flick 2009). A summary of the type of documentation collected is shown in Table 9.

Table 9: Illustration of documentation collated during fieldwork period

Documentation type	No. pages
<i>Housebuilder intranet pages</i>	79
<i>Housebuilder in-house learning research study documentation</i>	157
<i>Site-wide Quality Control reports</i>	96
<i>Construction Stage Completion Booklet (including printouts of tablet forms)</i>	37
<i>Staff induction booklets</i>	15
<i>Staff guidance manuals</i>	378
<i>QA Handbook</i>	290
<i>Quality management routine training materials</i>	183
<i>Other documentation collected in the field e.g. meeting minutes</i>	27
Total	1262

The collection strategy was unlimited, as an artefact's potential relevance was unknown during the fieldwork period; all available documentation relating to organisational quality management, and local level daily practices was collated. However, its relevance to the routine was only assessed during the analysis period, as a way to compare *ostensive* and *performative* views with *artefacts*. Any documents collected were scanned where possible and filed both electronically and as hard copies. Information was also gathered about the setup of each Region, e.g. management hierarchy diagrams of staff, office layouts, current development projects and staff assigned to them.

Every evening a reflective journal of the day's events was written in WordPress (on a private site) to note the personal side of the fieldwork (Spradley 1980). It gave the Researcher an opportunity to discuss the day's events in light of what has gone before, explore hunches and think beyond the immediate boundaries of the study, i.e. be reflexive. (See Appendix 12 on pages 354 for an example of the Researcher's reflective journal). This reflexive outlet is also discussed later in the chapter in Section 4.13, and a reflective statement is included in the Appendix 4 on page 330.

4.9.3 Document analysis

In addition to the documentation collected during periods of participant observation, associated *quality management routine* documentation was sent by the Quality Team to the Researcher before the fieldwork period commenced. Guidance

material and inspection forms were sent on a USB memory stick and electronically via email.

4.10 Sampling strategy

During the two weeks spent observing participants in Region 1, it emerged that the research design needed to be flexible: following relevant lines of inquiry identified by participants, together with being able to adapt and observe another individual should the original participant not be available that day. Thus, a snowballing sampling strategy (Flick 2009) was adopted for new participants. This was beneficial as it gave the Researcher access to participants on other sites; however, it skewed the sample, particularly in Region 2, to focus more on Build Team participants. But given the alternative was not to shadow anyone and thus lose a day in the field, this approach was preferred.

Time was also reallocated during the fieldwork period to shadow or interview participants who frequently used the *quality management routine*. This meant spending more time with individuals from Build Teams rather than Commercial Teams. Also, to understand how the *quality management routine* worked as part of the housebuilding process, time was spent with members from both the Customer Care and Development Teams when opportunities arose in Regions 2 and 3.

In Region 3, the ratio of time spent in the office was greater than in the others, where more time was spent on housing project sites. This was to allow relevant *quality management routine* documentation (or artefacts) from the organisation's intra-web to be read, as this required using the organisation's computers on their internal data network.

At Head Office level, it was possible to observe members of the Quality Team as they enacted the *Site-wide Quality Control Inspections* in the study regions. Three days were spent between November 2015 and January 2016, observing two members of the Quality Team; the key projects in Regions 1 and 3, and another project in Region 3. Two additional semi-structured interviews were conducted by phone in February 2016, as the interviewees had been identified by participants during the fieldwork period, as playing a crucial role in the development and *institutionalising* of the *quality management routine*.

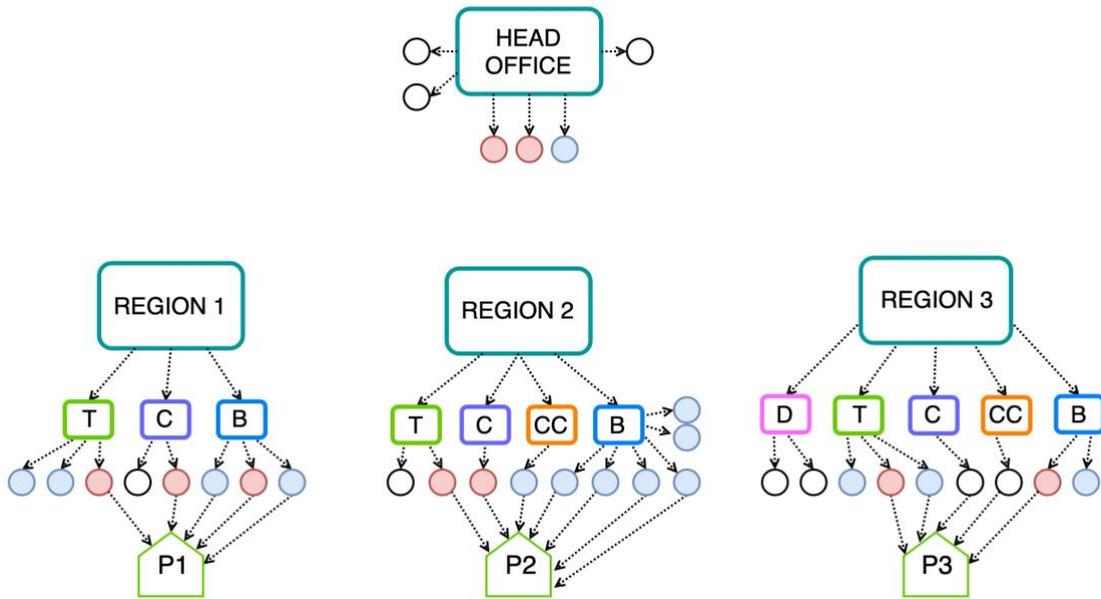


Figure 10: Actual sample of participants across the organisation

Semi-structured interviews (white circles), semi-structured interviews followed by participant observation (red circles), and ethnographic interviews followed by participant observation (blue circles) took place with participants from Technical (T), Commercial (C), Build (B), Customer Care (CC) and Development (D) Teams and at Head Office level in ways that were not originally envisaged prior to the fieldwork starting.

As a result, the overall sampling strategy changed dramatically through snowballing (Figure 10), as more participants were formally or informally interviewed than originally anticipated. Rather than spending time with 12 participants, the number almost tripled to 33 – a significant increase. If an opportunity arose to gain another participant’s insight into the *quality management routine* while in the field, it was taken. These insights were normally captured as ethnographic interviews and recorded as audio files.

4.11 Analysis of qualitative data

For this thesis, two approaches to analysis were adopted in a specific order. Firstly, an inductive analysis approach was followed, using the Gioia methodology (Gioia *et al.* 2013). Subsequently, an abductive approach was pursued. Both approaches are described in this section along with how the data were managed prior to analysis.

4.11.1 Data management and transcription

Once away from the field, the summary spreadsheet was used to identify all audio files and assign a content label to them (i.e. semi-structured interview, ethnographic interview or observed activity). From this a transcription hierarchy was established to ensure the semi-structured interviews were analysed first. This was due to the content of the semi-structured interviews focusing on the *quality management routine* and thus comparable with other regional participants' responses. Ethnographic interview audio data comprised sections relating to the *quality management routine*, but the rest of the conversations captured tended to focus on other contextual aspects of the housebuilding process.

The first task following the data collection was to organise it prior to analysis. Table 10 below illustrates how this was done:

Table 10: Steps taken to organise and manage data collected, based on data type, prior to analysis in NVivo

Data type	What?	Action
Audio recordings	Semi-structured interviews (Ostensive aspect)	<ul style="list-style-type: none"> • Transcribe verbatim - unfocused orthographic transcription (Gibson and Brown 2009) - as Word document • Import into NVivo ready for coding
	Ethnographic interviews (Ostensive aspect)	<ul style="list-style-type: none"> • Type up as notes with salient quotes written verbatim as Word document • Import into NVivo ready for coding
	Observed events (meetings, inspections etc.) (Performative aspect)	<ul style="list-style-type: none"> • Type up as notes with salient quotes written verbatim as Word document • Import into NVivo ready for coding
Organisational documentation	Guidance documentation, meeting minutes, reports, inspection forms etc. (Artefacts)	<ul style="list-style-type: none"> • Index in a summary spreadsheet. • Assess for relevance, i.e. are they an artefact – “physical manifestations”? • Import artefacts into NVivo ready for coding
Photographs	Images of sites visited, illustrations of points discussed during shadowing (Performative aspect)	<ul style="list-style-type: none"> • Index in the summary spreadsheet. • Assess for relevance, i.e. do they relate to the routine? Primary purpose is to aid memory of routine performance. • Import relevant images into NVivo ready for coding and write accompanying passage of what they illustrate from the fieldnotes
Fieldnotes	Log of each day (Performative & Ostensive aspects & Artefacts)	<ul style="list-style-type: none"> • Write up as a summary spreadsheet • Import into NVivo ready for coding
	Handwritten notes of activities or observations written in real time (Performative aspect)	<ul style="list-style-type: none"> • Import into NVivo ready for coding
	Typed notes of activities or observations written in real time (Performative aspect)	<ul style="list-style-type: none"> • Import into NVivo ready for coding
Journal entries	Analytic reflection of each day's events (Performative & Ostensive aspects & Artefacts)	<ul style="list-style-type: none"> • Import into NVivo ready for coding

Semi-structured interview audios were transcribed by listening to the audio file through headphones in Express Scribe and repeating what was said verbally using Dragon for Mac voice recognition software into a Word document. Transcriptions comprised full sentences, with details such as pauses annotated but not every inflection, as the discourse was not analysed in detail (see Appendix 5 on page 330 for an example transcript). Gibson and Brown (2009) describe this as unfocused orthographic transcription, and was sufficient to answer the research question given time available and depth of analysis required (Hepburn and Bolden 2017). The ethnographic interviews and observed activities were listened to. Notes were made periodically on the content and salient parts were transcribed verbatim (Saldaña 2016) in Word. Once transcribed, the Word documents were checked for accuracy against the audio file. The transcripts were read over to familiarise the Researcher with their content.

NVivo 11 for Mac software was used for analysis. Data were imported into a password protected file, organised and indexed in folders chronologically by Region for easy future retrieval. At Head Office level, additional folders were set up for *quality management routine* literature and guidance, organisational learning documentation, and training or induction materials. Each file was identified as either:

- “Interview” or “Audio Notes” to denote *ostensive* data;
- “Fieldnotes”, “Activity Notes”, “QM Event Notes”, “Journal Entry” or “Photos” to denote *performative* data;
- “Document” or “Intraweb Document” to denote *artefacts*;
- “Overview” was used for summary information about each regional office.

To retain the time element of the data collection, each day in the field was numbered chronologically, dated and allocated against a region, therefore it would be possible to identify points in time where the Researcher’s understanding developed, or a pattern of observed behaviour started to emerge. Each electronic file was named consistently (as shown in Table 11 below) and imported into NVivo. Audio files were not imported to reduce the overall size of the NVivo file.

Table 11: NVivo document filing structure

Where:	Day:	Note number (if more than 1 file)	Date:	Type:
R1 R2 R3 Head Office (HO)	Day (+number)	(+_number)	Reverse order for sort	Interview Audio Notes QM Event Notes Activity Notes Fieldnotes Journal Entry Document Photos Intraweb Document Overview
Example	R1 Day 2 - 151110 Fieldnotes			

4.11.1.1 Participant anonymity

Participants were set up as Cases in NVivo with their consent forms assigned to them (see Section 4.12 for ethical considerations). In addition, participants and interviewees were given a unique reference code in NVivo to anonymise their responses. Individuals that were spoken about by participants were also set up as Cases in NVivo and given a unique reference code.

4.11.1.2 Additional documentation

During the analysis period, the Researcher requested and received additional documents from the Housebuilder organisation. These were final reports from the three *Site-wide Quality Control Inspections* attended between November 2015 and January 2016, as the Researcher was not in the field when these documents were issued to regional participants (see Table 9).

4.11.2 Cross-referencing the findings

Analysing the three methods (interviews, document review and participant observation) collectively draws on the strengths of each method employed to validate and cross-check findings (Gray 2014). For example, as Pettigrew (1990) points out, while interviews provide insight into a participant's interpretation, things said may reflect what a participant views as best practice, rather than what usually happens. The selective storage and promotion of organisational documentation requires consideration, and observations highlight inconsistencies between what participants say they do in contrast to what is seen in practice. Therefore, by triangulating findings, it is possible to answer the research question.

4.11.3 Inductive approach to analysis

Langley (1999) identifies seven strategies to analyse process data. One strategy she describes is grounded theory. Historically, inductive analysis of qualitative data has been carried out using “grounded theory” methods to generate theory (Glaser and Strauss 1967; Corbin and Strauss 2015), which have evolved over time (Glaser 2003; Charmaz 2013). For process data, a grounded theory approach has been used to compare eclectic and ambiguous incidents using rich description (Langley 1999). However, there has been criticism of grounded theory in terms of its reliability as a method for scientific advancement (Gioia *et al.* 2013). In response, Gioia *et al.* established a methodology based on inductively grounded principles which they argue enhances grounded theory development. This analytic methodology has become increasingly popular across the field of management studies, and this approach was adopted here.

The so-called “Gioia methodology” (2013) describes distinctive steps at the research design, data collection, analysis and theory articulation stages. For research design, a research question that frames “how” a phenomenon does something is suggested. The literature is also consulted but suspended until the later stage of theory articulation. During data collection, a flexible approach to the participant voice is encouraged, where the Researcher is free to further investigate participant responses rather than be fixed to a set list of questions. Points posited for research design and data collection were adhered to in this study.

For the analysis stage, firstly, all text was coded using a “process akin to Strauss and Corbin’s [1998] notion of open coding” (Gioia *et al.* 2013, p.20), using constant comparison (Corbin and Strauss 2015). Therefore, a line-by-line approach was taken across all written files. To do this,

“Data are broken down into manageable pieces with each piece compared for similarities and differences. Data that are similar in nature (referring to something conceptually similar but not necessarily a repeat of the same action or incident) are grouped together under the same conceptual heading.” (Corbin and Strauss 2015, p.7)

This generated numerous codes, or conceptual headings, that were close to the data, and participant-centric. These codes, prolific in number, were referred to as “first-order concepts”. A coding hierarchy was established that prioritised ostensive views: semi-structured interviews first, ethnographic interviews and observed activity notes second, fieldnotes, journal entries and photographs third, and lastly documentation. The number of codes generated by this adapted open-coding approach, while numerous, was only applicable to a selected portion of the data corpus, i.e. portions of the text that related to answering the research question. Coding was applied to sentences, a single sentence, or part of a sentence, therefore it was a reductive process (Saldaña 2016).

As patterns started to emerge in the first-order concepts, the code names (nodes in NVivo) were repeatedly relabelled and previous instances in the data revisited as part of the iterative process of constant comparison (Corbin and Strauss 2015).

Following this, the first-order concepts were grouped into closely related “second-order” themes (Van Maanen 1979; Turner and Rindova 2012), again using constant comparison. These second-order theme groupings were constantly reorganised and discussed with PhD Supervisors.

After this point, the Gioia methodology suggests the “theoretical explanatory dimension” is extracted, “providing an overall representation of the observations and relationships reflected in the emergent theoretical framework” (Turner and Rindova 2012, pp.28–29). This is when grounded theories are articulated (Gioia *et al.* 2013).

Langley (1999) states that while the strength of grounded analytic strategies, such as the Gioia methodology, comes from staying close to the original data, it can be challenging for researchers to make any theoretical leaps. This turned out to be the case during this study. As a way to break the analytic deadlock, Langley (1999) suggests researchers adopt additional analytic strategies to make sense of process data. Therefore, to facilitate the development of aggregate dimensions and subsequent theory articulation, an abductive approach was taken to understand what the inductive findings meant in relation to established extant multi-level learning theories.

4.11.4 Abductive approach to analysis

There are differing views between researchers about how analysis should be approached; some argue that theoretical development is a purely inductive process, with the data speaking for itself while the literature is put to one side (Glaser and Strauss 1967), and others argue, “that scientific truth results from both the act of observation and the emerging consensus within a community of observers as they make sense of what they have observed” (Suddaby 2006, p.633), i.e. abductively moving between deductive peer consensus and the inductively data-specific. Also, the Gioia methodology suggests that the literature is left behind to some degree during the analysis period (Gioia *et al.* 2013). Following on from this, questions are also raised as to whether it is possible to leave the literature behind when analysing data inductively, when individuals use their own beliefs as a starting point to anchor and envelope new knowledge (Nonaka 1994). Van de Ven (2007, p.104) describes theory development as an abductive process and posits that

“A theory is a pattern of conceptual organisation that explains phenomena by rendering them intelligible... we reason our way towards a keystone idea from which the properties can be explained. Thus, instead of thinking of theory creation as being analogous to drafting on a clean sheet of paper, it is more helpful to think of it as one of erasing, inserting, revising, and re-connecting ideas scattered on many papers that are scribbled full of experiences, insights, and musings of ours and others.”

The multi-level learning literature comprises many notions of how learning takes place across single and multiple levels in social contexts. Therefore, it was possible to build on the extant literature and develop a learning process model abductively to generate ideas that may represent the findings here (Locke *et al.* 2008). However, while the literature was used to inform this analysis process, it was not comprehensively drawn on, as the full literature review (for Chapters 2 and 3) was not conducted until after the analysis period was completed.

During this abductive stage of analysis, a journal article (Morland *et al.* 2019) based on this thesis’ findings was written by the Researcher and PhD Supervisors, and published, as a way to crystallise the first-order concepts, second-order themes and

aggregate dimensions. A multi-level learning framework was developed through an abductive process to effectively “simulate” findings and assist in the final stages of theory development.

4.11.4.1 *Developing a multi-level learning model*

The model was developed by first of all identifying three examples of *quality management routine* enactment practices (see Appendix 6 on page 337 to see how this was done). The Researcher observed events in the field, and found that the three examples reflected practices common to all three study regions. The examples were then mapped out iteratively using the mind map software, Mind Node Pro. In addition to the observational data, relevant parts from participant transcripts were added, along with documented sources. Compiling data in this way inductively built up a rich picture of the *quality management routine* practices into mini-vignettes.

Next, the extant literature was used to build a rough learning framework from the seminal papers described in Chapter 2. The framework attempted to visualise Elkjaer’s (2004) ‘third way’ of learning. It was done by combining Crossan *et al.*’s (1999) 4I framework to represent the metaphor of acquisition with Kim’s (1993) and March and Olsen’s (1975) organisational learning models to represent the metaphor of participation.

Following this, the examples described above were mapped onto the rough learning framework to explore the process of multi-level actions and consequences. Through iterative refinement, a multi-level learning framework model was developed and used as an analytical tool. Through this iterative and abductive approach, it was possible to start to “visualise” multi-level learning, and in so doing, identify the aggregate dimensions in action. Table 12 shows the final first-order concepts, second-order themes and aggregate dimensions from this thesis. Once the aggregate dimensions of *communication*, *time* and *trust* were identified through the examples and the model, it was possible to work backwards and develop the second-order themes. The first-order concepts were well established as they aligned with the data from the fieldwork. However, the second-order themes were less so, which was why they were constantly reorganised. For example, (see the highlighted red box in the table below) it was relatively straightforward to identify the different ways in which individuals within the organisation related to each other as they worked, making the first-order concepts clear. However, it was only when the aggregate dimension of

communication was identified that it became easier to move away from the data and start to theorise around silos for the second-order theme label.

Table 12: All first-order concepts, second-order themes and aggregate dimensions from this thesis

<i>First-order concepts</i>	<i>Second-order themes</i>	<i>Aggregate dimension</i>
<i>Communication of conflicting goals</i>	<i>Changing lines of communication</i>	<i>Communication</i>
<i>Communication which bypassed Regional Superiors</i>		
<i>Communication through project stages</i>	<i>Siloed inter-group communication</i>	
<i>Communication through hierarchical layers</i>		
<i>Communication between competing regions</i>		
<i>Site communication vs. office communication</i>		
<i>Developing a shared interpretation</i>	<i>Communication and interpretation</i>	
<i>Individual interpretation of formal practices</i>		
<i>Turnover and continuity of interpretations</i>		
<i>Financial deadlines encouraged team level improvisation</i>	<i>Multi-level short-term financial goals vs. long-term learning goals</i>	<i>Time</i>
<i>No time to change team working practices</i>		
<i>Timing of Project Team feedback</i>	<i>Timing of episodic vs. systemic feedback</i>	
<i>Timing of inter-organisational feedback and feed-forward</i>		
<i>Informal Project-to-Project Team learning</i>	<i>Project-to-Project multi-level, multi-disciplinary learning</i>	
<i>No formal review of past project practices</i>		
<i>Within team trust</i>	<i>Trust between levels</i>	<i>Trust</i>
<i>Selective reporting from lower to higher levels</i>		
<i>Trust in superiors</i>		
<i>Emotional response to organisational level interference</i>	<i>Trust and Affect</i>	
<i>Fear of blame</i>		
<i>Expectations of inter-organisational performance</i>	<i>Inter-organisational trust</i>	
<i>Inability to monitor inter-organisational practices</i>		
<i>Development of respect and friendship</i>	<i>Intra- vs. inter-organisational trust over time</i>	
<i>Development of inter-organisational relationships</i>		

Once the first-order concepts and second-order themes were grouped more confidently into the aggregate dimensions (described in Chapters 6, 7 and 8) following a similar approach to the example outlined above, it was possible to start

articulating theory (Chapter 9) in a way that answers the research question (Chapter 10).

4.12 Ethical considerations

Conducting qualitative studies raises ethical issues around gaining informed consent, maintaining confidentiality and anonymity, as typically more detailed information is collected on each participant and stored (Elliott *et al.* 2008). This study was granted ethics approval by the University of Sheffield Ethics Committee. A single sided A4 consent form was prepared which accompanied an information sheet (included in the Appendices on pages 342 and 344). This was emailed to participants prior to entering the field, or given to them once in the field, and discussed with them before they signed it and any data collection commenced. To protect identities, each participant was given a unique reference code to anonymise their responses (Flick 2009).

4.13 Positionality of Researcher, validity and “trustworthiness”

Recognising the Researcher as the primary instrument throughout the research process results in attention being paid to increasing the credibility and trustworthiness of the study. To achieve this, the following steps were taken: firstly, spending a considerable time immersed in the field while carrying out a study that triangulates findings from different methods. This is seen to increase the probability of credible results through “prolonged engagement” and “persistent observation”; secondly, by using “peer debriefing” with two PhD Supervisors who were not directly involved in the research but part of the research development. This provided an opportunity to use them as a “sounding board” for emergent ideas as well as checks during analysis periods (Corley and Gioia 2004); thirdly “member checks” – participants at the case study organisation were consulted at multiple points to validate the data along with aligning the Researcher’s interpretation of specific events to those within the studied community (Lincoln and Guba 1985; Flick 2009, p.392). This predominantly happened during the writing and publication of the journal article; and lastly through reflexivity and being self-aware of the role of a researcher. To address this last point of researcher bias, the following steps were taken. Firstly, during the fieldwork, the Researcher’s analytic journals were used for “the process of meta-learning – not only reflection *in* but *on* action” (May and Perry 2017, p.165).

Writing a journal also separated events viewed as they occurred from the Researcher's interpretation of them in light of the data collection to date, i.e. ensuring it was possible to differentiate between the experiencing and reflective self during analysis later (Kahneman 2012). (See the Appendix 12 on page 354 for an example.) This was to ensure that when the fieldnotes were analysed later, they were observations that described events in effectively "neutral" language, i.e. what was seen, and not coloured by the Researcher's interpretations, i.e. what the Researcher thought of what was seen. Therefore, if an event needed to be reanalysed, it was easy to decipher each layer, i.e. the fieldnote that described the event and then the additional layer of the Researcher's immediate reflection of events, to possibly add a third layer – reflection in light of something that occurred at a later date. Secondly, a reflective statement is included in the Appendix 4 on page 330.

4.14 Methodological limitations

One limitation of the study's methodology is the sample size and make-up. The way in which sampling is conducted determines how much of another world, in this case housebuilding, and working for a Housebuilder organisation, is represented, and is therefore generalisable (Bernard 2006). The generalisability of the study could be viewed as limited by some researchers, given the findings relate to one organisation; however, the Researcher attempted to address this by exploring three cases within one case to gain a holistic overview of the Housebuilder organisation, thus reduce the impact of this limitation by providing more in-depth context about the conditions in which the case operates. Therefore, the reader can identify where the similarities and nuances exist between this and other large UK volume housebuilder organisations.

The sampling strategy also changed as the fieldwork progressed, thus deviating from the original 12 participants. However, this was the outcome of changes to circumstances at short notice, and being pragmatic, as participants were ill, or not available in the agreed location, as their diaries changed at the last minute. Likewise, the Researcher took conscious steps to interview individuals in other teams to try to better understand the operational context beyond the study routine. These changes were made once out of the field in the breaks between each study region's visit.

Another limitation to consider is the dynamic nature of organisations and the environment in which they operate. As conditions within the organisation

constantly changed, this had knock-on implications for the fieldwork. This was addressed by taking a flexible approach to the study's design and being pragmatic when planned events were no longer possible.

4.15 Chapter summary

In this chapter, the methodological basis for this study was set out. The research question that guided this study was put forward, asking “*How does learning occur at multiple levels when an organisation institutionalises new quality management standards?*” Three objectives examine *the conditions under which multi-level learning occurs, how the multi-level learning sub-processes unfold under these conditions, and, how, when and why these conditions are influential to learning.* A case study approach was proposed and justified.

The case organisation (Housebuilder) was purposely selected. A practice view of organisational routines was used to inform the means of inquiry. Therefore, learning sub-processes were ‘measured’ by observing routine-related processes, and the housebuilder’s *quality management routine* was identified at the start of the study. Methods included and combined participant observation, semi-structured interviews and document analysis. Three individuals from three housebuilder disciplines (teams) in three regional offices were chosen to participate in the study based on their day-to-day involvement with the *quality management routine*. In addition, three individuals from the housebuilder’s Head Office were interviewed and observed. However, the sampling strategy changed with participant numbers nearly tripling during the study to gain a broader insight into the phenomenon.

An inductive approach to data analysis was proposed using the Gioia *et al.* (2013) methodology, and from this, initial first-order concepts and second-order themes were established. To further refine the second-order themes and identify the thesis’ aggregate dimensions, an abductive approach was pursued. This involved developing a learning model to assist the analytic process and ‘visualise’ the learning sub-processes in action. Consequently, the aggregate dimensions (Gioia *et al.* 2013) of communication, time and trust were found to influence learning sub-processes across the Housebuilder organisation and are explored in Chapters 6, 7 and 8 respectively. However, these three chapters are to be read in conjunction with Chapter 5, as this outlines the organisational context and quality management standards in detail, against which the findings are described.

CHAPTER 5. CASE STUDY CONTEXT

5.1 Introduction

This section gives an overview of the case study organisation and describes its inner workings. Reasons for choosing this housebuilder as a case study are explained in Chapter 4 above. This chapter starts by describing the organisation's hierarchical structure and then the general process of housebuilding, i.e. how a parcel of land becomes a development of new homes. With this scene set, the *quality management routine* is laid out. This starts with its format prior to revision, why it changed, how it was revised, and how this revised version was introduced across the organisation. The chapter closes with the Researcher's impressions of each study region's working cultures when in the field.

5.2 Structure of case study Housebuilder organisation

5.2.1 The organisational hierarchy

At the time of this study, the Housebuilder organisation was one of the major volume housebuilders in the UK. The organisation comprised between five and 10 regional offices, employing between 500 and 1,000 staff nationwide. Overseen by a Board of Executive and Non-Executive Directors, day to day management of the organisation was carried out from Head Office by the *Chief Executive Officer* (CEO), with support from a handful of *Executives* working in a team at *Main Board* level. The hierarchical structure of the Housebuilder organisation comprised 10 levels, descending from *Main Board Executive* level at the top to *Staff* level at the bottom, with three *Executive* and five *Management* levels sitting in between. The *Main Board* level was only relevant in the Head Office, as that was where *Main Board Executives* sat. The most senior member of staff in each region, the *Managing Director* (MD), sat at *Executive Level 1*. Each Region's *MD* reported directly to the *Main Board Executives*. Roles and titles assigned to individuals across the organisation roughly conveyed the level within the hierarchy at which they sat. These are described in more detail below in Table 13.

Table 13: A breakdown of roles typically associated with each hierarchical level.

	Hierarchy Level	Typical roles associated with level	
		Head Office	Regional Offices
Organisational superiors	Main Board Executives	Chief Executive Officer Chairman Chief Operating Officer Company Secretary Finance Director	
Regional superiors	Executive 1		Managing Director
	Executive 2	Organisation-wide Team Director (see Table 14 for teams)	Team Director (see Table 14 for teams)
	Executive 3	Organisation-wide Team Executive Departmental Head	Team Executive
Middle management	Management 1	Manager	Senior Manager (Includes Senior Project Manager) *
	Management 2	Manager Advisor	Manager (Includes Project Manager) *
	Management 3	Manager Advisor	Roles with no employees to manage (Exception at this level is Senior Site Manager who managed those in Assistant Site Manager roles)
	Management 4	Assistant Manager Officer	Roles with no employees to manage (Exception at this level is Site Manager who managed those in Assistant Site Manager roles)
Junior staff	Management 5	Trainee	Senior Co-ordinator Graduate Trainee (on Graduate scheme) <u>Assistant Site Manager</u>
	Staff	Secretary Co-ordinator Administrator Assistant	Secretary Administrator <u>Trainee Site Manager</u> <u>Site Assistant</u> Apprentice Forklift Driver Technician Co-ordinator Management Accountant Advisor

The positions underlined were Build Team members permanently based on housing sites, and are referred to as Site Team members in this thesis.

*A Project Manager was a promoted Senior Site Manager

Study regions were grouped by housebuilding disciplines for the purpose of building houses. Head Office teams, which were located centrally away from study region activity, performed organisation-wide activities which affected all study regions, and subsequently comprised different teams from the regional offices. Head Office teams performed an overseeing role across all study regions.

5.2.2 Organisational functions

Head Office teams carried out activities related to running the organisation, providing the necessary support to regions, resulting in regions being able to produce new homes efficiently. A key part of this was ensuring the organisation met all regulatory requirements. Head Office teams were *Quality, Health and Safety, Human Resources (HR), Information Technology (IT), Sustainability, Development, Sales and Marketing* and *Finance*. In each region, the focus was on producing new homes. To do this, the seven teams from different disciplines related to building and selling new homes were overseen by the regional MD. The teams were *Development, Technical, Commercial, Build, Customer Care, Sales and Marketing* and *Finance*. An overview of all the organisation's teams, both Head Office and study regions, is given in Table 14 below.

Table 14: Overview of all of the organisation's team and their duties.

Therefore, outlining how Head Office teams had different remits to those within the study regions

Team name	Functions and responsibilities associated with each team discipline	
	Head Office	Regional Offices
Quality	<ul style="list-style-type: none"> Ensured all design work complied with statutory requirements and NHBC standards. Made sure the organisation's standard construction details reduced defects risk. Liaised with suppliers to update construction details. Raised awareness of quality policies and procedures. across the organisation. Provided support to regions at both design and construction stage. 	X
Health & Safety	<ul style="list-style-type: none"> Ensured all regions' construction sites were Health & Safety Executive compliant. Inspected sites to make sure procedures to keep workers safe were followed. 	X
Human Resources	<ul style="list-style-type: none"> Ensured all employment legislation was followed across the organisation. Recruited, appointed, inducted, supported and trained employees. Payroll duties. 	X
IT	<ul style="list-style-type: none"> Ensured functioning IT infrastructure and communications networks. Ensured staff had access to the necessary digital hardware and software. Gave Consultant and Trade organisations, access to digital construction information. 	X
Sustainability	<ul style="list-style-type: none"> Developed sustainability policies and 	X

	<p><i>procedures</i></p> <ul style="list-style-type: none"> • Worked with the Quality Team to source low impact materials for construction. • Ensured all sites complied with relevant sustainability legislation and standards. 	
Development	<ul style="list-style-type: none"> • Oversaw and approved all land acquisitions made by each region. 	<ul style="list-style-type: none"> • Appraised suitable sites, prepared reports for Main Board Executives to approve. • Purchased sites. • Managed Concept Consultants.
Technical	<ul style="list-style-type: none"> • (Came under Quality Team remit). 	<ul style="list-style-type: none"> • Managed Technical Consultants to prepare construction information. • Liaised with the Development Team and local authorities to sign off planning conditions. • Liaised with statutory bodies to ensure site services were provided to sites on time. • Supported Build and Commercial Teams during the construction process.
Commercial	<ul style="list-style-type: none"> • (Came under Quality Team remit). 	<ul style="list-style-type: none"> • Prepared and issued all construction packs for Trade organisations to price. • Met with and appointed Trade organisations prior to and during construction period. • Fixed, assessed and controlled development project budgets and paid Trade organisations. • Supported Build and Technical Teams to assess financial implications of late changes.
Build	<ul style="list-style-type: none"> • (Came under Quality Team remit). 	<ul style="list-style-type: none"> • Determined and fixed plot construction programme. • Managed Trade individuals to ensure construction work matched the drawings. • Met all Health and Safety requirements to keep site workers safe. • Coordinated Trades so plot construction followed the programme set. • Worked with Technical and Commercial Teams to resolve unforeseen issues.
Sales & Marketing	<ul style="list-style-type: none"> • Ensured brand guidelines were followed when setting up and launching new developments to the market. • Developed and revised brand guidelines periodically. 	<ul style="list-style-type: none"> • Prepared sales and marketing materials for the new site. • Talked to potential customers about housetypes on offer. • Showed customers around the show home once one was complete. • Met frequently with the Build Team to discuss progress against legal completions.
Customer Care	X	<ul style="list-style-type: none"> • Took responsibility for a plot once it was complete. • Met with the customer during the initial occupation period and put right defects. • Issued NHBC customer satisfaction survey. • Resolved issues and defects arising in the property for two years post-purchase.
Finance	<ul style="list-style-type: none"> • Oversaw organisational spending against set budgets. Tax and accounting duties. 	<ul style="list-style-type: none"> • Oversaw regional office spending against set budgets. Tax and accounting duties

The number of individuals in each team, both Head Office and regional teams, varied. Ratios across the seven teams in regional office were similar, with nearly two-thirds of

the region’s workforce being in the Build or Sales Teams. The regional breakdown for the three study regions is shown in Figure 11 below.

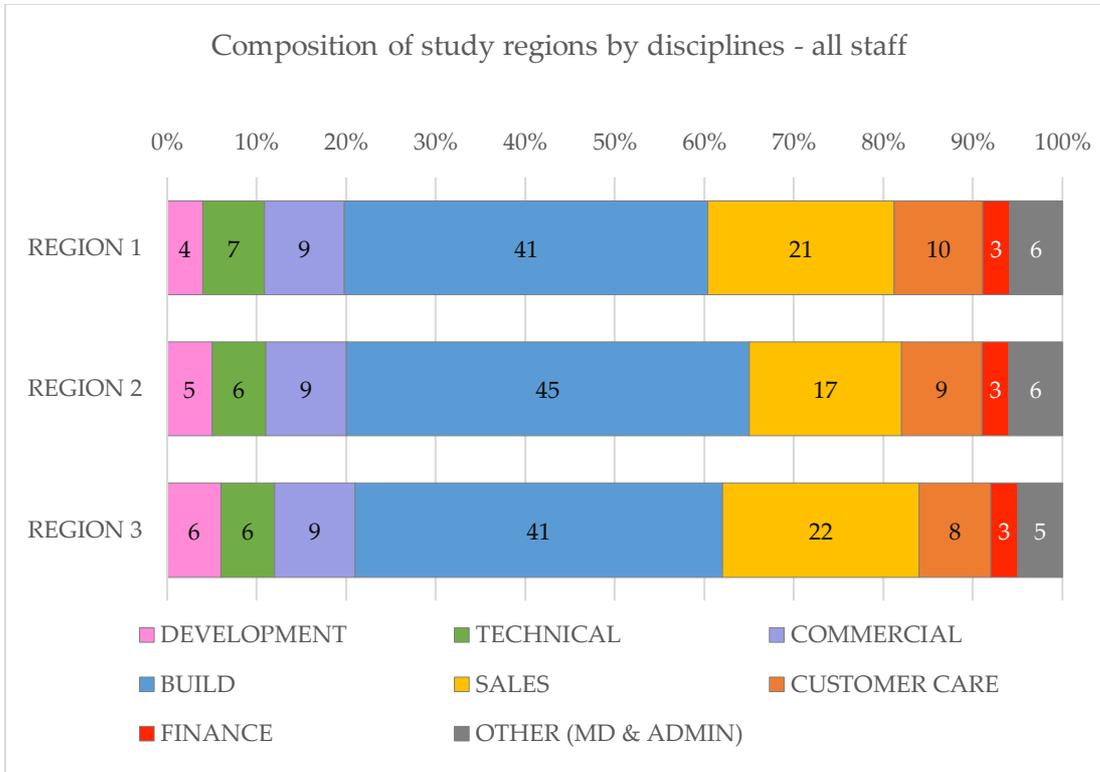


Figure 11: Team make-up of study regions

This shows the proportion of staff in each team in relation to the region’s overall staff head count. The ratios for each team are similar across the three study regions, with most people working in either the Build or Sales Team.

Each region comprised mostly Build or Sales Team staff. However, in the Build Team, only the Director, Executive and Build Managers were based in the office (with their administrative support). The rest, which comprised around 60% of the region’s overall workforce, were based on each region’s active housing construction sites. In this thesis, Build Team members permanently based on housing sites are referred to as Site Team members. Build Managers were also only in the office one day a week, with the rest of their time being spent driving between sites. In the Sales Team, the Director, Senior Managers and Managers were based in the office; Sales Advisors were located in the sales suite at each site. Therefore, when examining each regional office by the ratios of staff sitting together in teams in an open plan office, a different picture of each region’s make-up was presented (see Figure 12). The absence

of Build and Sales Team staff suggested to the Researcher an office dominance of the Commercial and Customer Care Teams, which, when examining the bigger picture of the regional workforce as a whole, was not the case.

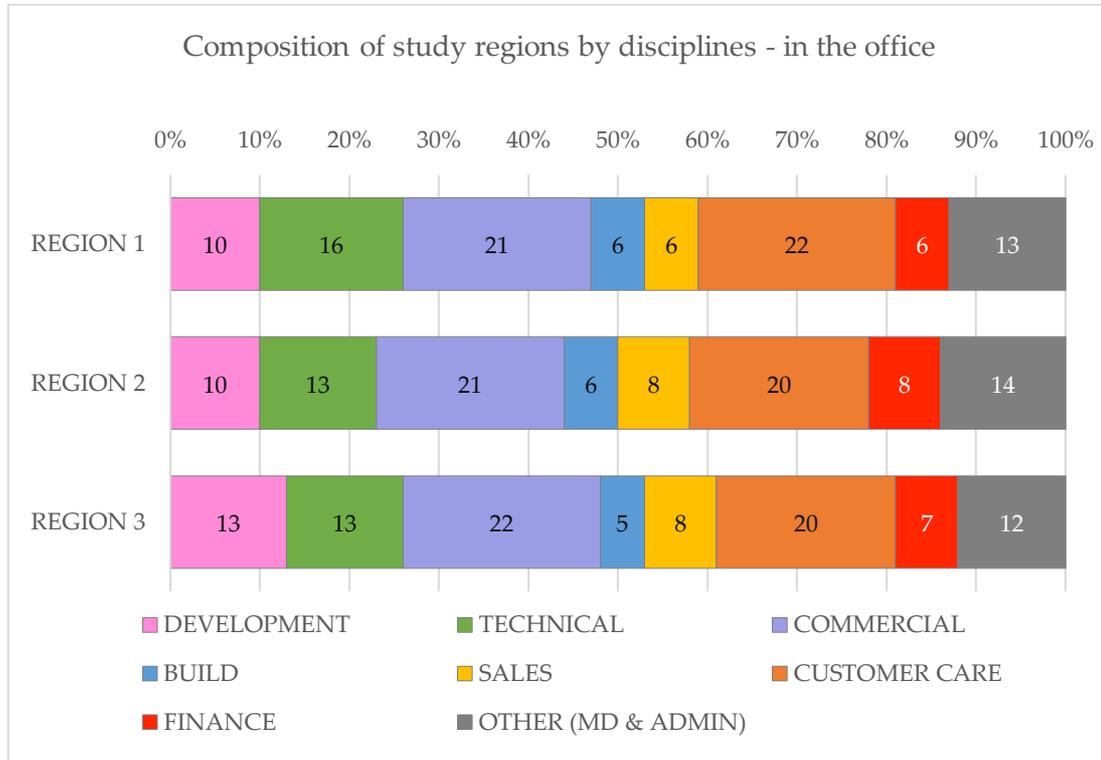


Figure 12: Team make-up of study region's office-based staff

This shows the proportion of staff in each team based in each regional office. The ratios for each team are similar across the three study regions, with most people working in either the Commercial or Customer-Care Teams.

At Head Office, resources were committed to managing people by the HR department, ensuring the necessary IT infrastructure, hardware and software were in place so individuals across the organisation could carry out their daily work tasks effectively. In addition, Head Office personnel manage the large sums of money constantly moving in, out and across the organisation: cash in from sales, cash out to pay staff and Trade organisations, for materials and services. Figure 13 illustrates how each Head Office team was staffed in relation to Head Office's overall head count. How the Housebuilder organisation grouped individuals, in either its Head Office or the study region, by their hierarchical level status and professional discipline is now explored.

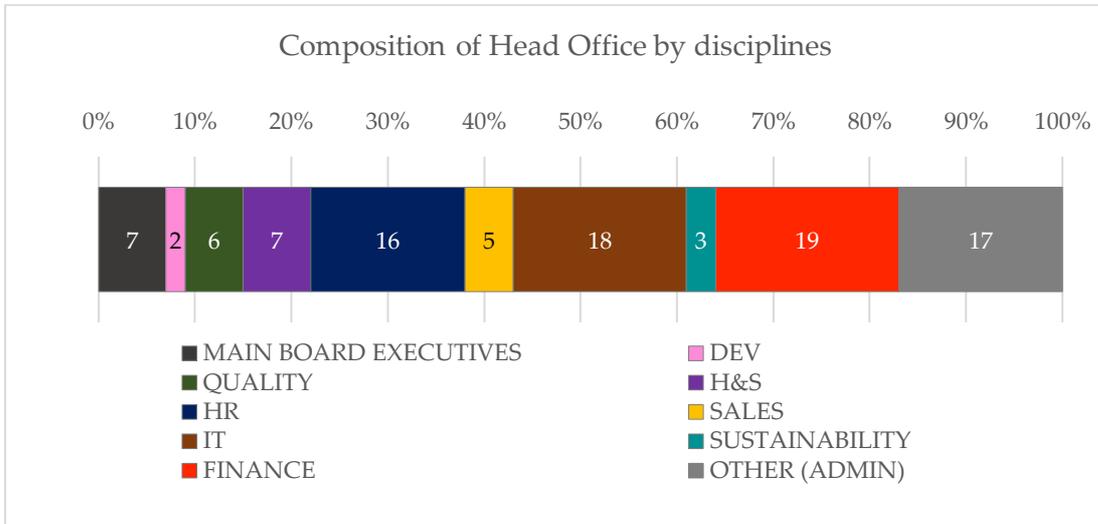


Figure 13: Team make-up of Head Office

This shows the proportion of staff in each team in relation to Head Office's overall staff head count.

5.2.3 Team Structures – hierarchy and function

The same 10-level hierarchical structure (see Table 13 on page 103) provided the backbone for all teams within the Housebuilder organisation. However, there was not always an individual at every level of the hierarchy in each team. This thesis focuses on four primary teams: the Quality Team at Head Office level, and the Technical, Commercial and Build Teams within Regions 1, 2 and 3. It was noted that:

- The Quality Team (Figure 14) was led by an individual at *Executive 2* level, and included an individual at *Executive 3* level and an individual at *Management level 1*, with administrative support at *Staff* level.
- In Region 1 (Figure 15), all activity taking place within the Technical, Commercial and Build Teams was overseen by a Production Director, who sat at *Executive 2* level. Below this, Technical Team individuals sat at every hierarchical level from *Executive 3* to *Staff*. Commercial and Build Team individuals sat at *Executive 3* level, *Management levels 2, 3, 4* and *5*, as well as *Staff* level.
- In Region 2 (Figure 16), the Technical Team was led by an individual at *Executive 2* level. The rest of the team was made up of individuals sitting at *Management levels 1, 2 and 4* along with *Staff* level support. The Commercial Team was also led by an individual at *Executive 2*

level. The rest of the team was made up of individuals sitting at *Management levels 1, 2, 3 and 4* with *Staff* level support. The Build Team was effectively led by the region's Production Director at *Executive 2* level. Below them was an individual at *Executive 3* level, then individuals at *Management levels 2 to 5*, with *Staff* level support.

- In Region 3 (Figure 17), all activity taking place within the Technical, Commercial and Build Teams was overseen by a Production Director, who sat at *Executive 2* level. Below this, Technical Team individuals sat at *Executive 3* level, *Management levels 1, 2 and 5*, as well as *Staff* level. The Commercial Team had individuals sitting at every hierarchical level from *Executive 3* to *Staff*. The Build Team was made up of individuals from *Management levels 1* through to *Staff* levels.

HEAD OFFICE STRUCTURE

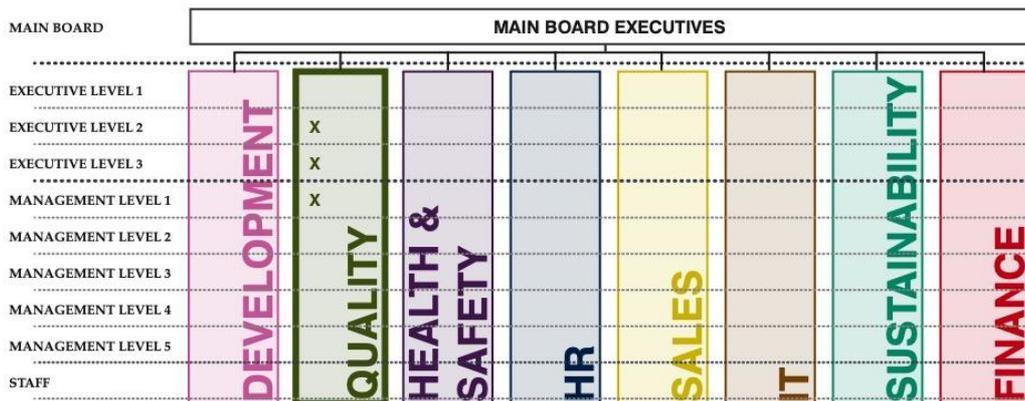


Figure 14: Structure of Head Office Quality Team, showing members at three hierarchical levels
 Each cross in Figure 14 to Figure 17 represents one or more individuals at that hierarchical level.

REGIONAL STRUCTURE: Region 1

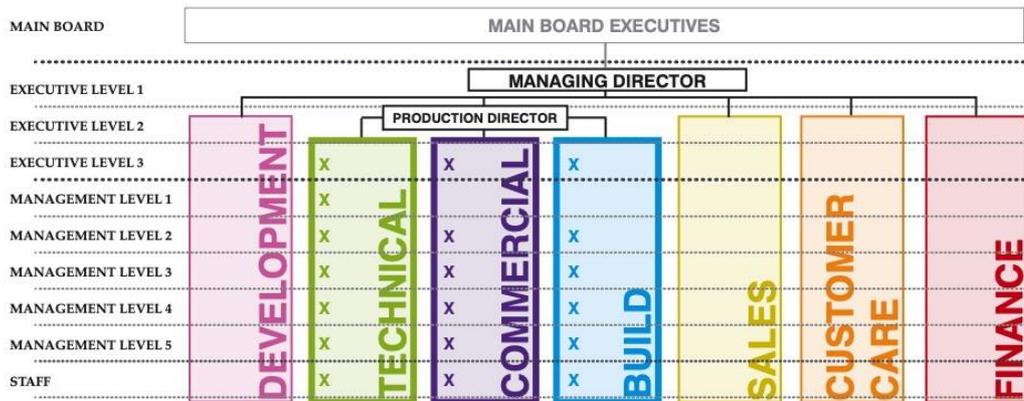


Figure 15: Structure of Region 1's Technical, Commercial and Build Teams

This shows members at numerous hierarchical levels

REGIONAL STRUCTURE: Region 2

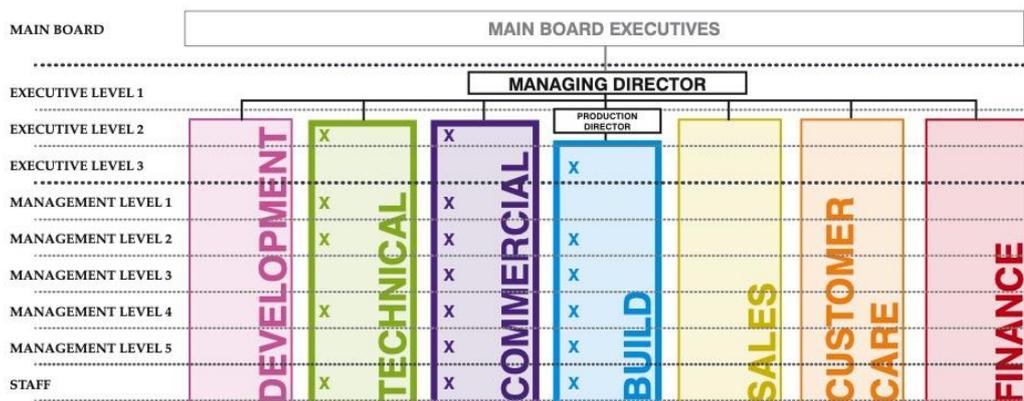


Figure 16: Structure of Region 2's Technical, Commercial and Build Teams

This shows members at numerous hierarchical levels

The Build Team was responsible for building each housing project (*construction phase*) and passed each completed house on to the Customer Care Team prior to its purchase by a customer. The Sales Team flanked both Build Team and Customer Care Team activities, as the Sales Team was the interface between customers and the Housebuilder organisation. The Sales Team ultimately handed over the keys to the customer for their new home (*handover and occupation phase*). This thesis concentrates on the activities conducted during the **detailed design** and **construction phases** by the **Technical, Commercial** and **Build Teams** because this was where the Housebuilder focused on improving build quality through the *quality management routine*. In 2015, each region had between 15-20 housing development sites in progress; 75% were in the construction phase, the remainder were at the detailed design phase.

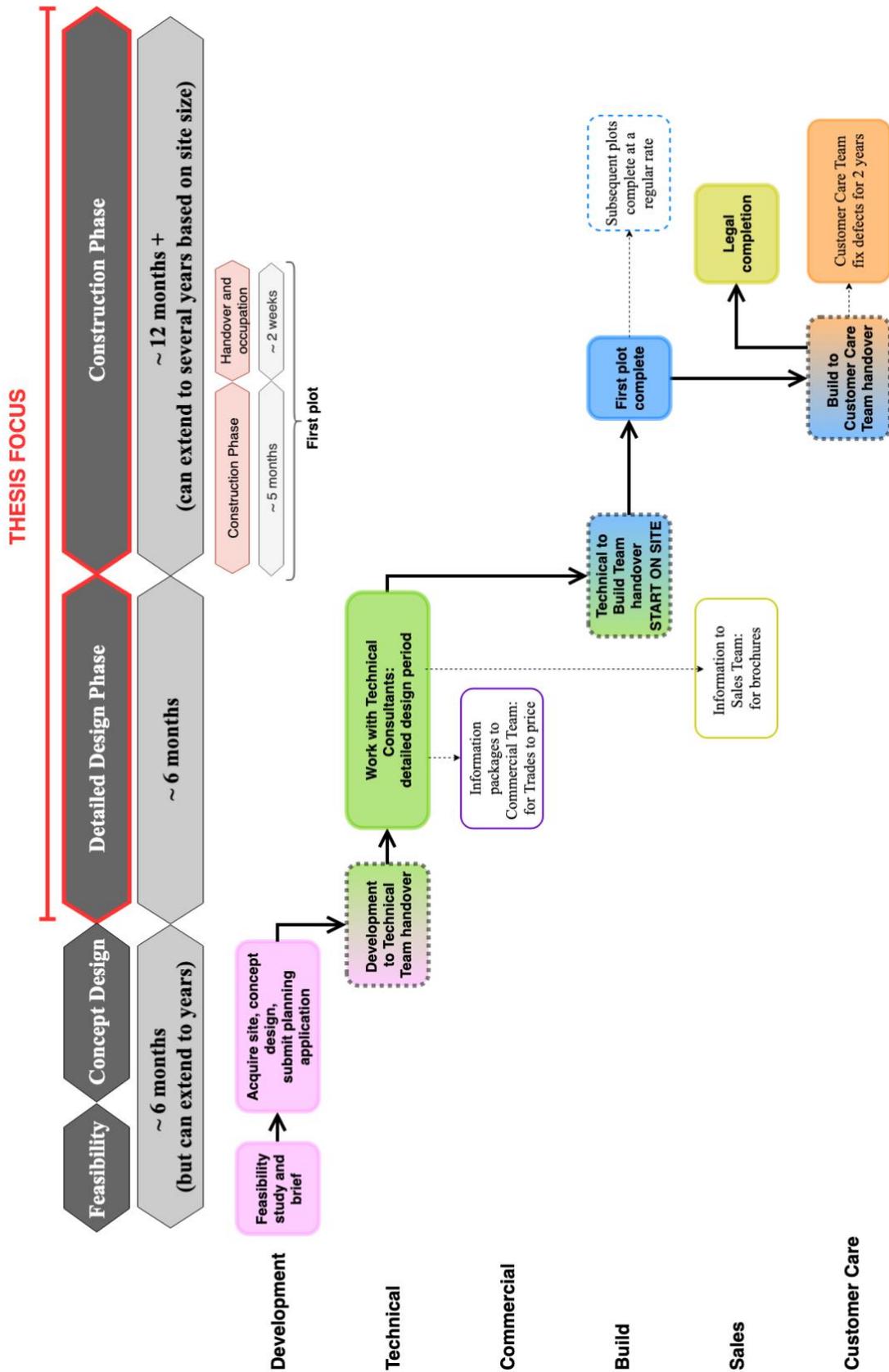


Figure 18: General stages of a housing project's life cycle across regional teams

This shows the path from land acquisition to the first plot being completed, sold and occupied

5.3.2 Housebuilding Project Teams

As a new housing project moved along this ‘assembly line’, one or more individuals from each team were assigned to work on it. Interaction tailed off for the Development Team during the detailed design phase but often Technical Team members stayed involved (to some degree) from the detailed design phase to the end of the construction phase. Commercial and Build Team members became involved towards the end of the detailed design phase to the end of the construction phase. Sales and Customer Care Teams became involved in the project during the construction phase (see Figure 18). Each team had their own team-specific procedures manual to guide individuals through the standard organisational processes to be followed by that team in relation to each project. The exception here was the Build Team, as their manual was being drafted at the time fieldwork was undertaken. These manuals gave an overview of the housebuilding phases relevant to each team from their own team perspective. For example, the Technical Team Manual described organisational processes from Development Team handover to changes to the detailed design on site during construction.

During the detailed design and construction phases, individuals from five teams made up a Project Team, which was responsible for the day-to-day running of a project. Usually one individual from Technical, Commercial and Customer Care Teams was assigned to a project, with numerous individuals from Build and Sales Teams. Within the *Management* level roles, Build Teams had a Build Manager, at least one Site or Project Manager (at various levels of seniority) and one or more Assistant Site Managers per project. They were overseen by an individual within their team from one of the three *Executive* levels. Sales Advisors at Staff level were overseen by a Senior Sales Manager. Figure 19 illustrates an example of how a typical Project Team was resourced.

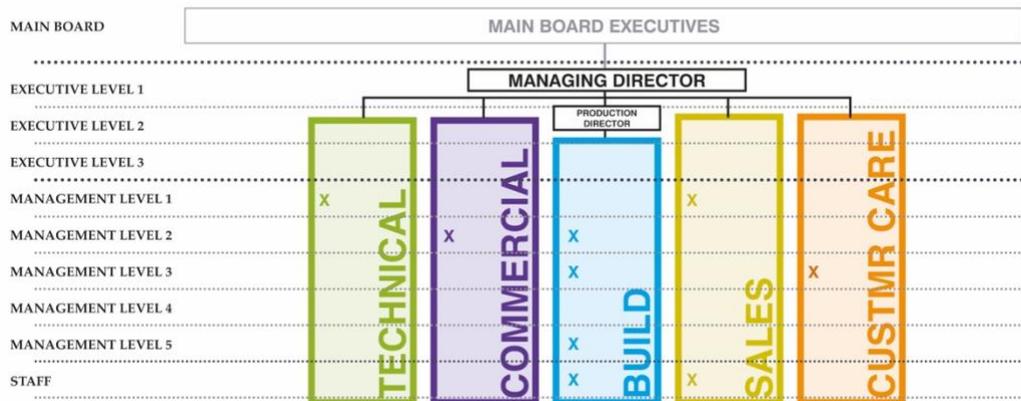


Figure 19: Example Project Team structure for a housing project in a study region

In addition to individuals from the Housebuilder organisation working on each housing project, extra resources were needed to design and build them. This was done by the Housebuilder organisation appointing multiple external organisations for every housing project.

5.3.3 External organisations

Development, Technical, Commercial and Build Teams worked closely with many external organisations throughout the house design and building process (Figure 20).

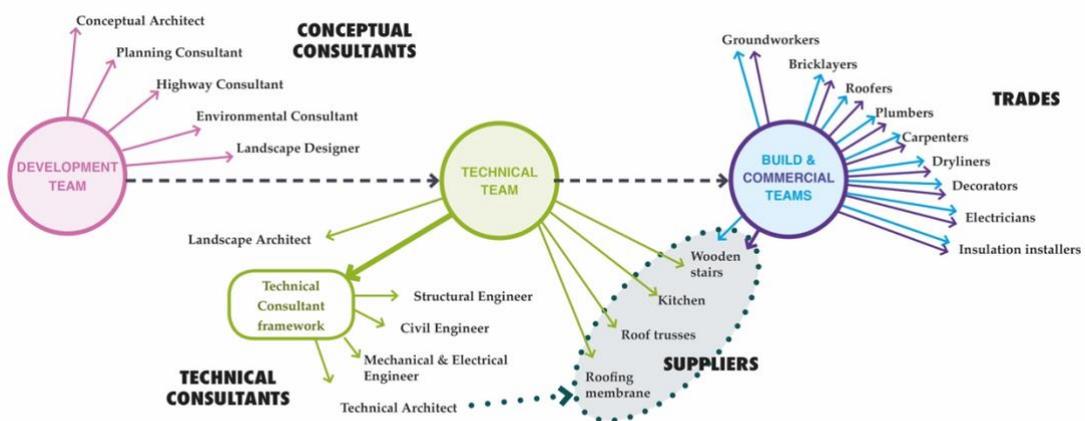


Figure 20: External organisations and the relationships they had to each team

Development and Technical Teams worked with Consultants, i.e. built environment professionals such as architects and engineers, to design housing developments. However, the Consultants that worked with the Development Team were described as 'conceptual', and those that worked with the Technical Team as, 'technical'. The former developed the initial project layout in sufficient detail to secure planning permission, the latter worked up these initial proposals into more detail, providing enough information for the scheme to be built. Rarely did the same organisation fulfil both 'conceptual' and 'technical' roles. Technical Consultants were usually employed by the housebuilder through a framework. The intention was to build relationships between the Technical Consultants and Housebuilder organisation through repeat work. Technical, Commercial and Build Team members worked with Suppliers, i.e. organisations providing materials to fulfil the housebuilder's requirements such as roofing membranes, wooden stairs and roof trusses. Their input was required during the detailed design phase, so team members could integrate the individual product into the house as a whole. Suppliers were required to meet with Technical Consultants during the initial design phase, prior to construction work starting on site. Lastly, Build Teams established close working relationships with Trades individuals, i.e. skilled built environment operatives such as bricklayers and plumbers. Build Teams liaised with Suppliers to discuss delivery of items and logistics. Commercial Teams had more of a fiscal relationship with Suppliers and Trades individuals, as they paid them.

5.3.4 The overall housebuilding process

5.3.4.1 The feasibility and concept design stages

The housebuilding process started with the Development Team working with Conceptual Consultants to carry out a feasibility assessment of a parcel of land in line with the Housebuilder organisation's brief. Depending on the project's location, planning restrictions and market conditions, the Housebuilder organisation's brief could specify the organisation's standard housetypes to be used, or for the Concept Consultants to design a bespoke scheme. If the feasibility study proved profitable for the organisation, the Development Team presented the site and concept design to the *Main Board Executives*. If approved, the land was purchased. Land can be purchased with or without planning permission. If purchased without planning approval, the Development Team worked with their Conceptual Consultants again to develop the

concept design proposed as part of the feasibility study into a more developed design which was then submitted for planning approval. Once submitted and awaiting approval, the Development Team met formally with the Technical Team to hand over responsibility of the project.

5.3.4.2 The detailed design phase

The detailed design phase took approximately six months, with key events taking place in a fixed sequence prior to starting on site. After the Development Team handover, the Technical Team would appraise the site, planning scheme and organisational objectives in more detail than at the feasibility phase, appoint their Technical Consultants and meet with them. At an early stage a design programme was set by agreement between the Technical Consultants and Technical Team. For sites using standard housetypes, a standard length of time was set. The timescale was revised for bespoke schemes, as more thinking and drawing time was needed by Technical Consultants to work through each aspect of the design. Key milestone dates were identified where information needed to be ready to send to the Commercial Team. This allowed the Commercial Team to go out to Trades organisations to tender in good time, prior to starting on site. Technical Consultants issued a set number of packages, containing technical drawings and written specifications, which were checked by the Technical Team before they were sent out to the Commercial Team or Trades. Information was also required by the Sales Team, so they could prepare all of the marketing materials. At the end of the detail design phase, the Technical Team handed over development responsibility to the Build Team in a formal meeting. This coincided with the Build Team starting on site and commencement of the construction phase.

5.3.4.3 The construction phase

Construction of each housing project in this case study started with the site-wide infrastructure (i.e. mains services and haul roads), and site compound for the *Site Team* (i.e. Site or Project Manager and Assistant Site Manager to be based from). From this a build sequence for houses (referred to as *plots* by the organisation) was established. In Figure 21, haul roads are marked by green lines, the yellow area denotes where the site compound will go, and red lines mark out the order in which the plots will be built. In this example, the road from the roundabout was built first

along with the haul roads to allow vehicular access to the show homes and sales suite (in blue in Figure 21), which were to be amongst the run of plots to be built first.



Figure 21: Site plan for a housing development

The site compound location is shown in yellow and plot build sequences are marked by the red lines

Once the infrastructure was in place, a number of plots were marked out (denoted by the red arrows) and built sequentially. For this organisation, the construction process for each plot was broken down into 12 stages, which was linked to how the Site Teams reported weekly progress to the Production Directors. The 12 stages are illustrated in Figure 22 to Figure 36 below.

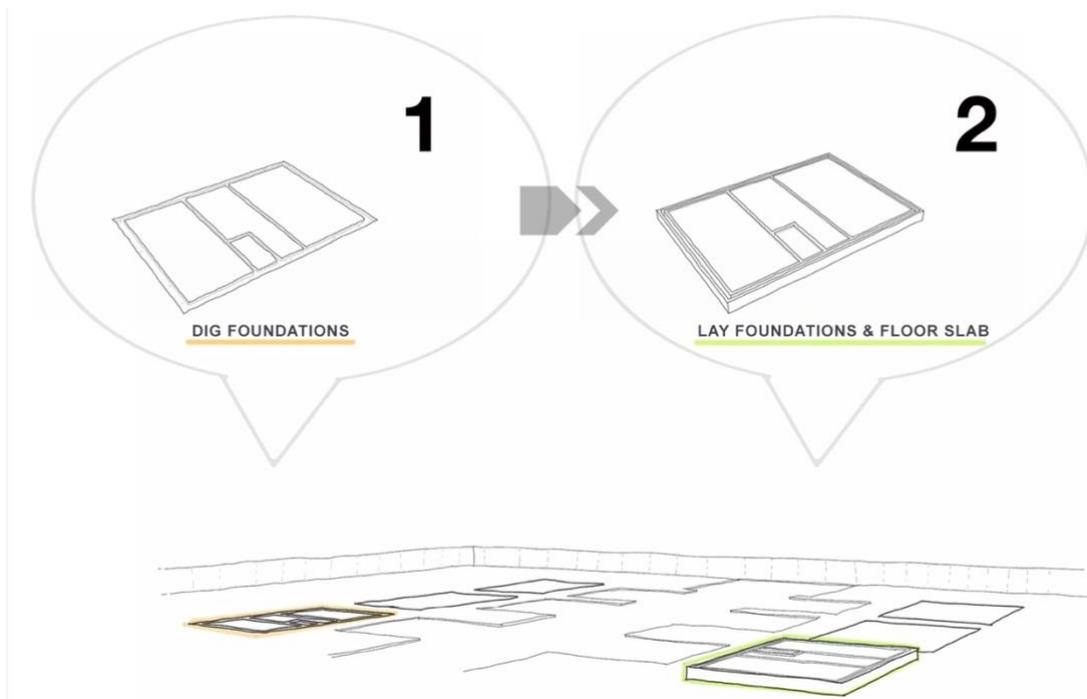


Figure 22: Construction Stages 1 and 2

Each plot started with the foundations being dug (Construction Stage 1 – in yellow), then cast, along with the concrete ground floor slab (Construction Stage 2 – in green).



Figure 23: Photo of Construction Stage 1 (left)



Figure 24: Photo of Construction Stage 2 (right)

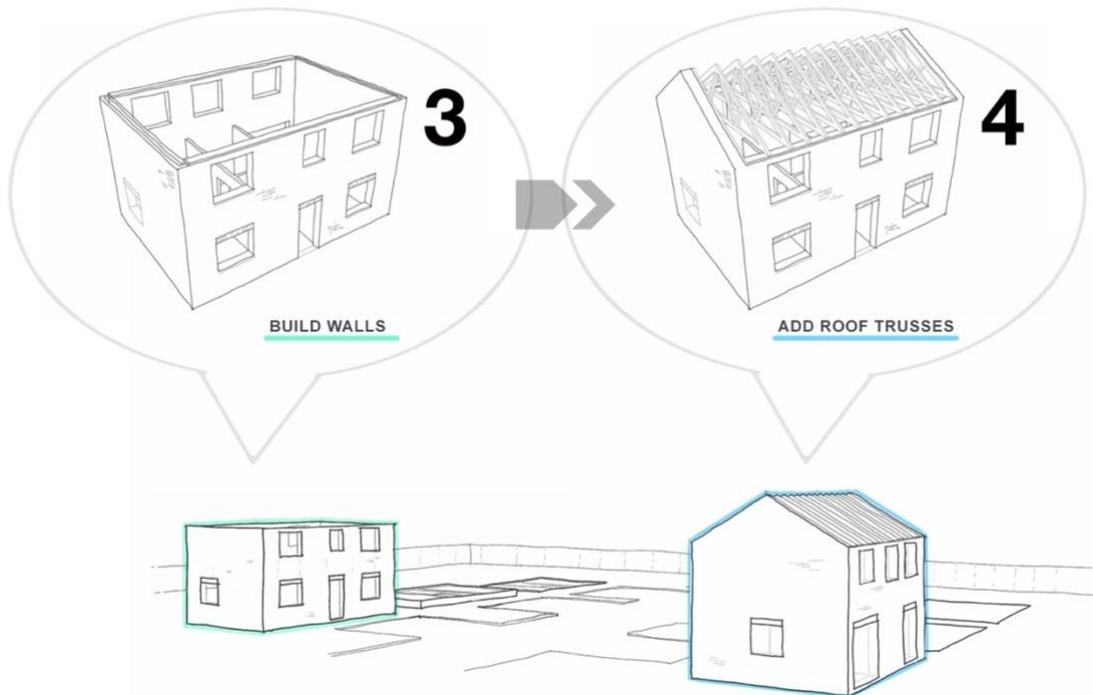


Figure 25: Construction Stages 3 and 4

The external walls and internal loadbearing blockwork walls were built (Construction Stage 3 – in green), then the timber roof trusses were lowered into place and fixed (Construction Stage 4 – in blue).



Figure 26: Photo of Construction Stage 3 (left)



Figure 27: Photo of Construction Stage 4 (right)

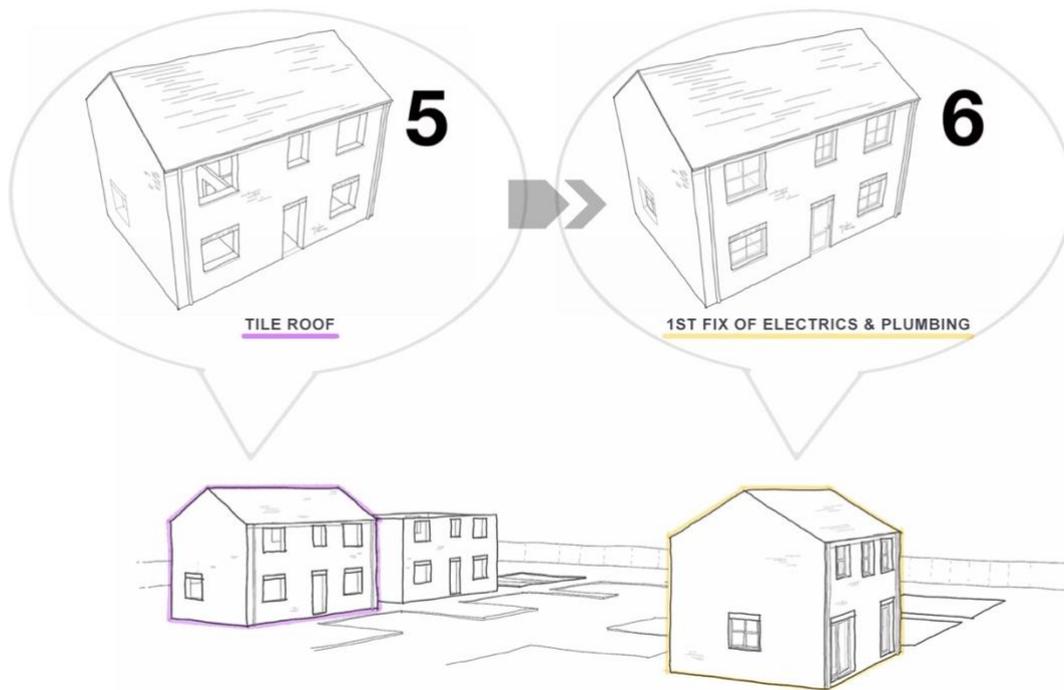


Figure 28: Construction Stages 5 and 6

The roof was tiled so the plot was weather tight (Construction Stage 5 – in pink), then the windows were fitted. First fix (Construction Stage 6 – in orange) referred to all the pipework for plumbing (i.e. bathrooms and kitchens) and electrics (cable runs for power sockets and light switches) being laid next and fixed in position before they were covered up with plasterboard or plaster.



Figure 29: Photo of Construction Stage 5 (left)



Figure 30: Photo of Construction Stage 6 (right)

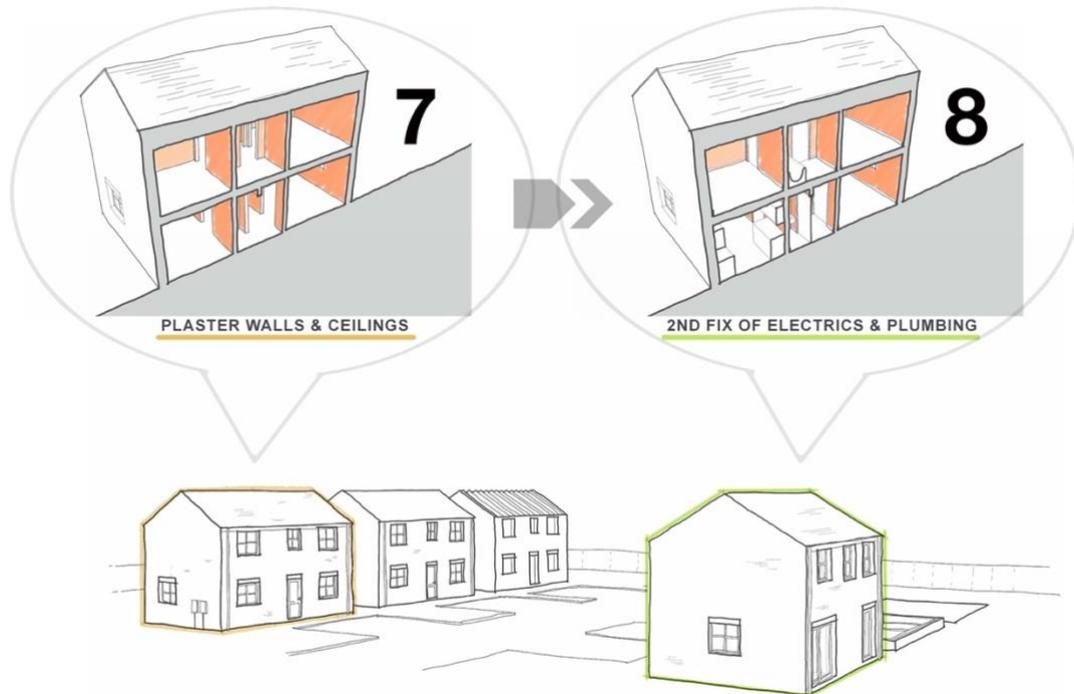


Figure 31: Construction stages 7 and 8

The walls and ceilings were then plastered, giving a smooth surface for painting (Construction Stage 7 – in orange), then kitchen units and bathroom sanitaryware were fitted as part of the plumbing and electrical second fix which connected all the services to the plot (Construction Stage 8 – in green).



Figure 32: Photo of Construction Stage 7 (left)



Figure 33: Photo of Construction Stage 8 (right)

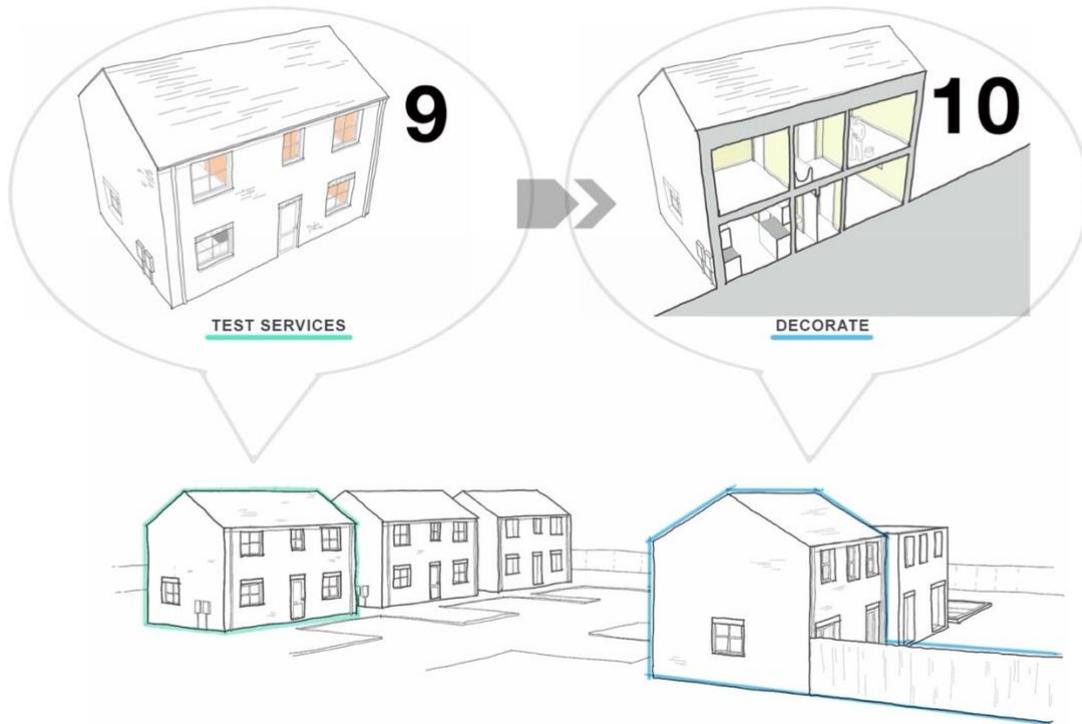


Figure 34: Construction stages 9 and 10

The services to the plot were then tested (i.e. water, gas, electric) and boilers and fans were checked (Construction Stage 9 – in green). Decoration of all walls and ceilings followed (Construction Stage 10 – in blue).



Figure 35: Photo of Construction Stage 10

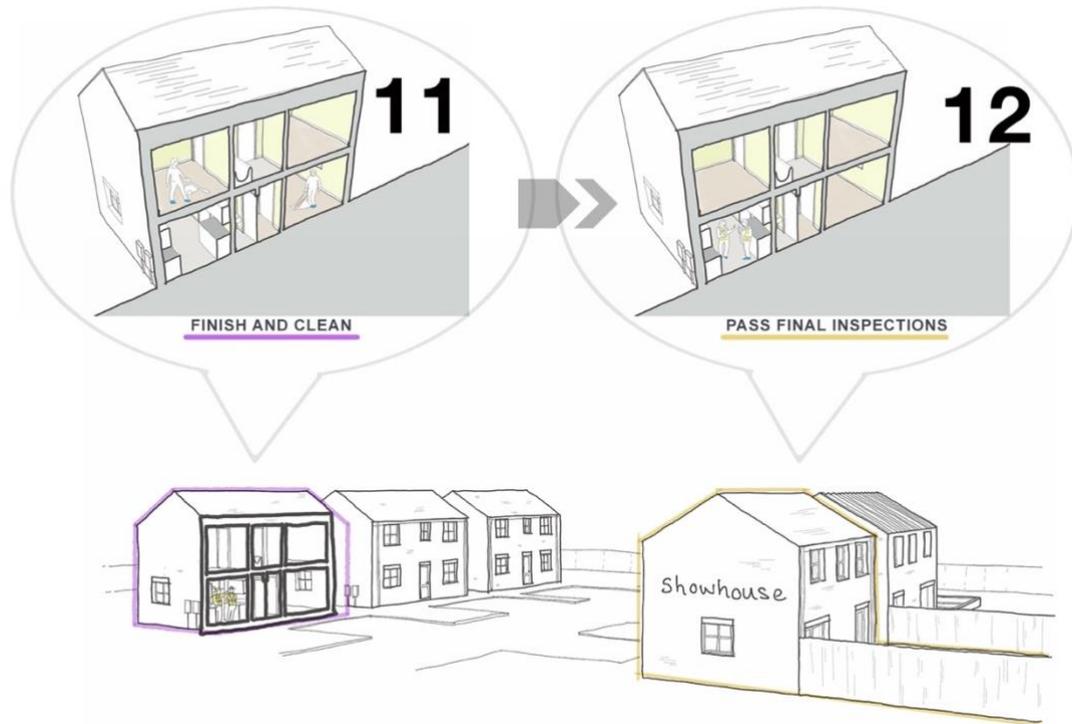


Figure 36: Construction stages 11 and 12

Plots were finished off (i.e. carpets are laid, and any outstanding items were addressed. After which, the plot was thoroughly cleaned (Construction Stage 11 - in purple). There were two final inspections as part of Construction Stage 12; firstly, from an external organisation, the NHBC, which meant the plot met all statutory requirements and was safe for habitation (the NHBC and their role in the housebuilding process is described in more detail in 5.4.1). This meant the Council of Mortgage Lenders would release mortgage monies to a potential customer, so the plot could be purchased. In addition, the Housebuilder organisation had their own final quality inspection, the *Customer Care Final Inspection*, which marked the end of the *revised quality management routine* and is described in 5.4.4. The Project Team's Customer Care Manager checked that the plot met the required standard (this is explored in more detail in 5.4 below) and that there were no outstanding items or parts of the plot that were of substandard quality prior to occupation. As each plot was covered by the Housebuilder organisation's two-year warranty, it was the Customer Care Team's role to ensure the plot was defect free for that period of time. The Customer Care Team also worked with the Build Team to ensure any defects reported by a customer post-occupation were put right as early as possible.

After the Site Team had rectified all the items identified as missing or substandard during the *Customer Care Final Inspection*, and prior to legal completion, customers were walked around their new house by a member of the Site and Sales Teams to give them a demonstration of all the features and systems in the house. This focused on heating and appliance use as well as ways to reduce defects such as plaster cracks occurring as the house dried out. Once legal completion took place, Sales Advisors handed keys over to customers who then moved in. Customer Care Teams then looked after customers, providing an after-care service. They made contact with customers several days after occupation, introduced themselves and ensured customers knew who to contact in case of emergencies. Contact was then made weekly to ensure any arising issues or defects reported were acted on and rectified quickly.



Figure 37: Photo of plots nearing completion



Figure 38: Photo of finished and occupied homes

The process was then repeated for all remaining plots, following the build sequence set out. Usually the first plot to be finished became the show house during the construction period. Once this was complete, Sales Advisors were based at the site.



Figure 39: An occupied plot being sent an NHBC customer satisfaction survey

Eight weeks after legal completion, each household was sent an NHBC National New Homes Survey to complete (see Section 3.4.3 for more about this survey). The case study organisation took the survey extremely seriously as the survey responses went towards ranking their housebuilder performance nationally in terms of customer satisfaction league tables.

Once on site, the duration of the construction phase varied, with the first plot usually being completed within five months, and plots being completed at regular intervals thereafter. Timings also differed depending on the construction method, as the build sequence for masonry homes was different from that of timber frame dwellings. This meant there was no 'one-size-fits-all' approach to design and construction programmes that could be taken. The Technical Consultants, Technical and Build Teams together with Regional Superiors had to take the 'bespoke-ness' of each project into account when putting the detailed design and construction phase programmes together.

With the overall linear process of concept design, detailed design, construction and after sales activities described above, the Housebuilder organisation's quality procedures are laid out in the section below. This illustrates where and how the *quality management routine* sat within the housebuilder's operations as a whole.

5.4 The Housebuilder organisation's quality management routine

5.4.1 Regulatory quality inspections

For the Housebuilder organisation, quality standards were primarily monitored and managed during the construction phase. To ensure all the statutory building regulations had been satisfied, 3rd party quality inspections were carried out by the NHBC. This was an essential inspection regime for the Housebuilder organisation, as without it, the Housebuilder would be unable to offer a 10-year warranty to customers. Each plot underwent five inspections during the construction phase to ensure statutory standards were met. Passing the final inspection was considered a key milestone by the Housebuilder organisation, as mortgage monies were released. This series of inspections was an established part of the housebuilding processes and not affected by the organisation's own *quality management routine*.

5.4.2 The organisation's quality management routine (pre-2014)

In addition to the NHBC inspections, the organisation had its own inspection regime that went above the minimum statutory standards set by the NHBC. It aimed to ensure these more prescriptive quality and technical compliance standards were being met during the construction period. This latter set of inspections was described by participants as the organisation's *quality management routine* and is the focus of this thesis.

During the detailed design phase, responsibility was placed on the Technical Team and Technical Consultants to audit the construction drawings. These checks were to make sure the organisation's standard construction details were used where possible and that what was designed was theoretically possible to build on site; however, this did not fall under the Housebuilder organisation's *formal quality management routine*.

Before 2014, the organisation's *quality management routine* centred around Site Managers; firstly, completing a paper *Construction Stage Completion* booklet for

each plot; secondly, transposing a small amount of information from the *Construction Stage Completion* booklet's contents into another shorter booklet, the *Plot Passport*; and lastly, passing the *Customer Care Final Inspection* (referred to in the previous section). Exploring each element in turn:

- the *Construction Stage Completion* booklet consisted of eight double-sided A4 pages of checklists to tick off, date or put notes against. The checklists related to items at four of the 12 Construction Stages; 5, 6, 9 and 12 (described in Figure 22 to Figure 36 above), therefore ensuring items had been remembered or installed correctly at the easiest and most cost-effective point in time during the construction process. Once the Construction Stage 9 inspection was complete, four key dates referring to when the Construction Stages were complete were copied across by the Site Team from this booklet to the *Plot Passport*.
- Comprising six sides of A4 paper, the *Plot Passport* was used to record customer requirements and meter readings. It also required the Site Manager to confirm the plot had been built as per the construction drawings and inspected at the four required construction stages. Once signed, the *Plot Passport* was handed over to the Customer Care Team and formed part of the legal completion paperwork.
- The *Customer Care Final Inspection* involved a Customer Care Team member walking around the plot and noting what presentation and decoration items were, in their opinion, substandard. The list of non-conformance items was given to the Site Team to put right, and then attached to the *Plot Passport*. This was filed by the Customer Care Team in the regional office and used as a reference to check whether or not the Build Team had rectified the issues. It then became possible to detect whether or not the Site Team had rectified a defect if the customer then reported the same issue to the Customer Care Team after they had moved in.

Table 15: Overview of NHBC inspections and original quality management routine inspections

Plot-specific Quality Inspection	About	Construction Stage												Comments	
		0	1	2	3	4	5	6	7	8	9	10	11		12
NHBC (for Building Regulations)	Carried out by 3rd party		X	X	X			X						X	Final inspection (Stage 12) released mortgage monies
Case organisation's original quality management routine (pre-2014)	Carried out by Site Teams. Paper booklet						X	X			X			X	Dates from four completed stages and CCFI results went onto the Plot Passport, which was completed at end of Stage 12

This table highlights when they were carried out during the construction phase (Figure 22 to Figure 36)

5.4.3 Incentive to changing the quality management routine

Historically, the role of checking quality and enforcing compliance against the Housebuilder organisation's own quality standards (described above) sat with Quality Assurance Managers, who were employed by the Housebuilder organisation. With the economic downturn in 2008, the Quality Assurance Managers were made redundant across all regions, with the expectation being that Site Managers would take on the role in addition to their current tasks. Consequently, as Site Teams could not focus on quality alone but had other obligations, the responsibility for ensuring quality standards were met was passed down for individual Trade organisations to manage. This resulted in an overall decline of quality standards: NHBC New Homes Survey customer satisfaction scores became lower, and eventually the Housebuilder organisation's star rating fell. Once this happened, the Housebuilder organisation decided to create the Quality Team, whose priority was to improve construction quality across the entire organisation. The Housebuilder organisation's *quality management routine* was modified through collaboration between Head Office Directors and the Quality Team. In Region 2, the post of Quality Assurance Manager was retained, to help support Site Teams, as the region historically had the lowest NHBC National New Homes Survey customer satisfaction scores across the organisation.

Following an internal quality process review by the Quality Team and Head Office Directors, it became apparent that few Site Managers completed the *Construction Stage Completion* booklet. Instead Site Managers focused solely on the *Plot Passport* and *Customer Care Final Inspection* at the end of each plot's construction phase, as these were linked, and the *Plot Passport* was required documentation for legal completion. In addition, once all outstanding matters generated from the *Customer Care Final Inspection* had been satisfied, the plot then became the Customer Care Team's responsibility, and no longer the Build Team's. Therefore, it was impossible to tell whether the items listed in earlier Construction Stage inspections had been checked throughout the construction process, as little was formally recorded. Defects could have been hidden within the fabric of the plot, covered by plaster and paint, and not materialise for years; however, if and when they did materialise, they would be expensive and inconvenient to fix. This lack of quality standards compliance left the Housebuilder organisation open to risk: risk of dissatisfied customers, unforeseen exorbitant costs, and of not being able to defend the quality of their product. The Housebuilder organisation's workforce and workload were also increasing. This made managing operations using current leadership practices at regional level challenging, as one person with authority, namely the region's Production Director, was becoming unable to physically oversee staff actions, Trade organisation activities and plot progression simultaneously across multiple sites. Instead, Head Office started to explore using digital technology to report and record plot progress data. Individuals in authority could then identify potential on-site problems earlier by observing data remotely in the regional office. These defect risk and lack of management factors drove an internal need to change the current *quality management routine*.

Incentives to change the Housebuilder organisation's *quality management routine* were also driven by external factors. From an environmental perspective, the Quality and Sustainability Teams at a strategic level were looking at ways to bring each plot's predicted energy use figures (computed at the detailed design stage) and actual energy use figures closer together. The gap between the two performance figures rarely matched (de Wilde 2014). In addition, upcoming changes to the UK Corporate Governance Code (FRC, 2016) at that time meant more emphasis needed to be placed on the internal enforcement of organisational policies and procedures. If

the Housebuilder organisation was not seen to be doing what they said they were doing, there was a risk to the Housebuilder organisation's reputation through embarrassment in a public arena. This could be detrimental to the Housebuilder organisation's credibility.

5.4.4 The revised quality management routine (post-2014)

The revised *quality management routine* was introduced for use across all regions' housing sites in 2014 and comprised three parts. Firstly, a new ***Quality Assurance (QA) Handbook***; secondly, a revised version of the ***Construction Stage Completion*** booklet; and lastly, a new ***Site-wide Quality Control Inspection***. These are discussed in turn below.

5.4.4.1 The Quality Assurance Handbook

The *QA Handbook* was written by the strategic level Quality Team and refined using feedback from individuals in regional offices. It was made up of chapters, one for each Construction Trade, and illustrated the quality standards sought by the organisation through photographs and supporting text. These defined the Housebuilder organisation's construction and finishing standards – the minimum level each Site Manager should accept. Therefore, the Trade organisation would not be paid unless the relevant level of quality was met. Chapters were sent digitally to the relevant Trade organisations by the Commercial Team when they were asked to price the works (purple box in Figure 18). The *QA Handbook* then became part of the contract between the successfully appointed Trade and the Housebuilder organisations. A hard copy of the complete *QA Handbook* was assigned to each Site Manager by the Quality Team, and digital copies were given to Commercial, Technical, Customer Care, Build Team members and Technical Consultants.

5.4.4.2 Updated Construction Stage Completion booklet

In Study Regions 1 and 3, the format of *Construction Stage Completion* booklet had been revised to refer to the *QA Handbook* and checked items reordered to mirror the construction stage sequence more accurately. This was still eight pages of A4 and comprised checklist items for four of the 12 construction stages. In addition to the mandatory four stages as before, Microsoft Word-based forms were introduced for a further five Construction Stages. In the guidance given to Site Teams, about how

to use the revised booklet, these new Word document forms were not identified as compulsory (see top row of Table 16).

In Region 2, the booklet had been digitalised for electronic tablet use and was being trialled there. Region 2 had been selected, as it was considered by Head Office to have the most to gain through the tablet's introduction. The booklet now consisted of eight electronic forms, each comprising checklist items. Instead of only having to complete four of the Construction Stages, as per the paper version, Site Teams had to complete all eight forms. These had merged with the site's progress reporting process too. The checked items listed on each form needed to be ticked off electronically by the Site Manager or Site Team member, with comments added or photographs uploaded where required. Once the electronic form had been completed, the digital content was uploaded online and sent to the regional office to update staff there on build progress. If the Site Team missed out a Construction Stage form for a plot and moved on to complete the next one, the omission could be seen in the regional office and Build Team Directors could call the Site Manager to find out why the form had been skipped. The intention was for all regions to use tablets (instead of a paper booklet) over time, as it meant site progress could be observed in real time. Regional Directors could manage sites remotely more effectively, and when Site Managers left the organisation at short notice, more individuals (both on site and in the regional office) were aware of current progress. This made it easier and quicker for a new Site Manager to familiarise themselves with a site and its current situation (see bottom row of Table 16).

The *Customer Care Final Inspection* was updated and added to the tablet. It explicitly referred to parts of the *QA Handbook*. Any discrepancies in finishing standards were to defer to the *QA Handbook* for resolution and not rely on personal judgement. As a result, the information required for the Plot Passport was stored digitally and accessed by the Customer Care Team centrally, so the paper version became obsolete.

Table 16: Overview of Construction Stage Completion booklet and digital forms

Plot-specific Quality Inspection	Enactment	Construction Stage												Comments	
		0	1	2	3	4	5	6	7	8	9	10	11		12
Case organisation's revised quality management routine (post-2014) in PAPER FORM In use in Regions 1 & 3	Carried out by Site Teams Paper booklet for four mandatory stages, (red X) Word documents for the remainder (grey x)	x		x	x		X	X	x	x	X			X	Inspection items updated to reference the QA Handbook Dates from four mandatory stages and Customer Care Final Inspection results went onto Plot Passport, which was completed at end of Stage 12. Customer Care Final Inspection updated to use the QA Handbook as a reference tool.
Case organisation's revised quality management routine (post-2014) ON THE TABLET In use in Region 2	Carried out by Site Teams Digital form in Region 2. All eight forms were mandatory (red X)			X	X		X	X	X	X	X		X		Inspection items updated to reference the QA Handbook. Customer Care Final Inspection moved to tablet, so Plot Passport became electronic. Stage 12 form moved to Stage 11 as it contained pre-inspection items for Customer Care Final Inspection.

This table shows when they were meant to be completed during the construction phase

(Figure 22 to Figure 36).

5.4.4.3 Site-wide Quality Control Inspection

A new *Site-wide Quality Control Inspection* was devised and introduced to give the Quality Team first-hand experience of the quality standards being adopted across the organisation as a whole. It also provided an opportunity to catch examples of *QA Handbook* non-conformance on site at an early stage of the construction process, when they were easier to put right. Rather than being an inspection process that ran for the duration of a plot's construction life cycle, like the checklist in the *Construction Stage Completion* booklet, the *Site-wide Quality Control Inspection* was carried out over the duration of one day and looked at a cross section of dwellings across the site, at various stages of construction – from foundations at Construction Stage 1 to decoration at Construction Stage 10, as well as finished but unoccupied plots. Its purpose was to establish whether the *QA Handbook* standards were being met on site. The *Site-wide Quality Control Inspections* were conducted by Quality Team members with the Site Manager, Build Manager, Technical Manager and

Project Architect present. Depending on the nature of the site, one or two *Site-wide Quality Control Inspections* would be conducted over the site's construction life cycle.

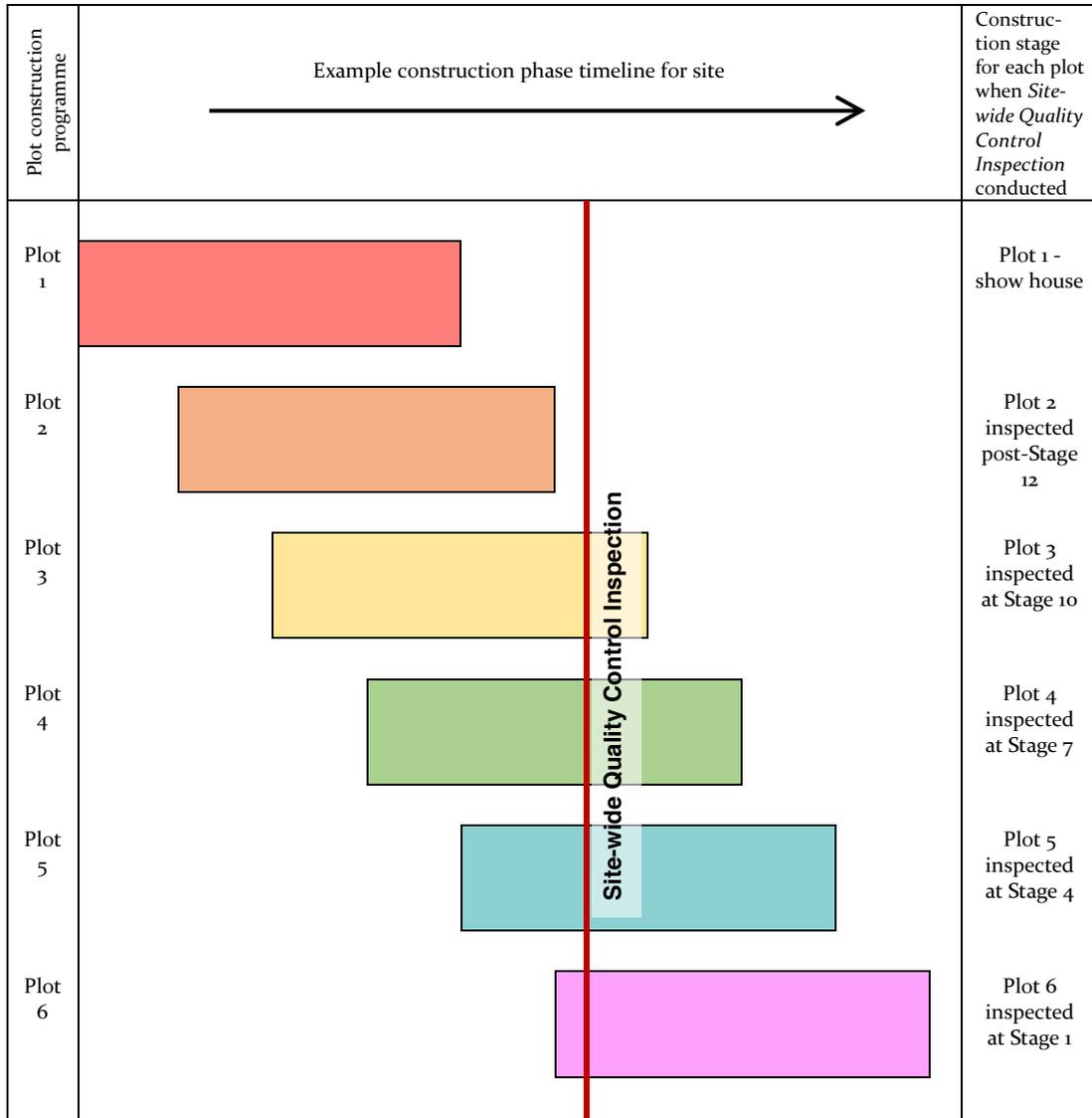


Figure 40: Diagram showing when a *Site-wide Quality Control Inspection* would be carried out.

As plot timelines cascade over time, by the time the first saleable plot is complete, the plots being built afterwards are at different stages. A day is spent inspecting a range of plots, all at different construction stages.

Following an inspection, a report of the findings was issued to all attendees and regional senior management. The report colour-coded items, as outlined below in Figure 41. Photographs of non-conforming items listed accompanied the report.

3. Colour code your findings to reflect the degree of the departure from the design or the expected impact it may have on the design performance or risk to [the organisation] as follows:

- Purple:** minor impact or departure on design/build; improve quality on future plots
- Orange:** intermediate impact or departure on design/build; rectify on all incomplete plots
- Red:** major impact or departure on design/build; rectify on all incomplete plots and raise with [Team Director] and [Quality Team] whether remedial work is required to completed plots
- Green:** Information Required

Figure 41: Colour coded key taken from the first page of a Site-wide Quality Control Inspection report

OR26	External movement joints: Are movement joints in design position, consistent width, and ideally behind rain water pipes?		Movement joint backing strip needs to be fitted in line with the manufacturer's instructions to ensure correct depth of the joint sealant. The width is consistent and neat.	
EW3	Have Cavity trays been installed over all openings and cavity obstructions?		The trays are installed above the lintel leaving the brick courses set into the lintel exposed to water ingress and tracking under the lintel and over the door frame. It is a low risk limited area, so a liquid applied product would be an acceptable solution. The leak through the lintel of plot 53 balcony door must be investigated before boarding	
OC5	Have First Fix brackets for balconies, balustrading etc. been fixed and water proofed?		Please confirm waterproofing detail	

Figure 42: Example snippets of one Site-wide Quality Control Inspection report to show the colour coding

Purple text denoted an issue of minor impact, which required improvement on future plots; orange text meant the discrepancy had an intermediate impact, which required rectification on all incomplete plots; red text meant the item listed had a major impact, which had to be rectified on all incomplete plots and assessed with Regional Superiors about rectification on completed plots and; green text denoted a

request for information. In summary, changes to revise the organisation's *quality management routine* comprised introducing a new *QA Handbook*, the *Site-wide Quality Control Inspection* and redrafting the *Construction Stage Completion* booklet in two formats; paper and electronic tablet.

5.4.5 Institutionalising of the quality management routine

Quality Team members went around each regional office in 2014 and presented an overview of the revised *quality management routine*. A PowerPoint presentation was given to those who would be using the *QA Handbook*, filling in the *Construction Stage Completion* booklet or electronic forms, or attending a *Site-wide Quality Control Inspection* (i.e. individuals from Commercial, Technical and Build Teams). The session was also used by the Quality Team as an opportunity to have a discussion with individuals across each region about changes to the *quality management routine* and general quality standard improvements.

Following the presentations, digital copies of all the inspection forms and *QA Handbook* sections were available on the Quality Team's intranet page, which every employee could access. Also, written guidance documentation was issued to Build Team members in all regions. Quality Team members also conducted additional informal quality inspections of sites with Site Teams to illustrate to Site Managers where parts of the *QA Handbook* standards could be applied. While these inspections were conducted in a similar way to *Site-wide Quality Control Inspections*, only Build Team members attended and the defects were not recorded in the same way as for a *Site-wide Quality Control Inspection*.

From an inter-organisational perspective, at the design stage, Technical Team members were to ensure Consultant organisations produced technical drawings that met *QA Handbook* standards. At the tender stage, Commercial Team members were to ensure Trade organisations priced their work to meet the housebuilder's quality standards. Finally Build Team members were to ensure that individuals from Trade organisations built to the quality standards set out in the *QA Handbook*.

5.5 Researcher impressions of study regions' cultures

Fieldwork commenced approximately 18 months after the revised *quality management routine* had been introduced. Each regional office environment felt different to the Researcher as an outsider. Region 1 felt relaxed and members across

teams seemed familiar and comfortable in each other's presence. Region 2's office environment felt more strained, stretched and struggling with time pressures. As staff turnover was higher here, there appeared to be a heightened sense of formality and emotional tension, as working relationships were not as well established or relaxed as in Regions 1 and 3. In Region 3, staff appeared relaxed and comfortable between themselves as individuals had worked together for a long time. To the Researcher, there was also a slight sense of reservation to her presence than in the other two regions, although everyone was extremely accommodating. Other noticeable differences were between the office and site environments. In the office, conversations were courteous and level. There was no noticeable gender imbalance between male and female employees. On site, the atmosphere was male-dominated and punctuated with loud outbursts of emotion and confrontation, usually from Trade individuals, as well as coarse language and much swearing; this was in marked contrast to the regional office environment. With the case study organisation scene set, the following three chapters describe the thesis' findings, following six weeks immersed in the field.

5.6 Chapter summary

In this chapter, the case organisation (Housebuilder) was described in depth. This included an overview of the hierarchical structure and team functions within both the Head Office and the three study regions. The general housebuilding process for the Housebuilder organisation was described in detail, showing how each Regional Technical, Commercial and Build Team (the three main teams under study here) typically worked together to develop a detailed design, go out to tender, and start building work on site. As part of this, the general make-up of a Project Team was described. The external organisations involved, i.e. Conceptual Consultants, Technical Consultants, Trade and Supplier organisations are discussed, along with how each group worked with the Housebuilder organisation over the life cycle of a housing project.

The Housebuilder organisation's 12 stages of the construction phase were illustrated using sketches and photographs to show how a house is built, finishing with the customer purchasing a house, or plot, moving in and completing the NHBC National New Homes Survey (see Section 3.4.3).

The Housebuilder organisation's *quality management routine* was described, and the chapter explains why the *quality management routine* was revised in 2014. This revised *quality management routine* was explained and the three constituent components are described; the *Quality Assurance (QA) Handbook*, the *Site-wide Quality Control Inspection*, and finally the *Construction Stage Completion booklets*, which were used in Regions 1 and 3 as a paper booklet, and in Region 2 as digital forms on a tablet.

The chapter finished by recounting how the *quality management routine* was institutionalised across the organisation, and how at the organisational level, the three teams were envisaged to communicate the QA Handbook to individuals in external organisations. The Researcher's impressions of each of the study regions are also presented.

CHAPTER 6. FINDINGS - COMMUNICATION

6.1 Introduction

In this section of three chapters, the study's findings are presented. This chapter discusses the first aggregate dimension, communication, in relation to the *quality management routine*. Chapter 7 explores the second aggregate dimension of time, and Chapter 8 explores issues arising around trust – the third aggregate dimension.

In this chapter, nine first-order concepts describe:

- Firstly, why lower hierarchical levels, i.e. Middle Management and Junior Staff, resisted organisational level changes to working practices, restricting how new learning was subsequently communicated up hierarchical levels, i.e. to Regional and Organisational Superiors.
- Secondly, how four diverse types of intergroup relationships simultaneously communicated learning across the case study organisation:
 - Team to team communication over time where one team handed over responsibility for a site's development to another;
 - Top to bottom and bottom to top communication up and down the organisation's rigid vertical hierarchy;
 - Horizontal communication between rival regional offices, as each region was in direct competition with the others;
 - Diverse communication practices over a geographic distance where individuals in different geographic locations worked in different environmental conditions.
- Lastly, how individuals formed their own interpretation of the *quality management routine* through communication over time, to then persuade others to change their behaviour in line with the original individual's interpretation of that routine.

These first-order concepts interrelate and are grouped into three second-order themes. These theoretical constructs identify:

- Firstly, how organisational- to individual-level *institutionalising* of the *quality management routine*, and subsequent feed-forward, was more effective through direct top-to-bottom, and bottom-to-top,

communication, as opposed to learning being communicated up or down multiple adjacent levels of analysis, i.e. Organisational to Regional to Team to Individual and vice versa.

- Secondly, that communication between groups of individuals from diverse disciplines was complex and siloed, with limited interconnections between them.
- Lastly, that an individual’s interpretation of quality standards built up steadily over time through individuals collectively discussing various parts of the *quality management routine* as they worked. This interpretation facilitated an individual’s ability to further communicate the *quality management routine* to others, particularly in external organisations.

By examining these first-order concepts and second-order themes, links are established between them and generate the aggregate dimension of ***communication***. Table 17 illustrates how the nine first-order concepts are grouped into the three second-order themes and aggregate dimension of communication.

Table 17: Communication data structure

<i>First-order concepts</i>	<i>Second-order themes</i>	<i>Aggregate dimension</i>
<i>Communication of conflicting goals</i>	<i>Changing lines of communication</i>	<i>Communication</i>
<i>Communication which bypassed Regional Superiors</i>		
<i>Communication through project stages</i>	<i>Siloed inter-group communication</i>	
<i>Communication through hierarchical layers</i>		
<i>Communication between competing regions</i>		
<i>Site communication vs. office communication</i>		
<i>Developing a shared interpretation</i>	<i>Communication and interpretation</i>	
<i>Individual interpretation of formal practices</i>		
<i>Turnover and continuity of interpretations</i>		

6.2 Concept 1a: Communication of conflicting goals

Alongside the *institutionalisation* of the *quality management routine*, Project Teams attempted to meet various (often conflicting) goals from the organisation,

region and team levels. These competing goals influenced how individuals subsequently responded to the *quality management routine*, with responses ranging from compliance in Region 1 to resistance in Region 3 depending on what the regional and team levels communicated.

The Quality Team introduced the *quality management routine* through a presentation to Project Team members. This was followed up over time through responding to *QA Handbook* queries, carrying out *Site-wide Quality Control Inspections*, and in Region 2 supporting *Construction Stage Completion forms* used on the tablet. At the same time, a competing message was communicated at the organisational level to Regional Superiors: 'build the required number of new homes during the financial year to receive a bonus'. Of the two messages, one concerning the *quality management routine* and the other relating to bonuses, only one message was incentivised by Head Office. Head Office staff observed that the latter message about meeting this goal percolated down the hierarchical levels and influenced individual behaviour:

*“At the end of the day, the thing you are going to get paid
your bonus on is the thing that's going to drive your behaviour.”*

Head Office: Participant U

Therefore, individuals were less motivated to learn the *quality management routine*, as it was not rewarded in the same way. In addition, the Quality Team (at Head Office level) was unable to enforce the *quality management routine*, as responsibility for its enforcement was passed down to each region. This suggests that learning was more likely to occur if Regional Superiors supported the *quality management routine*, and subsequently checked that new working practices were adopted. However, individuals in some regions, particularly Site Managers, resisted changing their working practices. Participants cited that they had always done things a certain way and did not see the benefits in doing the same activities in a new way.

This was observable in individual behaviour. For example, at the start of a *Site-wide Quality Control Inspection*, none of the participants (except the Quality Team member and Researcher) had a notepad to take any notes. The Quality Team member asked a Technical Team participant to take notes from the inspection. This shifted the atmosphere from one of polite passive interest in the activity, to active

engagement for the Technical Team member. The assumption that appeared to go with this observation was that the inspection was for the Quality Team's benefit, rather than the Project Team's. For the Project Team, the inspection was a necessary inconvenience to their normal working practices. This suggests the Project Team took a reactive, rather than proactive, approach to learning the *quality management routine*.

In Region 1, Site Managers changed their working practices in line with the *QA Handbook*, as their superiors asked them to. In Region 2, some Site Managers described how they fundamentally disagreed with parts of the *QA Handbook*. This led to compliance being inconsistent. In some circumstances, the Site Managers instructed individuals from Trade organisations to follow the *QA Handbook* but were unhappy about doing it. In other instances, they ignored protocol and instructed individuals from Trade organisations to build what the Site Manager believed resulted in a better house for the customer. For example, one Site Manager was very hesitant about changing the way a door detail worked. The detail in the *QA Handbook* focused on reducing heat loss, but the Site Manager felt it compromised how robustly the door frame could be fixed at the bottom, and created a weak point to fail in future (see Appendix 1 on page 311). The Site Manager's belief in their experience, outweighed the instructions communicated in the *QA Handbook*, and instead provided their base justification for ignoring it. Consequently, they felt that the Quality Team should be using their Site Team experience to update the *QA Handbook*:

*"This site is supposed to be in line with the QA Handbook,
but I do lots that the QA Handbook has got to catch up with." Region
2: Participant G*

In Region 3, as Regional Superiors and Middle Management were sceptical of the *quality management routine's* benefits, regional staff collectively assessed parts of the *QA Handbook*, and sections deemed unnecessary were omitted in line with their collective experience (see Appendix 1 on page 311).

In summary, multiple goals were communicated from top to bottom levels within the organisation, with incentives for individuals to meet performance goals, not quality goals. This suggests that *institutionalisation* of the *quality management*

routine was resisted at the individual level as they failed to reconcile the process with multiple competing goals. As these influences varied from being supportive in Region 1 to sceptical in Region 3, the *quality management routine* was adapted to meet the most pressing goal across each region's hierarchy. This led to the inconsistent further communication of the *quality management routine* to individuals in external organisations, thus, impacting the enforcement and associated learning of the *quality management routine* in each study region at multiple levels.

6.3 Concept 1b: Communication which bypassed Regional Superiors

Historically, learning communicated from the organisational level through training to Project Team individuals was difficult for individuals to apply in practice. This suggests a disconnect across levels, fuelled by a lack of communication in both directions up and down the organisation. In contrast, the *quality management routine* introduced a direct, two-way, face-to-face communication link between the Quality Team at the organisational level and Project Team individuals. This link created and developed multi-level relationships; however, it bypassed the regional level, causing some tension with Regional Superiors.

In classroom training, examples used often described best case scenarios found on site. However, in practice, individuals rarely encountered the conditions described. For example, in Region 2, a participant described how, in a training session they attended, all drawings and specifications issued were assumed to be complete and accurate prior to starting on site. In their experience, however, this was never the case, with the training they were receiving being perceived as detached from reality:

"[During the training] ... she went, 'you will have all of this information prior to [starting on site] and...I said, 'yeah, with these drawings being [with you] prior to [starting on site], what makes [the ones you are describing] so special? Because we are supposed to have everything, but we have nothing. So why does [your] drawing take precedence above everything else?' And she went, 'you should be getting everything.' But then I said, 'can I just pull you down from your ivory tower, we get nothing, so what's to say that this is any different?'" Region 2: Participant J

This suggests the training given, while effective in terms of describing the necessary behaviours to adopt in ideal circumstances, was ineffective on the ground.

One Head Office staff member described how a lack of communication between Head Office and lower hierarchical levels may have been responsible for this disconnect. Once *institutionalisation* of the *quality management routine* had taken place across the organisation, there was a feeling of closure at the organisational level. Instead the participant felt that such a new process should be adapted to suit regional working environments:

"Changes were introduced and people given training and then that was it – that was project closed, it's done, we've done it. As opposed to actually listening to stakeholders and all the barriers they are facing...and slightly adapting or changing [routines]." Head Office: Participant V

Quality management routine training was carried out differently compared to other training programmes across the organisation. In normal circumstances, the HR Department took responsibility for training. However, as the *quality management routine* required specific expertise, the Quality Team trained individuals across the organisation themselves. Learning through *Site-wide Quality Control Inspections* took place through face-to-face conversations between members of the Quality Team and Project Team members, as well as the Project Architect on site. Any queries or misinterpretations of the *QA Handbook* were collectively discussed in a site-based context, in stark comparison to the detached classroom conditions experienced during the training sessions. Therefore, learning was communicated in situ, direct from the Quality Team to Project Teams and vice versa during the inspection.

Communicating in this way bypassed the regional level, as Regional Superiors did not usually attend these inspections. This created two different learning experiences; one for participants from the inspection day, and another for Regional Executives reading the report that followed. Project Team participants commented that the consequences of the latter experience often overshadowed the positive learning outcomes from the former, as Regional Superiors only focused on the items of non-conformance identified, not wider learning experiences from the inspection. Overall, this suggests that the *Site-wide Quality Control Inspections* positively

influenced *quality management routine* learning; however, they changed the lines of communication across the region by not directly involving the hierarchical levels in between.

In sum, individuals in Project Teams struggled to learn in a classroom environment, especially when not supported to communicate problems from bottom to top levels. Conversely, the *Site-wide Quality Control Inspection* practices changed this by learning occurring in the field through face-to-face, organisational to Project Team level communication. However, this approach changed the established lines of communication between hierarchical levels by bypassing Regional Superiors.

6.4 Theme 1: Changing lines of communication

Learning the *quality management routine* was challenging at the individual level, thus competing with goals set at regional, team and individual levels. These latter goals focused on plot production and financial deadlines. There was a risk that, despite its best intentions, the *quality management routine* would be compromised when viewed alongside such goals:

"Something has got to give. And generally, the one that gives is quality...And you don't want it to, and you try desperately not to." Region 1: Participant A

Learning and enacting the *quality management routine* required individuals to focus on quality, when those higher up the organisational hierarchy did not necessarily value or reward these efforts. As Regional Superiors in Regions 1 and 2 were supportive of *quality management routine* practices, individual learning and associated behaviour change was easier. However, the *quality management routine* was not always enacted, as individuals within these regions chose whether to communicate the *QA Handbook* to individuals from external organisations, or rectify defects identified during *Site-wide Quality Control inspections*.

In Region 3, Regional Superior scepticism towards the *quality management routine* made it harder for individuals to make changes to their working practices on their own. When direct communication between the organisational and individual levels bypassed this regional level resistance, it challenged the organisation's well-established communication infrastructure. While communicating in this way may have strained regional- and organisational-level relationships in Region 3, in Regions 1

and 2, there were examples of positive relationship development between Project Team individuals and members of the Quality Team.

Carrying out *Site-wide Quality Control Inspections* through face-to-face communication appeared to create and reinforce relationships between the organisational level and Project Team individuals. It appeared that the communication channel in the direction of the Quality Team only opened if the Project Team individual had the confidence to talk to them. Participants who described a historic working relationship with Quality Team members had no qualms about contacting the Quality Team directly:

"I used to use [this Quality Team member] as my font of all knowledge. If I had a problem that I couldn't work out or didn't know what to do with, I would see [them]. [They] would always have the time " Region 1: Participant A

Conversely, when those types of relationships did not exist, the default communication channel for Project Team individuals was through the formal vertical hierarchy:

Researcher: "If you did come across something [that didn't seem to work on site], what would you do?"

Region 2 Participant F: "I would go back to [a particular individual within the Quality Team]. I know [them] well enough to ask [them]. As I know [them], I feel confident in speaking to [them]."

Researcher: "Do you think the situation is similar for the members of your team?"

Region 2 Participant F: "Yes, they can always go back to [our Team Director], and in fact the right route is probably to go through [our Team Director] and do that."

There appeared to be some apprehension from Project Team individuals about communicating directly with a Quality Team member if a relationship had not been established in person. Therefore, growing a social network that was based on face-to-

face communication appeared to be one way to improve direct organisational- to team-level relationships.

To summarise, top-down and bottom-up communication of the QA Handbook through adjacent hierarchical levels across the Housebuilder organisation was challenging at the individual level. This is because learning to enact the QA Handbook was less of a priority compared to other competing goals. Conversely, direct top-down communication of the QA Handbook between the organisational and individual levels during a *Site-wide Quality Control Inspection* was more effective at conveying learning. The inspections also meant the Quality Team could develop direct relationships with Project Team members, bringing the levels closer together. Despite these efforts, *institutionalising the quality management routine* across the organisation was challenging, as the organisation’s communication infrastructure comprised multiple disciplines, hierarchical levels, and geographic locations, creating many small learning silos.

6.5 Concept 2a: Communication through Project Stages

Responsibility for a project’s development passed from one regional team to another over time (see Chapter 5). Teams deployed expertise in a specific order, to progress the project, at specific points in its life cycle (Figure 43).

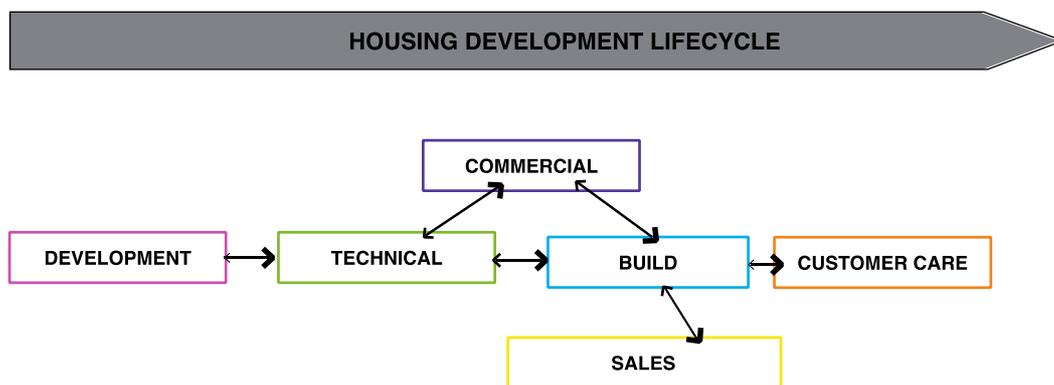


Figure 43: Team responsibilities in order over time

Development to Technical to Build to Customer Care, with input from the Commercial and Sales Teams

In reality, the process was less streamlined, with time often dictating when a new team took responsibility for a housing project before it changed hands again. The Development Team’s concept design, at the start of the process, influenced the

Technical Team's ability to draw up a scheme that could be built. Technical Teams viewed conceptual scheme designs as an inexact science, whereas their designs had to be precise:

"[The design process at the] Development [Team level] is like applied mathematics, you can have 2 + 2 but it can equal 5 [in reality]. Commercial, Technical, Build [Teams] – [the design process is] quite a precise science, a bit like pure mathematics, there is only one answer." Region 3: Participant R

This suggests that communication across team interfaces was a key influence on the functioning of the housebuilding process and in meeting the organisation's quality standards at the end of the housebuilding process.

Across the three study regions, participants admitted that formal handover procedures were not always carried out. As different teams passed work to each other, the responsibility for housing project progress moved with them too. However, in Region 3, participants described how the formal handovers from the Development to Technical Team and the Technical to the Build Team, were rarely or inadequately executed (see Appendix 1 on page 311). In Region 2, Technical Team members felt the Development Team did not take the handover seriously, as the Technical Team received information in a piecemeal fashion at the point in time when they assumed responsibility for a site (see Appendix 1 on page 311).

Consequently, each team's understanding of other regional teams was limited to those teams immediately upstream and downstream. This limited communication chain through the project stages meant that individuals in a team rarely understood the needs of individuals in non-adjacent teams. The latter were not consulted on housing projects and did not receive the information required to do their work well. This often led to cost increases or programme delays, as the consequences of an action cascaded into other aspects of the project:

"It's sort of like a pass the parcel down through the chain...people making decisions upstream or downstream, which have a knock-on effect, which then either cause a delay in time or an increase in cost, which we only feel the pain of later on down the line." Head Office: Participant U

It was unclear whether the lack of communication was due to the additional time it would take to communicate with colleagues in non-adjacent teams, a lack of familiarity between team members in each team, or the additional effort and actions that would follow as a result of checking with colleagues in non-adjacent teams.

For the *quality management routine*, this assembly line approach to communication had similar negative consequences; in some instances what was designed at the outset could not be built on site. The Quality Team often traced back quality-related or compliance issues to the actions of other teams at earlier stages of the housebuilding process. Crucially, the teams who influenced build quality, such as Development, Technical and Commercial Teams as well as Technical Consultants, were often unaware of the specific practices set out in the *QA Handbook*. Instead, participants from these teams viewed meeting and enforcing the *QA Handbook* standards as the sole responsibility of the Build Team (see Appendix 1 on page 311). Development Team members never came into contact with the *QA Handbook*, or inspections. Commercial Team members sent out parts of the *QA Handbook* to Trade organisations but were not familiar with its contents. Technical Team members needed to ensure that Technical Consultants used the organisation's standard details where possible, while being guided by the standards set down in the *QA Handbook*, so that individuals in Trade organisations could build what the Consultant organisations detailed. Technical Team members across all regions were aware of the *QA Handbook's* existence, but few referred to it, as they did not use it in their daily work practices (see Appendix 1 on page 311).

In addition, Head Office staff described how quality was affected by teams focusing on passing responsibility for a project swiftly onto another team. They suggested reasons for this were a combination of time pressures and a perpetually forward-looking organisational culture (see Section 7.10). For example, Site Teams focused their attention on passing their last inspection, the *Customer Care Final Inspection*, rather than completing the incremental inspections set out in the *Construction Stage Completion* booklet or form. As a result, Site Teams only prioritised meeting *QA Handbook* standards at the point of handing over a plot to the Customer Care Team. Head Office staff felt that this communicated the wrong message to Site Teams, as emphasis was placed solely on the *appearance* of quality across the finished product. By focusing mainly on decorative defects at the end of the

construction phase, attention was taken away from maintaining underlying quality consistently throughout the entire construction process:

"We relied very heavily on [the Customer Care Final Inspection] to pick up [defects]...That has been immensely damaging because...it absolved the Site Manager of responsibility of quality because all they had to do was get it past the Customer Care people and that's what they did." Head Office: Participant W

This suggests that teams did not spend enough time on handovers, as they were under pressure from Regional Superiors to start on the next project. Subsequently, the current housing project or plot was handed over quickly, and the next housing project to be designed or plot to be finished was prioritised. At the end of the construction phase, there was no communication between the Build or Customer Care Teams and Development Teams (see Chapter 7). Teams simply repeated previous activities.

To summarise, team-to-team interfaces were important to the continuity of quality standards and project-based learning but handovers were inadequate as time pressures resulted in limited inter-team communication. The focus was always on what was coming up, not what was being handed over. Therefore, feedforward across teams was imperfect and disjointed. However, communication also took place vertically within the organisation's hierarchical structure.

6.6 Concept 2b: Communication through hierarchical layers

Communication within the organisation occurred mainly through the organisation's hierarchical layers. This hindered learning, as the messages were abridged or forgotten, as they were communicated up the hierarchy. The regional office structure (see Chapter 5) comprised the *Managing Director* (MD), who sat at *Executive Level 1*. Below the MD were two further Executive levels and five Management levels, with a Staff level at the bottom. Table 18 below gives an overview of the nine hierarchal levels in regional offices along with the roles assigned to them.

Table 18: A breakdown of roles typically associated with each hierarchical level in regional offices.

	Hierarchy Level	Typical roles associated with level
	Regional Offices	
Regional Superiors	Executive 1	Managing Director
	Executive 2	Team Director (see (see Table 14 for teams) for teams)
	Executive 3	Team Executive
Middle Management	Management 1	Senior Manager (Includes Senior Project Manager) *
	Management 2	Manager (Includes Project Manager) *
	Management 3	Roles with no employees to manage (Exception at this level is Senior Site Manager who managed those in Assistant Site Manager roles)
	Management 4	Roles with no employees to manage (Exception at this level is Site Manager who managed those in Assistant Site Manager roles)
Junior Staff	Management 5	Senior Co-ordinator Graduate Trainee (on Graduate scheme) <u>Assistant Site Manager</u>
	Staff	<u>Secretary</u> <u>Administrator</u> <u>Trainee Site Manager</u> <u>Site Assistant</u> <u>Apprentice</u> <u>Forklift Driver</u> <u>Technician</u> <u>Co-ordinator</u> <u>Management Accountant</u> <u>Advisor</u>

The positions underlined were Build Team members permanently based on housing sites, and are referred to as Site Team members in this thesis.

*A Project Manager was a promoted Senior Site Manager

Those in Management posts reported to their *Senior Manager*, who reported to their *Executive* and/or *Director* (depending on the region), who reported to their *MD*. Each region's *MD* reported directly to the *Main Board Executives* within Head Office.

The feed-forward learning sub-processes that connected the individual, team, regional and organisational levels became increasingly restricted as the hierarchical levels ascended. For example, communication was free flowing at the individual and team level. Participants in all regions described how problem-solving and similar experiences were discussed by those within each team's middle and junior management when thinking about future actions:

"It really is understanding through experience, and there is often a lot of conversation between the [team members]." Region 3:

Participant X

There was sometimes a degree of hesitation about communicating to Regional Superiors because individuals wished to be considered competent and capable in their jobs. When someone in middle or junior management described encountering a problem, they felt they should be able to deal with it themselves, without having to talk to Regional Superiors. However, after expending time trying and not succeeding, Regional Superiors were often consulted as a way of bringing in an extra resource to solve the problem at hand. One Region 1 participant described a reluctance to share everything with his Regional Superiors, as it duplicated efforts:

"I don't want to take all of my problems to [my Team Executive]. He may as well do my job. So, you pick and choose where you ask him to give us a bit of help." Region 1: Participant B

However, because of this hesitation, time often passed between the incident initially arising, and additional help being sought from superiors at a later stage often exacerbated the problem. How Regional Superiors addressed the issue, and the degree to which the individual responsible would be reprimanded, dictated whether a problem was shared or concealed. As one Region 2 participant described, it was better to admit there was an issue straightaway, so it could be addressed in good time and put right:

"I think it's an easier job to say, 'actually I have cocked that up', rather than hide it and get caught out two months later. Again, I learned that through hard experience." Region 2: Participant F

This suggests that there was a filtering of information, and junior and Middle Management were selective in what they chose to discuss with higher levels of management. Regional MDs were, in turn, selective with what they communicated to their superiors at Head Office. Mistakes made at the regional level were rarely reported to Head Office:

"If there has been a big cock-up on a site, anyone at [Head Office] is the last person [the region] will tell. They entirely keep that to themselves." Head Office: Participant U

This particular practice of communication obstructed wider learning from the *quality management routine*. As there were long vertical communication chains from individuals at team level to Head Office level, messages, associated learning or problems often did not reach their final destination. Individuals at lower managerial levels communicated their ideas for improving quality standards directly to a Regional Superior after they experienced problems enacting the *QA Handbook*.

However, this promising line of communication did not necessarily lead to change, or even an acknowledgement of their ideas. If Regional Superiors had a difference of opinion, then the learning was not communicated further. A Region 2 participant described Regional Superiors as having selective hearing, which resulted in the participant choosing their fights wisely, while making local changes to their working practices that their superiors were unaware of (see Appendix 1 on page 311). Conversely, if Regional Superiors had other priorities to attend to, they did not communicate the learning any further. In Region 1, a participant described telling a Regional Superior about a problem they had encountered with installing insulation below ground floor level in a house. The participant then went on to describe how they, along with colleagues had come up with a solution, which they had subsequently put into practice. Their solution did not conform to the *QA Handbook* standards; however, they were optimistic that in time it would, as knowledge of their solution would pass from their Regional Superior to the Quality Team:

"Somebody talks to somebody and it goes on their list of things to do. Eventually it will get done." Region 1: Participant D

This proved not to be the case, as the Regional Superior left the organisation a week after the conversation with the participant took place. Despite this, the participant felt it may nonetheless take some time for the information to reach its destination.

As only one or two *Site-wide Quality Control Inspections* took place per housing project, Quality Team members also asked individuals in regional Project Teams to feed-forward problems they encountered with enacting parts of the *QA Handbook* as part of their day-to-day working practices. However, they did not

necessarily receive any communications from Project Team individuals as a result. Head Office participants felt this was due to the absence of a clear communication channel connecting Project Team individuals indirectly with individuals at the organisational level, without Project Team individuals feeling they had to follow the rigid regional hierarchical structure. Without this being made clear, it made it hard for individuals at the lower levels to know who to contact at Head Office.

However, a Site Manager in Region 2 described feeling not listened to when he did feed-forward problems he encountered, as he found nothing ever changed as a result. Therefore, despite a direct individual- to organisational-level communication between the Site Manager and Quality Team, the lack of satisfactory feedback from the Quality Team caused this Site Manager to ignore problematic parts of the *QA Handbook* (see Appendix 1 on page 311).

In summary, individuals on site fed forward problems they encountered enacting the *QA Handbook* to the next level up, or directly to the organisational level. However, each communication channel was imperfect and affected subsequent *quality management routine* learning. Communication up adjacent hierarchical levels resulted in messages being filtered or not communicated further, and failing to reach the organisational level. Conversely, communication through a direct bottom to top channel resulted in no changes being communicated back to the individual level to assist with their problem. Therefore the feed-forward and feedback mechanisms of the organisation's vertical hierarchy hindered learning. The lack of horizontal communication networks across the organisation is examined next.

6.7 Concept 2c: Communication between competing regions

Communication between regional offices occurred only through those at the top and bottom of the organisation's hierarchy. Regional Superiors communicated at a strategic level with their regional counterparts. Conversely, at the bottom of the hierarchy, members of the organisation's graduate scheme maintained cross-regional relationships with their counterparts. There was no formal horizontal communications network between Middle Management in regional offices.

Constriction of communication between regional offices stemmed from intense competition between regions. Historically, the Head Office encouraged regions to operate as autonomous entities. As the organisation evolved over time, mergers of housebuilders resulted in outposts of rival organisations being brought

under the same umbrella organisation, working together while trying to outperform each other. This competition over time became part of the organisation's cultural fabric. Any culture of collaboration and communication was minimised by the introduction of regional performance league tables:

"It's very, very heavily ingrained in the MDs...there's a point where competition is helpful to spur on performance but there's a point where the balance tips and it becomes more of a hindrance, and I think that we've tipped over. We are too competitive because that just totally stops any collaboration... [The regions] are pitted against one another. That comes through because we have league tables."

Head Office: Participant U

More recently, Head Office, through external corporate governance pressures, was trying to encourage more collaboration between regions to ensure organisational practices were consistent across the organisation. Participants in Regions 1 and 2 were keen to communicate with individuals in other regions. In Region 2 participants cited an instance of cross-regional collaboration when the two regions' Technical Teams, and Consultants pooled their knowledge for their own bespoke housing developments. However, communication ended once different heating system designs were pursued in two housing sites, leading to each team taking different actions from that point on (see Appendix 1 on page 311). In contrast, participants across Region 3 shared little desire to communicate beyond their region. This may be due to the perception expressed by participants that market conditions in other regions were not the same. Therefore, there was little to gain from collaborating with other regions operating under different contextual factors:

"I couldn't even tell you [my regional counterparts'] names, nothing, no...When you work here, this is the business. We don't see that there are other regions exactly like this. This is the business as far as we are concerned, and we only need to know the people that are in here." Region 3: Participant M

However, the horizontal communication networks differed between hierarchical levels.

Regional Superiors for each team periodically met their counterparts from other regions to communicate both strategic issues arising at Head Office level, and aspects faced by the regions. Afterwards, Regional Superiors fed back the main points to the rest of their team. However, as Regional Superiors oversaw intra- rather than inter-organisational *quality management routine institutionalising*, they rarely discussed related operational details. Middle Management saw the meetings as useful when Regional Superiors returned and discussed changing statutory regulations. However, some Middle Management participants described the meetings as "jollies" for Regional Superiors or opportunities to informally moan about problems faced in their respective regions. Other managers were not sure what the strategic meetings were called (they knew the acronym used to describe them but not what the acronym stood for), or what the purpose of the meetings was. As a result, the strategic issues discussed by Regional Superiors carried little meaning for those in Middle Management.

For Middle Management, there were no opportunities to meet in the same way that Regional Superiors did (as described above), or there was little desire to forge connections between regional team counterparts (for reasons discussed earlier). As a result, individuals had few opportunities to share operational experiences about working at the housebuilding "coal-face". From talking to participants in all study regions, there was the expectation that if Head Office wanted Middle Management to work collaboratively, Head Office staff should provide the opportunity for communication, rather than individuals being independently proactive in reaching out directly to their counterparts.

All new graduate trainees, entering the organisation through the organisation's graduate scheme, were rotated between teams across a region before coming back to their designated team. The goals of this scheme were to improve each graduate's understanding of different teams and their needs. In addition, each graduate was paired with graduates from other regions for set activities and challenges, through which they could build and develop inter-regional communication networks across the organisation.

To summarise, because of the Housebuilder organisation's limited horizontal communication infrastructure, learning only passed between regions at a strategic level through Regional Superiors and at a junior level through graduate

trainees, rather than at an operational, or Middle Management, level. This hindered Middle Management’s ability to learn about the *quality management routine* from each other. In addition to limited cross-regional communication, teams within Regions worked in distinct locations and environments depending on their discipline.

6.8 Concept 2d: Site communication vs. office communication

Build Team members located permanently on housing project sites (Site Teams), were geographically remote from the regional office. Consequently, they developed different working and communication practices compared to their office-based counterparts. On site, the noise levels were much higher with talking, shouting and machinery working away loudly. Sites in winter (when the study was conducted) were wet, muddy, dusty, dirty, windy and cold. These conditions made it challenging for individuals to hear and understand each other when talking, and paper got dirty, wet, and torn or could blow away, reducing its use as an interpretation tool. Plus being cold or rained on made it hard for individuals to concentrate when they were talking outside.

Site cabins, where the Site Team was based, were a hive of activity with people coming and going: supervisors from Trade organisations, delivery drivers, various staff from the regional office teams and NHBC inspectors (see Chapter 5). Often Site Team members were out on site or going between different areas on site. As housing sites were so vast, Site Managers spent much of their time on walkie talkies with fellow team members or on their phone to individuals from Trade organisations who were on another part of the site. Thus, they relied extensively on frequent verbal communication from their colleagues and Trade individuals, as they could not always be in a particular plot on site to see something first-hand. They received photos on their phones or via email, or they spent hours walking around the site, talking to Trade individuals, with the site cabin being left open. Site Teams also used visual ways to communicate, so that the Site Team could pass information on to site cabin visitors in their absence (see Table 19 and Figure 44 to Figure 46).

Table 19: Various ways information was communicated to individuals on site by Site Team members

Communication methods – walking plots	Communication methods – visually in site cabin	Communication methods – at desk in site cabin
<i>Pen and paper – recording defects in plots to communicate to Trade individuals what needed rectifying</i>	<i>Whiteboards – plot progress and inspections marked on (Figure 44)</i>	<i>Mobile phone – talking on the phone to suppliers, coordinating other Trades, or colleagues back in the</i>

		office, querying drawings, costs, materials or labour
Walkie-talkies – Site Team members had one each on site to communicate with each other	All up-to-date technical drawings were printed and hung in a cabinet in the site cabin, so Trade individuals could look at them if they had a query	
Mobile phone – verbally talk to individuals about defects they had seen that need rectifying	QA Handbook on shelf On site in Region 3, QA Handbook was mounted on a lectern so it could be easily read (Figure 46)	Computer – email or updating progress reports to send back to the regional office
Mobile phone – typing notes and photographing defects	Permits needed for hazardous site activities – on display in folders on the wall	Talking face-to-face with people coming into the cabin
Tablet (Region 2) – QA Handbook, Technical drawings, Construction Stage Completion forms	Health and safety information – listed and pinned to the wall, Health and Safety files on shelves	
Dictaphone – recording actions or conversations while out on site		
Typed information left in plots for Trade individuals to see (Figure 45)		

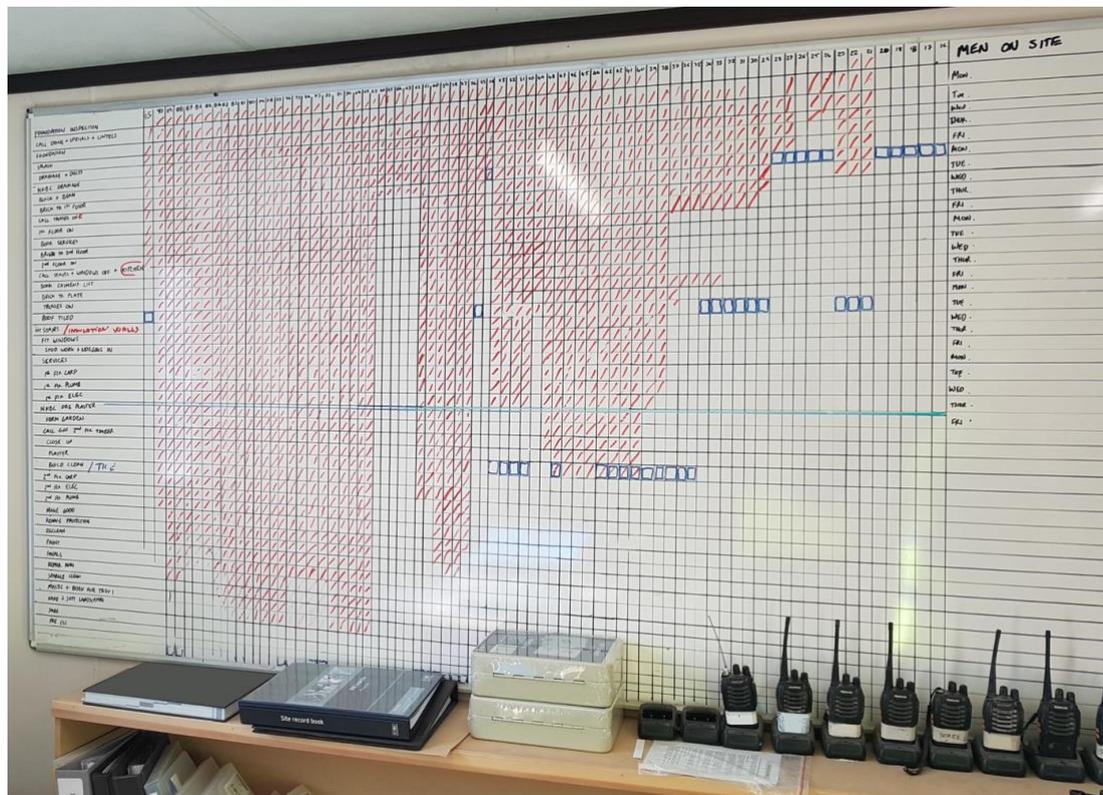


Figure 44: Whiteboard used by Site Team to show plot progress against construction stages.

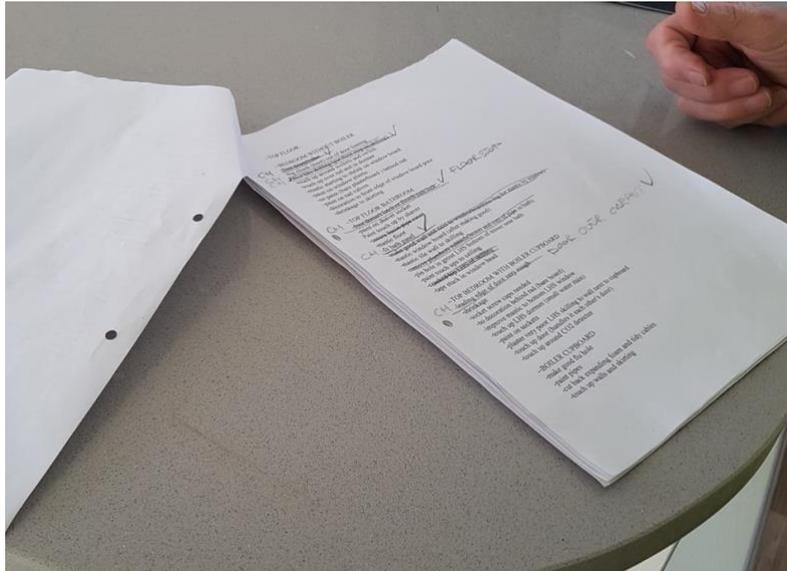


Figure 45: Printed list of defects left in a plot for Trade individuals to check off



Figure 46: QA Handbook on display in a Region 3 site cabin for everyone to reference if they needed it.

The pace of site communication also differed from communications in the regional office. The pace on site was more frantic and intense. Multiple queries often required rapid responses, as delays cascaded across plots, negatively affecting work sequencing, deliveries and programmes. Conversely, working conditions varied enormously from the less hectic office environment experienced by regional staff. In the regional office, the environment was clean, stable and comfortable. There was a quiet hum of activity as individuals had face-to-face conversations between themselves, as well as conversations on the phone. A lot of communication was also carried out through email between individuals and others in the regional office, Project Team members on site, or individuals from external organisations.

To assist Site Teams, Site Managers received weekly face-to-face support from their supervising Build Manager. Members from other teams also went to sites on an ad hoc basis: Commercial Team members to meet individuals from Trade organisations before they started on site, or to inspect Trade organisation invoices, Technical Team members to attend design team meetings (which were usually held every four weeks), and Customer Care Team members when they needed to carry out *Customer Care Final Inspections*. As Sales Team members were also based on site, Site Team members met with them frequently to talk through plot sales. While communication between sites and the regional office was constant, the onus placed on Site Teams by Head Office to ‘get the job done’, and the geographic proximity between the two places, created a communication time lapse. Verbal communication could convey site activity in real time between an individual on site and in the office but there was a time lapse between Regional Superiors in the regional office being able to see the site for themselves. Participants described this happening when someone on site said a construction stage was complete when, on closer inspection, it was not:

"I took 550 photographs [of defects in an apartment block], I sent it all to the Build Director [back in the regional office] and he went, 'what the f-- is this?' And I went, 'somebody [on site] told me this was finished', ... That's what I found. I've given the Build and Site Manager two weeks to sort it out." Region 2: Participant H

As site activities involved many people with different skills, who completed numerous interrelated small tasks, keeping everyone up-to-date on the progress of others relied on constant communication. The findings here suggest that verbal communication was the main way individuals on site communicated between themselves, as it was faster to articulate and convey meaning. In addition, written information could be easily damaged or lost, given the working environment. However, working in this way, meant there was an inconsistent written record of what had occurred, which might need to be referred to at a later point in time, or might have been the basis of learning.

In summary, different communication methods were used on site, which were mainly verbal or visual, as these were faster at conveying meaning, given the environmental conditions. However, as little was formally recorded, it made it harder for individuals on site to definitively recall conversations and what was agreed, or pass on to others to learn from. Also, individuals on site had different interpretations of the organisation's quality standards compared to Regional Superiors, who were away from the site and unable to develop an interpretation of their own. Instead, Regional Superiors relied on the words of others or photographs taken by others on site in between their monthly visits to sites.

6.9 Theme 2: Siloed inter-group communication

Three key communication barriers appeared to impede *quality management routine* learning across the organisation. Communication took place through poor handovers between well-defined, multi-skilled groups over time. Individuals across the organisation relied on vertical hierarchical networks rather than horizontal peer relationships due to competition between regional offices. Individuals used a range of verbal, written and visual communication methods depending on their geographic locations. However, communicating in this way meant:

- Firstly, individuals at the design phase failed to understand how their actions, as part of the housebuilding process, affected the subsequent actions of others during the construction phase, ultimately compromising the quality standards of a finished house.
- Secondly, as inter-regional networks were limited and relationships competitive, learning could only be communicated up or down the organisation's hierarchy, limiting how *quality management routine*

experiences and associated operational learning were shared across the organisation. As Regional Superiors did not enact the *quality management routine*, shared experiences were confined to those in Middle Management with each region. Vertical communication up and down the organisation's formal hierarchy was, however, also an unreliable way to convey learning up from the individual- to organisational-level.

- Lastly, as individuals adopted different working practices on site, it was not possible to record all activity explicitly. This made it hard for everyone, both on site and in the regional office, to know what information was up-to-date. As a result, what the Site Team communicated to the regional office was not always a true reflection of build quality on site, as everyone had their own interpretation of the organisation's quality standards.

This resulted in learning taking place at an individual or small group level with numerous diverse silos across the organisation:

"I mean there is definitely an internal learning process I would say - individually." Region 1: Participant D

Consequently, each silo developed their own interpretation with regard to how the *QA Handbook* should be enacted on site, and as Project Team individuals did not talk to their peers in other regions, these diverse team-level interpretations went unchecked. It was only through the introduction of the *Site-wide Quality Control Inspection*, that the Quality Team had the opportunity to provide a checking mechanism and correct these varied interpretations.

Communicating directly with Site Team individuals in each region, Quality Team members started spotting patterns of *QA Handbook* non-compliance on site. In these circumstances, Quality Team members offered guidance to Site Teams on how to meet the organisation's quality standards. However, correcting Site Team interpretations did not necessarily lead to individual learning. For example, Site Teams struggled to insulate wall cavities below door thresholds in homes being built on site. The *QA Handbook* suggested one way to do it, however Site Teams in each of the sites visited during the study found that they could not do this in practice. Rather than individuals sharing their experiences across the three sites, each Site Team developed their own way of addressing the issue. In Region 1, the injected insulation

in the wall cavities was replaced by rigid board insulation. In Region 2, the insulation was omitted altogether. In Region 3, they drilled down into the door frame covering the cavity (cavity closer), so that the insulation could be injected from inside the house. All three approaches dealt with the situation, with none conforming to *QA Handbook* standards.

In Region 1, the *Site-wide Quality Control Inspection* report identified an alternative insulation product which did not compromise the plot's thermal performance. However, the Commercial Team member assigned to the project did not attend the *Site-wide Quality Control Inspection*. Despite having access to the report, they did not read it, as they viewed its contents to be only relevant to the Build Team. Therefore, they continued specifying rigid insulation as a substitute across new sites.

In Region 3, an Assistant Site Manager raised the issue concerning the insulation installation informally with a Quality Team member while walking back to the site cabin after a *Site-wide Quality Control Inspection*. The Quality Team member suggested the same product (as above). However, this recommendation did not make its way into the *Site-wide Quality Control Inspection* report. This suggests that the Assistant Site Manager forgot the informal conversation with the Quality Team member. As there was no written reminder in the report to change working practices, the Site Team did not adopt the *QA Handbook* compliant solution.

In the examples above, feedback from the Quality Team did not lead to learning at lower levels. In the first instance, learning was not communicated to the individual in the regional office who could make the change at the right point in the housebuilding process. In the second instance, having a verbal conversation between the Quality Team and Site Team members was not enough to convey learning to an individual on site, it needed to be written down to be enacted. However, Site Teams were able to feed-forward their *QA Handbook* experiences and problems they had trying to meet the *QA Handbook* standards. This led to the Quality Team investigating alternative ways to insulate the cavity under doors and update the *QA Handbook* in future:

"[The Quality Team has] talked about [the insulation]...we [the housebuilder]are going to move to [a specific] insulation below the thresholds and below the gas membranes because probably I'd

say about 75% of our houses probably haven't got [insulation there] at all, maybe more than that. That's just guessing." Head Office:

Participant Y

Poorly recorded organisational- to individual-level communication, or feedback, limited the uniformity of learning across the organisation. Conversely, practices from the *Site-wide Quality Control Inspection* positively influenced learning feed-forward from individual- to organisational-levels, meaning the Quality Team could refine the *quality management routine*.

To summarise, learning occurred in multiple small silos across the organisation. Silos were either based on team discipline, hierarchical status or geographic location, or a combination of these. For the *quality management routine*, there were team-level silos for Commercial, Technical and Build Teams, which potentially encompassed the external organisations they worked with, as well as interdisciplinary Project Teams, which also formed their own silos. Each silo had its own collective interpretation of the *quality management routine*. Therefore, as many different silos existed, learning across the organisation was not uniform. Rather than individuals in silos talking, or sharing experiences with silos in other regions, learning came through subsequent bottom-to-top feed-forward, as individuals on site discussed quality problems during *Site-wide Quality Control Inspections*. Each silo refreshed its interpretation when the Quality Team re-institutionalised an updated *QA Handbook*. These many diverse interpretations had an impact on quality standards across the organisation. This is explored next.

6.10 Concept 3a: Developing a Shared Interpretation

Project Team members interpreted *quality management routine* guidance individually after the routine was introduced across the organisation. Subsequently, individuals chose to check their interpretations with others at team and organisational levels using a range of communication methods. When practices were formalised, individuals questioned their own interpretations and then checked these against the interpretations of others. In addition, images were used to share and check interpretations between individuals, as these were found to be quicker than using text. This was especially so given the fast pace of on-site activity.

Two main modes of communication were used to convey design intent between individuals in the housebuilding process: text created by the Technical and Commercial Teams, and two-dimensional line drawings created by Technical Consultant organisations. As a result, individuals within Trade organisations (at both strategic and operational levels) and the Build Teams managing them, needed to quickly interpret large amounts of new information. As everyone had their own interpretation of how to build something, there was the risk of a mismatch between what individuals in Trade organisations were planning on building (and how) and what individuals from the Housebuilder organisation were expecting to receive.

When Head Office first introduced the *quality management routine*, Build Teams and Head Office staff appeared to share different interpretations of what 'quality' meant. In Region 2, where Head Office had introduced the tablet, Head Office staff received queries from Site Teams who were checking whether their interpretation of what was deemed as 'satisfactory' construction standards matched those of Head Office staff:

"The bit we are struggling with right now is to make sure that the Site Teams are aware of the requirements and when they tick [the form] and say that's 'satisfactory', that they actually understand what satisfactory means...questions from sites suggests that they are not really au fait with the requirements, albeit they have been there for years." Head Office: Participant W

Head Office staff wondered whether the different interpretations of Build Teams stemmed from the latter's reluctance to read the *QA Handbook*. This suggests that the activity of reading, correctly interpreting, and understanding text was too time-consuming and resource-intensive for Site Team members, compared to verbally communicating with the Quality Team to ask what was required. By using verbal or visual communication, individuals were able to rapidly share their interpretations.

For example, in Region 2, a Commercial Team member met with two individuals from a Trade organisation to talk about their work before they started on site. On the meeting table, under a sheet of clear Perspex, was a colour site plan. During the conversation, and when there was a difficulty in understanding, they would point to the site plan and use their hands to describe what they understood to

be the point of discussion. If this did not convey their meaning to the other two, the individual then drew an image on a piece of paper to accompany the site plan, and using both hand gestures and verbal exchanges tried to reach a common interpretation. Once the three individuals reached a shared interpretation on contractual issues, the Commercial Team member recorded it in their meeting notes. In contrast, the Commercial Team member did not explicitly record conversations relating to the clarification of operational interpretations. Therefore, using a combination of imagery, verbal communication and hand gestures, individuals developed shared interpretations which were not necessarily written down.

On this basis, the Quality Team designed the *QA Handbook*, as a pictorial version of the organisation's specification, to quickly convey minimum acceptable standards to individuals unfamiliar with the organisation's quality standards:

"Suddenly people can relate to the [QA Handbook] as it's a pictorial version of... the most key elements of our specification...and that makes it easier for them." Head Office: Participant T

In this instance, Site Team members found the *QA Handbook* to be a useful tool, as the photographs quickly and clearly conveyed complex issues to Trade individuals with little margin for misinterpretation. In addition, as not all Trade individuals spoke English as their first language, they were able to accurately interpret meaning from a photograph:

"The good thing about the [QA Handbook] is that it is very visual isn't it? So, while you might not have English as your first language, you've got eyes!" Region 2: Participant H

Site Team individuals found that using imagery, primarily photographs, to communicate with others within the organisation and Trade individuals was a more effective way than using written text.

In addition, Trade organisation directors did not always communicate information sent by the Housebuilder at the tender stage to those on site carrying out the work on site. This resulted in a communication gap across the hierarchical levels of a Trade organisation (see Appendix 1 on page 311). Trade individuals often started on site not knowing what they had been employed to build, let alone the

Housebuilder organisation's quality standards (see Appendix 1 on page 311). In those instances, the *QA Handbook* was there as a reference for quick comprehension for those who were not familiar with the organisation's practices or quality standards, prior to starting on site.

Project Team and Trade individual interpretations had to be dynamic and constantly refreshed, as the multiple text documents and 2D drawings were communicated between the Housebuilder organisation and Trade organisations during the construction phase and changed constantly. These fast-paced communications between individuals across multiple teams and Trade organisations influenced each Trade team's actions, as the latter could find themselves building using outdated information. In Region 2, a Plumber illustrated this by identifying an issue with a boiler installation in a townhouse loft cupboard. The Plumber's drawings showed the boiler situated on a wall where a door should have been. The Plumber's Superior had given the Plumber an out-of-date set of drawings, which the Boiler Supplier had originally drafted. The Consultant individual had incorporated the Supplier organisation's drawing into their definitive housetype drawing, amended it to avoid the boiler-door clash and re-issued the drawing to the Plumber's organisation. A member of the Site Team used their walkie-talkie to radio the Assistant Site Manager in the site cabin. They checked the Consultant organisation's drawing, and established the boiler's location, so the Plumber could install the pipework in the correct place. In contrast, the Site Team asked the Plumber's colleague to go back and change the location of the pipework in line with the up-to-date drawings, as they had set out the pipework in two identical plots the day before using the older drawings. Therefore, it was challenging for multiple organisations to consistently communicate up-to-date information between themselves, as well as ensuring that all affected individuals within each organisation knew of the changes before the associated building work took place.

Thus, the ability of Trade individuals to build an element as designed, and to the standards set out in the *QA Handbook*, was strongly influenced by the organisation communicating correct up-to-date information to them. However, this also relied on Trade individuals communicating up-to-date information within their own organisations, so that individuals on site were familiar both with the work they were about to undertake and the *QA Handbook*. Otherwise, Trade individuals had

little to learn from, both in terms of what they were doing and how they were supposed to do it.

In summary, individuals involved in housebuilding tended to learn more effectively when another individual communicated knowledge verbally to them, rather than by reading written text. Also, the timing of these verbal communications was relevant. Individuals tended to need to learn what was required just before starting the work, rather than being told far in advance of carrying out the work.

6.11 Concept 3b: Individual interpretation of formal practices

When the *QA handbook* did not apply to the situation at hand, individuals had to draw on their own experience to interpret parts of it. *QA Handbook* standards applied primarily to the organisation's standard housetypes. Consequently, participants found it challenging to apply the *QA Handbook* to bespoke sites, as the details included were not always applicable to what they were working on. At the time of the study, over 75% of the organisation's housing sites were bespoke. Therefore, while the *QA Handbook* covered numerous standard scenarios, it was unable to cover all scenarios using masonry, timber, reinforced concrete or lightweight steel frame construction methods:

"[The QA Handbook] covers as much as [the Quality Team] can think of. It doesn't really apply too much here – it's a generic book...but every site is different." Region 1 Build Team Member

As a result, individuals in Project Teams drew their own interpretation of the organisation's standards, when the *QA Handbook* did not cover a specific bespoke detail. Participants did not view this situation as problematic; they felt the housebuilding process involved human intervention to solve problems when inconsistencies between a site's design and construction occurred. However, as the individual did not always check their interpretation against a definitive source, (e.g. asking the Quality Team or looking at the *QA Handbook* first), the organisation became exposed to additional risk. By not checking, there was a risk of future defects in years to come.

Differences in individual interpretations were observed during the *Customer Care Final Inspections* on completed plots. As part of the *quality management routine*, Head Office asked the Customer Care Team to use the *QA Handbook* as a tool for the

Customer Care Final Inspection. This set a more codified frame of reference, compared to the Customer Care Team Manager's own interpreted quality standards; however, across the study regions, the *QA Handbook* was not seen to be used in this way. Therefore, individual interpretations of the housebuilder's quality standards became part of the inspection process. As a result, Site Teams had to learn over time how to pass their *Customer Care Final Inspections*, and developed their own dynamic practices, based on their Customer Care Manager's interpretation of quality standards. Participants described incidents of aggravation between the two teams, as each interpreted an item differently basing decisions on personal opinion and not the *QA Handbook*:

"It can get a little bit, not heated, but people can get a little bit agitated...You can have a different [Customer Care Team Member] that will judge two things, the same thing two different ways. So how much detail they will look at it in; all will have a minimum standard, but some could look at it and go, 'okay that's acceptable', and another one might go, 'no', and make a comment on it." Region 1: Participant B

Head Office expressed concerns over this difference in individual interpretation of *Customer Care Final Inspections*. It resulted in inconsistencies between site quality standards, with Customer Care Team Managers having differences in opinions. It also allowed Customer Care Team Members to dictate build quality standards, which Head Office considered to be the Site Manager's responsibility. It further resulted in Site Teams guessing what the Customer Care Team Manager would accept on the day of the inspection. However, over time, individuals in Site Teams became familiar with Customer Care Team Manager practices and what might be deemed acceptable (see Appendix 1 on page 311).

In Region 2, one Site Team had learnt how the Customer Care Team Manager carried out their inspection, and what, in the Manager's view, constituted a pass or fail. The informal benchmark adopted, revolved around how much time it would take an individual to carry out any rectification works (see Appendix 1 on page 311). On another Region 2 site, the Site Team had some trepidation about their Customer Care Team Manager and feared irritating them would lead to plots failing

their final inspections (see Appendix 1 on page 311). As the *QA Handbook* was not applicable to all situations, Site and Customer Care Teams were unable to use it to mediate disagreements. Instead, the Customer Care Team dictated acceptable quality standards. This suggests there was a power imbalance between Customer Care and Site Teams, with individuals from the former setting their interpretation as the housebuilder's definitive quality standards for the latter to meet. Site Team individuals learnt to adopt this interpretation, as it meant plots would pass their Customer Care Final Inspections first time, rather than using standards set out in the *QA Handbook*. This power imbalance was acknowledged at Head Office level, where Customer Care Teams were referred to as "little team God" (see Appendix 1 on page 311).

To summarise, the difference in individual or collective interpretations without a definitive source or reference, i.e. the *QA Handbook*, or Quality Team response, led to those in positions of power, i.e. Customer Care Managers, dictating acceptable, but not necessarily correct, quality standards to Site Teams. It was therefore up to one individual to convince others through communication that their interpretation represented the housebuilder's definitive standard in a way that meant others followed it to the letter.

6.12 Concept 3c: Turnover and continuity of interpretations

Given the considerable number of individuals involved in the entire housebuilding process, constant communication from individuals in positions of authority, i.e. the Site Manager, was crucial. However, this was challenging as the individuals involved constantly changed. Head Office described the high staff turnover across the organisation, particularly for Build Teams, as a genuine issue that affected the continuity of high quality standards. As Site Managers left (often with no handover), taking their notebooks with them, the organisation instantly lost all tacit knowledge stored within the individual's head, voiding any organisational learning in this respect (see Appendix 1 on page 311).

New arrivals had to quickly get up to speed with their predecessor's understanding and interpretation of project progress and quality standards. This also meant being able to communicate *QA Handbook* standards definitively to individuals in Trade organisations. This was particularly relevant if the Trade individuals had been working on site before the new Site Manager started, or had greater expertise in

the Trade organisation's field than the new Site Manager. Site Managers in all study regions described needing authority on site to enforce the *QA Handbook* standards (see Appendix 1 on page 311). Thus, if a newcomer was unfamiliar with the quality standards, they did not have enough respect on site to maintain them, i.e. inspect items and instruct Trade individuals with enough authority to get them to rectify items of non-conformance. This negatively affected quality standards, as without constant communication of the housebuilder's quality standards, Trade individuals reverted to their old working practices; thus, building the way they used to. Therefore, even when Site Teams communicated *QA Handbook* standards to Trade individuals with authority and conviction, the effects on site were short-lived (see Appendix 1 on page 311).

Familiarising a new Site Manager with organisational processes, which included the *quality management routine*, took time, as there was much information to take in quickly to be able to 'get up to speed' with the organisation's practices, and thus meet superiors' expectations. Regional Superiors assumed Assistant Site Managers knew enough to maintain site progress until a replacement Site Manager could be 'parachuted in'. Regional Superiors would thus "drop" a new Site Manager onto site, often with little preamble, and expect them to pick up where their predecessor left off.

One Build Team Member in Region 2, which had the highest rate of turnover across the study regions, thought the low cumulative experience of staff in their region explained why quality standards were lower than other regions:

"Our region has been [poor on quality] for years...we just can't keep up with all the other regions...A lot of the Site Managers, they don't stay with us because if you worked in [Region 1], you sit down for a meeting...get introduced to everybody, they are all 15 years, 10 years, 11 years, 12 years...a lot of experienced men here. And then you sit down with all of our guys here...and its a year, six months, two years.... There's no one there any more than three years." Region 2: Participant H

Head Office staff thought high staff turnover in Region 2 stemmed from a lack of new employee support. One participant in Region 2, described how, as a new employee,

they did not receive their induction to the organisation, or a formal team handbook describing their role and responsibilities. However, thankfully, they had found a team handbook in a spare desk drawer on their first day and read that instead. Consequently, new employees in Region 2 appeared to have had little procedural support on joining the organisation. Instead of developing an understanding of the organisation equivalent to that of their predecessor, they had to draw on their earlier experiences with other housebuilders. This had disastrous consequences for the individual concerned, as they often failed in their job:

"There [are no organisational processes in Region 2], [the new individual has] got no idea where their function stands, what happened in the past. They are just chucked in the deep end and they sink mostly." Head Office: Participant W

The digital tablet was introduced into Region 2 by Head Office to capture plot production progress formally, so information communicated was continuous and consistent across all sites in that region. Therefore, a Site Manager using the tablet on one site in Region 2 could move across to another site and be immediately familiar with the site's working practices and reporting methods. The tablet also dictated set procedural stages to follow. In the absence of a Build Team specific manual (which was being re-drafted at the time of study), the tablet showed new Site Managers what to do next, thus offering a form of procedural support from an authoritative source when a newcomer did not know what actions to take next.

To summarise, Site Manager turnover negatively affected quality standards. When one Site Manager left, the communication of up-to-date information slowed down, as all their tacit knowledge of the project left with them. A replacement Site Manager needed to regain this momentum once they understood what they needed to do and how they could achieve it. This left a temporary *quality management routine* learning and enforcement gap between organisational and Site Team levels, as new Site Managers did not know what quality standards to communicate with conviction to individuals from Trade organisations. With the introduction of the tablet in Region 2, Head Office staff sought to capture both a site's plot progress and quality standards. This provided a learning baseline on which a newcomer could build

their understanding. The tablet also supported and instructed newcomers on how to act in line with organisational level practices.

6.13 Theme 3: Multi-level, multi-disciplinary interpretations and time

The findings highlight how individuals independently or collectively developed their interpretation of the housebuilder's quality standards.

- Firstly, individuals on site relied on verbal communication to relay changes to the working environment between themselves, rather than written communication, as it was faster. The same approach was observed with learning, as individuals on site preferred to be told what to do by Quality Team members, as opposed to reading documentation for themselves. The photographs included in the *QA Handbook* speeded up the individual and collective interpretation process on site.
- Secondly, where there was no definitive reference to the housebuilder's quality standards, it was up to individuals in either Site or Customer Care Teams to convince one another which team's interpretation was correct and should be followed. Quality standards were therefore determined by an inter-team power dynamic. This resulted in Site Teams learning to meet the Customer Care Team's interpretation of the housebuilder's quality standards.
- Lastly, Site Manager turnover led to a *QA Handbook* learning and enforcement gap. As a new Site Manager tried to get up to speed with a site's progress, they also had to learn new quality standards quickly and build up enough respect on site to communicate the housebuilder's quality standards and be able to enforce them with conviction. Otherwise, individuals from Trade organisations would continue to enact their usual working practices, rather than meeting the prescribed standards.

This highlights a relationship between communication, interpretation and time. The main communication method on site was determined by time. Site Teams learnt Customer Care Team interpretations, as they did not have time to dispute them. As plot production was most important, Site Team individuals had no choice but to meet the Customer Care Team's requests if they wanted to hand responsibility of a plot over to another team. Also, it took time for an individual to develop an

accurate interpretation of a site and all its nuances, as new information was communicated to them over time. For an individual, learning to develop a new interpretation of quality standards was not something that could be rushed (but inevitably was).

It was possible to observe how Project Team individuals developed their own and collective interpretations over time as part of the *Site-wide Quality Control Inspection* process. Three key points were noted: firstly, that the volume of learning communicated from the Quality Team member to Project Team individuals during the inspection was too high for interpretation on the day, only the first part held everyone's attention; secondly, how the written report and photographs triggered individual memories of the inspection, encouraging individual reflection and leading to collective interpretation; and lastly, simple nuggets of learning were understood and learnt first. These are explored in turn.

During three *Site-wide Quality Control Inspections*, the sheer volume of learning communicated verbally from the Quality Team to members of the Project Team for them to interpret appeared to overwhelm individuals. Participants started off enthusiastically in the morning; however, this enthusiasm waned over time, as the number of incidents around non-conformance mounted. This resulted in participants becoming distracted, starting to joke, losing interest, or becoming defensive. It became hard for participants to stay focused for a prolonged length of time, especially as the observed inspections were carried out during the winter, when it was cold. This suggests the speed of an individual's learning process cannot be rushed, but is best done in incremental instalments. The verbal nature of the inspection was beneficial as it allowed participants to ask questions and obtain an authoritative answer from Quality Team members, thus checking individual interpretations.

After the inspection, the Quality Team issued a written report to Project Team members, outlining items of non-conformance (see Section 5.4.4.3 for an example). When examining the way the inspection reports were written, the text was unable to accurately convey the richness of the learning accrued by individuals participating in the inspection. An individual reading the report, who was not present during the inspection, was only likely to gain a partial insight into how much of the *QA Handbook* the Quality Team member communicated to the Project Team during the inspection. Therefore, to a non-attender, the reports, while comprehensive,

merely provided an explicit record of non-conformance items against the *QA Handbook* standards with suggested ways to rectify items. The reports also assisted by creating a formal snapshot of site quality standards to build some organisational memory. This suggests that the reports on their own offer little learning insight to those who were not present during the inspection; however, to those who were present at the inspection, the reports became a learning tool by generating reflection amongst participants and giving individuals from different disciplines opportunities to combine their experiences. This was crucial as it helped individuals to crystallise what they learnt during the inspection. From observing Project Team members when they reviewed a report, it appeared that individuals learnt small and simple things first.

In Region 3, one of the key learning outcomes for a *Site-wide Quality Control Inspection* was around correct movement joint installation. During the inspection, participants were shown by the Quality Team member how the foam joint was meant to be installed – with the foam in line with the front face of the brickwork, and then the front section peeled back so a line of sealant could be neatly installed later (Figure 47). This simple piece of learning appeared to stick in everybody’s mind. During the report review around six weeks after the inspection, after reading the related text, participants all recounted the revelation. One participant described it as “poetry in motion” and discussed how they were educating bricklayers as a result. Therefore, the team had learnt this from the inspection and were communicating to individuals in other organisations how to use the foam joint.

These examples highlight how individuals developed independent and collective interpretations of the *QA Handbook* standards as part of the *Site-wide Quality Control Inspection* process. This suggests it took time for these interpretations to develop and used a combination of verbal, written and visual communication at different time periods. The result was at least one detail from the *QA Handbook* being learnt with enough conviction that Project Team individuals were communicating what they had learnt to individuals in Trade organisations, thus successfully *institutionalising* part of the *quality management routine*.



Figure 47: Photographs showing the vertical foam movement joint

The large white piece protruding from the top of the wall with the peel off front section (the smaller white piece to the front)

In summary, the process whereby an individual develops their interpretation takes time. During this process, Project or Site Team individuals continuously communicated with others across or beyond the organisation. A range of communication methods, such as verbal and written communication along with photographic images, also aided this interpretation process. However, part of the *institutionalising* process involved individuals developing enough of an interpretation of the *QA Handbook* to convince others, ideally from another organisation, to change their behaviour. Therefore, the first individual needed to encourage the second individual to learn the first individual's interpretation, so that both interpretations matched. However, this convincing process also took time and many reminders, as individuals often reverted to their old working practices until their interpretation comprehensively changed.

6.14 Chapter summary

In this chapter, findings relating to the aggregate dimension of communication were discussed. The first two first-order concepts and first second-order theme identified a communication conflict at the individual level, as learning

the *QA Handbook* was less of a priority. This was compared to other competing goals promoted at organisational, regional and team levels, as well as an individual's beliefs and subsequent attitude to learning the *quality management routine*. Feed-forward and feedback of the *quality management routine* was most effective through direct communication of organisational and individual levels, rather than relying on communication up or down adjacent levels. Communicating in this way created face-to-face relationships between Quality Team and Project Team members but uncharacteristically bypassed the regional level.

The next four first-order concepts and second second-order theme examined how the *institutionalising* process resulted in the Quality Team communicating the *quality management routine* into many small silos at lower hierarchical levels. This resulted in many diverse interpretations of the *quality management routine*. Organisational level attempts to correct these lower level interpretations did not necessarily lead to learning at lower hierarchical levels; however, it allowed individuals at those levels to feed-forward their learning to the organisational level, facilitating future *quality management routine* refinements.

The last three first-order concepts and last second-order theme found that *institutionalising* the *quality management routine* started an individual's and collective interpretation process. This meant it took time for individuals to understand and learn the *quality management routine*. As part of this process, individuals continuously communicated with others at various levels across the organisation. This interpretation process was facilitated by a mixture of communication methods. Without this interpretation process, individuals in Site Teams were less likely to convince individuals in Trade organisations to change their working practices, therefore hindering the overall *institutionalising* process. The inter-organisational part of the *institutionalising* process required constant resources, as Site Team individuals had to frequently remind individuals from Trade organisations what the *QA Handbook* standards were.

CHAPTER 7. FINDINGS - TIME

7.1 Introduction

This chapter discusses the second aggregate dimension, time, in relation to the *quality management routine*.

In this chapter, six first-order concepts describe:

- Firstly, how financial deadlines accelerated the natural speed of the housebuilding process, causing Project Team individuals to deviate from the *quality management routine* and instead improvise to complete houses on time. As a result, there was insufficient time for individuals to carry out their usual working practices, let alone learn new ones associated with the *quality management routine*.
- Secondly, when *quality management routine institutionalising* took place, either within the organisation, or with individuals from external organisations, the point in time that feedback occurred, along with feedback frequency, influenced subsequent learning of the *quality management routine* at lower hierarchical levels.
- Lastly, how learning from project to project over time was informally generated at the individual and team levels and remained at those levels. This was because there were no formal organisational practices that reviewed past actions and fed learning forward to higher hierarchical levels or other disciplines involved in the housebuilding process over time.

These first-order concepts interrelate and are grouped into three second-order themes that explore:

- Firstly, multi-level short-term financial goals in relation to long-term learning goals.
- Secondly, the timing of feedback in relation to ad hoc episodes or as part of systemic working practices across hierarchical levels.
- Lastly, the nature of project-to-project learning as a multi-level, multi-disciplinary enterprise.

By examining these first-order concepts and second-order themes, links are established between them and generate the aggregate dimension of *time*. Table 20

illustrates how the six first-order concepts are grouped into the three second-order themes and aggregated into the dimension of time.

Table 20: Time data structure

<i>First-order concepts</i>	<i>Second-order themes</i>	<i>Aggregate dimension</i>
<i>Financial deadlines encouraged team level improvisation</i>	<i>Multi-level short-term financial goals vs. long-term learning goals</i>	<i>Time</i>
<i>No time to change team working practices</i>		
<i>Timing of Project Team feedback</i>	<i>Timing of episodic vs. systemic feedback</i>	
<i>Timing of inter-organisational feedback and feed-forward</i>		
<i>Informal Project-to-Project Team learning</i>	<i>Project-to-Project multi-level, multi-disciplinary learning</i>	
<i>No formal review of past project practices</i>		

7.2 Concept 4a: Financial deadlines encouraged team level improvisation

Delays to any site construction programme ran the risk of production targets not meeting the Housebuilder organisation’s financial deadlines. Given that this negatively affected staff bonuses at multiple levels across the organisation, Site Teams frequently tried to avoid falling behind with their programmes. As a result, Project Teams often changed aspects of the construction process on site to accelerate their production rates. For example, individuals from Trade organisations could be asked by Site Team members to work out of sequence if materials did not arrive on site on time. Alternatively, Project Teams could substitute construction materials with long lead-in times for ones that were more readily available. However, having conversations which changed design aspects in isolation at the Project Team level, without consulting wider teams within the Housebuilder and External organisations, carried the risk of negative consequences. These conversations also had the potential to prioritise short-term financial goals at the expense of longer-term learning goals.

This is illustrated below through a *Site-wide Quality Control Inspection* in Region 1. Here, the Project Team changed the way a roof was constructed with the aim of speeding up the construction process. There was a formal organisational level process to follow: a form was supposed to be completed, sent to Team Directors in

Region 1 and they were each expected to respond before the Project Team could proceed with the change. However, observations during the fieldwork period suggested this formal process was rarely followed, as it took too long to enact in full. When the formal change procedure was not followed in this example, the Site Team recounted their experiences after the change to a member of the Quality Team during the inspection and three knock-on issues were observed:

- Firstly, to speed up the change process, the Site Manager had contacted the Project Architect directly, which went against the Housebuilder organisation's rigid formal hierarchy and resulted in design changes being made without any Technical Team input. This excluded the Technical Manager from being part of the collective thinking process and subsequent learning associated with the change made (see Appendix 2 on page 318).
- Secondly, the change responded directly to short-term problems faced by the Project Team, rather than considering the longer-term effects of the change. To avoid the long lead-in time for roofing materials to arrive on site, the Project Team effectively chose to compromise the thermal performance of the new roof. This was because the same high level of insulation could not be installed in the new roof compared to the previous design and specification. In the *Site-wide Quality Control Inspection*, Project Team individuals were unable to remember when the change was made and who was ultimately responsible for making the decision.
- Lastly, vital information from the new roof design supplier was sent to the Project Team later than the team anticipated. This meant the design information had to be prepared quickly by the Project Architect and was not thoroughly interrogated and checked by the Technical Team but taken at face value instead. The new roof now reached a higher point against the adjacent house wall than anticipated. This resulted in individuals from Trade organisations having to make additional changes to windows and rooflights on the adjacent house to accommodate the new roof design.

As the Quality Team member explained, the Project Team needed more time to fully consider the implications of the changes they were making, and following these unplanned changes may not have been the best course of action:

"This is where it's very easy not to look in every detail and the full depth of the effect that a change will have on all the elements of your construction. You need time to do that... there could be some saving on changing...but what also you need to consider is programme implications, fees, other risks of elements, delivery, material availability. All this. It's not strictly down to money...especially if you've already started. This is where the problem implications play a very fundamental role and this is where you guys, the Build Team, or your Executive, look at that change...and say, 'no, I don't want that change now because that is going to have an effect on my programme and my trades'. " Head Office: Participant T

Therefore, these one-off spontaneous changes (to save time and avoid missing targets,) resulted in the Project Team improvising. However, this approach created many new problems that required further improvisation to remedy. This affected quality standards, as the newly improvised construction details were unlikely to comply with the *QA Handbook*, leaving the Housebuilder organisation open to the cost of defect repairs (as the roof may leak in future). The *Site-wide Quality Control Inspection* was used here as an effective way to informally discuss the multiple conflicting goals faced at team level, while striving to meet the simultaneous expectations of regional and Head Office levels. The Quality Team member was also able to reinforce the organisation's formal stance about following standard procedures when Project Teams are considering substantial design changes at a late stage of the housebuilding process.

To summarise, individuals in Project Teams often had to accelerate the construction process on site to try to meet financial deadlines. This resulted in individuals in teams and external organisations improvising on site, rather than taking the time needed to fully understand the implications of late-stage changes. The *Site-wide Quality Control Inspection* provided time and space for this kind of reflection for when Project Team individuals were next in that situation. However, the *Site-wide Quality Control Inspection*, as part of the *quality management routine*, also played a role in adding to those time pressures, which is discussed next.

7.3 Concept 4b: No time to change team working practices

Regional time constraints around plot production also hindered learning associated with *Site-wide Quality Control Inspections*; while the completion of associated rectification works was needed, additional time to do this was not always allocated to Site Teams. In Region 1, Regional Superiors asked individuals in Project Teams to rectify instances of non-conformance from the inspection, and to communicate details of rectification works to the Quality Team. In Region 2, the inspection report from July 2015 had already been forgotten by the Project Team in December 2015, (the Site Manager had delegated this responsibility to their assistant, who had subsequently left the Housebuilder organisation, along with the Technical Manager). New Site and Technical Team members were thus unaware of the inspection and associated report. In contrast, in Region 3, the Project Teams scrutinised the reports in detail, rectified items of non-conformance, but did not necessarily communicate this back to the Quality Team due to time constraints. Therefore, the Project Team enacted many *quality management routine* learning points but they did not feed-forward to the organisational level.

Actively checking standards and rectifying instances of non-conformance through *Site-wide Quality Control Inspections* resulted in more work for Project Team participants. Not knowing the extent or severity of non-conforming items that would be detected during an inspection also added uncertainty to Project Teams already under pressure:

"I know what they are trying to do, and they are trying to improve [quality] but it creates more work for everybody by doing it. You know, [the] Site [Team] and them lot [Trade individuals] have got to do. We've now got to meet, now we've got to read up on this, and relook at that." Region 3: Participant M

Rectification works slowed down plot production; however, production programme timescales were fixed. Despite this, Regions 1 and 3 appeared to invest additional resource into learning the *quality management routine* (despite having no additional time allowance). While Site Teams struggled to put right defects identified in the *Site-wide Quality Control Inspections*, Project Teams in Region 2 also learned new

practices associated with the *Construction Stage Completion forms* but found this challenging.

Before Head Office introduced the *quality management routine*, the Quality Team audited sites across the organisation to see how well Site Teams were using the *Construction Stage Completion booklets*. It became apparent that Site Teams were not completing these at all, as Site Team members viewed the booklet as someone else's site administration responsibility, as opposed to being an essential part of their own responsibilities. To avoid spending undue time performing the inspections as prescribed by Head Office, Site Team members completed the booklets incorrectly or omitted the inspections.

For example, in Region 1, participants who completed the booklets were reluctant to dedicate time to the task, as they viewed the output as superfluous to the housebuilding process. Rather than treating the booklet as a live document to track plot progress, the Site Team focused on simply presenting a completed booklet at the end of the construction process, as an output to demonstrate quality compliance. Their efforts to complete the forms were not checked, and the forms themselves were merely stored in a back office, never to be looked at again. The Site Team viewed the activity as a waste of their time, and an unnecessary expense for the case study organisation (see Appendix 2 on page 318). Therefore, the Site Team's interpretation of the booklets and associated practices did not match those of Quality Team members. Also, as no one at the organisational level was checking the booklets, it was not possible for the Quality Team to know that there was a difference in interpretation. This interpretation gulf simply existed, undetected, until the Quality Team carried out their audit.

In Region 3, many Site Managers omitted the inspections altogether. One Site Manager described how they put the *Construction Stage Completion booklets* to one side during the construction process, as non-audited items. The Site Team felt that while someone from Head Office may reprimand them for non-compliance, the repercussions would be extremely minor. Conversely, completing the *Plot Passport* was an essential practice, as all plots needed the document for legal completion. This became the focus instead (see Appendix 2 on page 318).

In Region 2, Head Office staff assumed Site Teams would quickly learn the practices necessary for the *Construction Stage Completion booklets*, as individuals

were simply switching from paper to digital format. However, this took far more time than anticipated as: Site Teams were not completing the hand-written forms in the first place; the wording and order of items on the electronic forms differed slightly; and lastly, the way in which data were entered on the tablet was not the same as writing by hand on a paper form. This meant Site Teams needed extra time to carry out a new activity and learn how to do it properly, typing instead of handwriting taking and attaching photographs to forms, choosing items on drop down lists to enter data, and following a sequence of steps to finish and sync the form with the Housebuilder organisation's cloud-based server.

In Region 2, Head Office expected Site Team members to learn how to use the tablet, while also meeting their own regional demands on time. This meant Site Team members had to perform their current tasks at the same rate, which resulted in stressful conditions for them. In addition to using their old working practices of informal verbal communication, which Site Teams found fast and effective, Site Team members adopted new working practices of recording inspections digitally on the tablet. However, these working practices had not developed sufficiently to combine verbal and digital communication methods, instead Site Team members did them cumulatively, which increased their workload. One participant was observed talking to a colleague about finding time to learn to use the tablet on top of their usual duties which appeared to be a source of anxiety:

"Just leave [the Construction Stage Completion form]; I'll sort it out... (sounding a little stressed) right, put a note on there. We can sit down and do one of these [forms] next week. We've gotta do them, we've gotta do them and it's one of those things, that when you do them, it will be fine. It's just you've got to get chance to do them."

Region 2: Participant Z

This suggests learning to change working practices in line with Head Office expectations took more time than expected – time that Regional Superiors could not often grant to Site Teams, as they worked to meet their own programmes and regional targets. This implies that achieving the region's plot production targets to meet the Housebuilder organisation's financial deadlines was prioritised over the need for individuals and teams to learn to use the tablet.

In summary, the *Site-wide Quality Control Inspection* created additional work for Project Team members on site, who were already under pressure to meet their production programmes. Also, few Site Managers during the study talked about completing the paper *Construction Stage Completion* booklet. The introduction of the tablet in Region 2 meant that Site Team members had to learn to complete *Construction Stage Completion* forms, (a task they never did before but should have done) in a new format, which differed widely from their usual working practices. Therefore, Site Team individuals required additional time to learn new working practices associated with the *quality management routine*. However, learning to do this increased normal task completion time, and slowed the plot production process, therefore making it harder for Project Teams to meet regional level targets.

7.4 Theme 4: Short-term financial goals vs. long-term learning goals

The initial two first-order concepts explore how time was allocated at all levels to meet short-term financial goals, rather than the longer-term learning goals of improving quality standards. This was because the time involved in the housebuilding cycles (i.e. the time it took to take a site from the feasibility phase to completion) rarely matched the organisation's financial cycles, creating an uncomfortable dichotomy between housing and financial cycles when teams attempted to achieve quality standards.

At the year and half year-end points, plot production was observed to be always prioritised above complying with the *quality management routine*. Enacting the *quality management routine* in its entirety required a specific amount of time. This time was unavailable if Project Teams artificially accelerated the construction process to meet financial deadlines. As Regional Superiors rarely extended site construction programmes, the enactment of the *quality management routine* became a lower priority compared to meeting year-end production targets:

"It's programme first, health and safety [second], then you might look at quality if you've got time." Head Office: Participant W

The examples below illustrate how the organisation's financial cycle was far shorter than the average housing site construction cycle, resulting in priorities conflicting and learning around the *quality management routine* being negatively affected when financial deadlines were looming.

In Region 1, rather than completing the *Construction Stage Completion booklets*, they were put to one side to focus on other aspects of the housebuilding process, when year-end time pressures started to mount. The inevitable result was that Site Teams did not formally record the inspections, or feed-forward learning from them to other hierarchical levels (see Appendix 2 on page 318).

In Region 2, the latter stages of the housebuilding process were frequently sped up by Site Teams, so plots could legally complete on or before year-end, which was the last working day of a specific month. The truncating of construction stages led to individuals from Trade organisations leaving some stages incomplete and needing last minute rectification (see Appendix 2 on page 318). Alternatively, individuals from Trade organisations completed construction stages out of sequence, which added cost, as well as complexity. The drive to prioritise plot production and meet targets had a positive impact on the organisation's share price. Therefore, short-term goals were prioritised, but the quality standards of plots were compromised. However, any benefits were ultimately short-lived as the organisation seemed to have to often return and rectify related defects occurring in substandard plots, and placate a disgruntled customer:

"If you don't make your numbers of the targets and the profit, your share price goes down and they go mad. So, the first site [we visited] ... should not have had people moving into it when it did but they had to get it in for year-end. So, they got the figures and they got the numbers and they got the profit. But now they are paying tenfold to make it right." Region 2: Participant J

In Region 3, year-end pressures were less intense than for other two regions, due to a more constant and regular production rate of one plot per week per site. Other regional programmes did not necessarily follow this pattern. However, Site Teams still had to accelerate plot rates in this region, as year-end approached. One participant described how they disliked showing customers around a house they had rushed, as it affected the sense of pride they felt when they did their job well:

"The only time I don't like [showing a customer around] is if I'm not happy with the house, which can happen. Especially at year-end. I had to do one and I couldn't stop it because we were running

out of time but you have to take a few deep breaths and talk through the issues that are still outstanding and just hope that they are happy with my charm!...What I really want to do is walk someone into a house that I'm proud of and pleased with." Region 3: Participant L

By striving to achieve short-term goals in line with financial deadlines, individuals learnt how to quickly solve immediate problems on an informal basis. As a result, an organisation-wide culture of short-term 'fire-fighting' emerged, changing individual and collective behaviour based on improvisation. This was seen to be detrimental, as defects often emerged post-completion, arising out of short-term fixes which then required some expense to put right. No formal long-term learning took place around preventing defects from recurring in the future. Those who solved problems in time for year-end were financially rewarded, as they received their annual bonus. In contrast, superiors at higher hierarchical levels often overlooked those who proactively avoided the problem altogether:

"Everybody here loves firefighting...The fact they cause the problem in the first place isn't kind of recognised; they put it out. Quietly getting on with it is not a trait that will get you very far [here]... It's a cultural thing...if you are going to get to the nub of quality... we encourage and reward reactive firefighting rather than proactive efficiency improvement." Head Office: Participant W

This culture further influenced how individuals learned the *quality management routine*, as participants described having little time to spend reflecting on past events, and instead felt that the time could be better spent on other things coming up.

To summarise, the conflict between the Housebuilder organisation's short financial cycle and longer housebuilding cycle was driven by the Housebuilder organisation's Shareholders and associated share price. Quality standards suffered as the housebuilder's financial deadlines approached. This meant Site Teams either truncated construction stages, or completed them out of sequence. Also, they omitted formal quality inspections. This caused defects in new homes that were costly to rectify but could be addressed after the year-end. Consequently, individuals across the organisation learnt how to fix short-term problems, fuelling a reactive firefighting, rather than a proactive learning, culture.

7.5 Concept 5a: Timing of Project Team feedback

The *institutionalisation* of the *quality management routine* often took place too late in a project's life cycle. Firstly, participants commented that the *Site-wide Quality Control Inspections* took place after too many new homes were built, and felt the inspection would be better earlier in the construction phase (see Appendix 2 on page 318). Secondly, the *quality management routine* only applied to the construction stage, not the design stage, where potential errors and defects could go undetected. Lastly, Site Teams did not receive confirmation of how to meet the organisation's quality standards, or advice to inform their actions, far enough in advance. This highlights how the timing, or timeliness, of feedback from the organisational level influenced construction quality standards, and associated learning, at lower hierarchical levels.

Participants in all teams and in all study regions described the *Site-wide Quality Control Inspections* as beneficial. However, the inspections did not take place until the show home had been built. This meant that by the time the inspection was organised and carried out, several plots had been built, and others were well into construction. Often the Quality Team had to postpone inspections, and instead carried them out later than intended. Despite the positive view towards inspections, participants always followed it with a "but...", as any serious items of non-conformance resulted in resource-intensive and disruptive rectification works for the Project Team and individuals from Trade organisations across more plots, unless they were detected early on:

"It [the Site-wide Quality Control Inspection] is a worthwhile exercise but I think [the Quality Team] leave it a bit late to do it. They wait until the show home was built, complete and finished but nobody's checked it all the way through.... I'm thinking we should do [the inspection] way before that." Region 2: Participant

H

A similar additional inspection to check quality standards at an earlier point in the housebuilding process was considered more beneficial from a regional Project Team perspective.

Quality Team audits of technical drawings at the detail design phase were deemed to improve the timeliness of the *quality management routine*. The *quality management routine* focused primarily on the construction phase of a site's life cycle. However, this was often considered too late on, when drawn information from the detail design phase was still incomplete or fluid. One Region 2 participant felt that a third-party audit of all technical drawings by the Quality Team at the end of the detail design phase would help ensure all construction details complied with the organisation's *QA Handbook* standards:

"[I would] have the same sort of audit [referring to the Site-wide Quality Control Inspection] on the working drawings before you've even started... I think it is good to have a third party do that because you tend to get a bit protective of your schemes... you do check them, and you do as much as you can... Almost always you get to a point where you've got a deadline." Region 2: Participant F

While all technical drawings were supposed to be checked by each region's Technical Team, this was challenging to achieve in reality, as Technical Team members and Consultant individuals often had some degree of emotional attachment to the scheme, as they were deeply immersed in its design. Equally, Technical Team members were not always able to thoroughly check all technical drawings due to design phase deadlines. The minimum organisational requirement was for Technical Managers to check a sample of these drawings before passing them to the Commercial Team. Therefore, it was quite possible for project designs to move into the construction phase without being fully resolved or *QA Handbook* compliant. The knock-on effect was that Site Teams needed to query details with the Technical Team and Quality Team during the construction process, and did not always receive an answer in time to meet their deadline.

The timing of *institutionalising* from organisational level to team level was thus crucial to ensure that learning could inform potential Site Team actions. Here, it meant Site Teams meeting *QA Handbook* standards before determining what to do next. In Region 1, members of a Site Team described how the Quality Team had not responded in time to their queries about the correct products to use on site. This left the Site Team with no feedback from the organisational level to inform their actions:

"[The Quality Team] came to me, 'you are using the wrong products,' well, hold on a minute, [individuals from Trade organisations] have been told to use this product and now it's wrong – so what do we use? 'Oh, we need to work that out.' So, we need to get on with it still. I've still got bricklayers, I've still got to get people started on stuff, but they haven't finalised the details yet, and it's like how long do we wait? So, in the end you tell the groundworkers to crack on because it's not failed before. It's already been done on 70 houses." Region 1: Participant A

As Site Teams need to maintain steady production rates, having to pause to wait for information caused problems elsewhere on site. Instead, individuals at team level collectively pooled their experience, and used this to inform their actions.

In summary, three points suggest the timing of *quality management routine institutionalising* affected multi-level learning. Firstly, the *quality management routine* only focused on the construction phase of a housing project's life cycle. Errors made during the design phase that resulted in poor build quality went undetected until a project was on site. Secondly, *Site-wide Quality Control Inspections* occurred too late in the construction phase, meaning Site Teams had to rectify many plots if the Quality Team found a serious defect during an inspection. Lastly, Site Teams did not always receive timely responses from the Quality Team to clarify quality-related queries. In these instances, Site or Project Team individuals used their own expertise and experience to inform future actions, rather than refer to the organisational level as a definitive source.

7.6 Concept 5b: Timing of inter-organisational feedback and feed-forward

The point in time when the *QA Handbook* was fed back to Trade individuals by Site Team members was also critical, as it informed individuals of the quality standards expected and accepted on site. It also formed the basis of a Trade individual's subsequent behaviour. New individuals for each Trade were constantly arriving on site, all of whom had various levels of knowledge about the site and organisation's quality standards. Head Office staff felt that this needed to be addressed, as it was proving costly to the Housebuilder organisation to assume that Trade individuals would learn the *QA Handbook* standards as they went along:

“At the moment, [Trade individuals] just go out on site and do whatever they have done in the past, and then we sort of hope that they will pick it up while the build is going on. Well that's very expensive and it's too late in the day.” Head Office: Participant W

This suggested that the timing of *QA Handbook* feedback from the organisation to new Trade individuals was key.

The Commercial Team gave all new Trade organisations the relevant section of the *QA Handbook* when they priced the work; however, individuals from the Trade organisation often arrived on site without being familiar with its contents. Responsibility then fell to the Site Manager to feedback the relevant parts of the *QA Handbook* to the newcomers. In the absence of early intervention from the Site Manager, a Trade individual's interpretation of what was required was set by their previous experience. The practices they observed on site also shaped their behaviour, which may or may not have been in line with the standards laid out in the *QA Handbook*. This was observed in tandem with how often Site Team members had to keep remembering to feedback parts of the *QA Handbook* to individuals from Trade organisations to ensure quality standards were upheld over time. Maintaining general levels of *QA Handbook* compliance on site, and therefore high-quality standards, meant Site Teams putting constant pressure on Trade individuals. This involved frequent re-communication through feedback regarding the organisation's expectations. Site Team participants in all study regions said they had to be firm with Trade individuals and not accept substandard work.

It took time for any learning to occur within Trade organisations, and any positive effects were temporary. One participant complained that despite Trade individuals trying to change working practices and meet the *QA Handbook* standards, standards soon slipped and old working practices crept back in:

“Right guys, we cracked it that's what we need to do...and then next month, it's all gone back to square one again. The [Trade individuals] just don't keep doing it.” Region 2: Participant H

Therefore, if a Trade organisation's overall working practices were to change, and learning were to take place, the Site Manager or their team members had to constantly feedback parts of the *QA Handbook*, by explaining and re-explaining the

contents, so that the Trade individuals started to become familiar with, and enact, the working practices as required by the organisation.

In Region 2, the feed-forward of photographs from Site Teams to regional, organisational and inter-organisational levels via the tablet, augmented Site Team individual feedback. To support the *institutionalising* process, Site Teams in Region 2 used their tablets to complete *Construction Stage Completion forms*, load up drawings to show Trade individuals the expected construction detail and where, or show pages of the *QA Handbook* to Trades. Therefore, with the tablet, it was possible to make visual comparisons between work a Trade individual had done and the expected standards set out in the *QA Handbook*. In addition, Site Team members took photographs of the work a Trade individual completed as part of a *Construction Stage Completion form*. This served to feed-forward learning to all other levels as a record of what the Trade individual had done. The photographs were also used by Site Team members as a reference for other individuals later, rather than having to rely on verbal descriptions of a Trade individual's work.

To summarise, the point in time and frequency of *institutionalising* between Site Team members and individuals from Trade organisations was also crucial to learning. Individuals new to a site needed to know the quality standards as soon as possible before they had an opportunity to apply their previous working practices to a new site. This was challenging for Site Team members, as Trade staff turnover was high. Also, as the effects of *institutionalising* on Trade individuals were temporary, Site Team members had to constantly remind them of *QA Handbook* standards. In Region 2, the tablet supported this reminding process, as it was possible for Site Team members to show individuals from Trade organisations images of what was expected next to their work as a comparison. Alongside this, to feed-forward learning, Site Team members captured defects as images and were able to show them to other individuals later. This meant that individuals did not have to rely on Site Team members' verbal description of a defect, which may not accurately convey the problem. Instead the second individual could see it for themselves and form their own opinion.

7.7 Theme 5: Timing of episodic vs. systemic feedback

First-order concepts three and four show that two different feedback learning sub-processes were in operation with regard to the *quality management*

routine: firstly, feedback between the organisational and individual levels, which connected the Quality Team directly with Site Team members; and secondly, feedback between the Housebuilder organisation and external organisations, as Site Team members communicated with individuals from Trade organisations, while they carried out their work on site. Feedback via the *QA Handbook* across both relationships took place differently, depending on the study region. In all study regions, feedback occurred as ad hoc bursts, or episodes. However, in Region 2, feedback might also occur systemically as part of an individual's daily work practices, if they chose to use their tablet.

The *quality management routine* did not really come into effect for Project Teams until a housing project went out for Trade organisations to tender. After this, episodes of *institutionalising* occurred more frequently: i.e. when the Quality Team performed a *Site-wide Quality Control Inspection*, when *Construction Stage Completion booklets* or *forms* were completed, or Site Team members asked the Quality Team to clarify their interpretation of a construction detail or material before the Site Team acted. In Regions 1 and 3, if the Quality Team timed the episodes well, feedback could facilitate the learning of the *quality management routine*. If ill-timed then learning was hindered. However, even if feedback episodes were well timed, Quality Team members found the effect to be temporary, and numerous episodes of feedback were needed, especially with individuals from external organisations, in order to maintain learning of the *quality management routine*. At the organisational level, constant feedback of the *quality management routine* was described as having a slow but positive effect, as previous quality-related issues were reduced across housing sites:

"Raising awareness ... and explaining why some things have changed from the way we used to do things five years ago, that has started slowly, slowly dripping through now and we do see some of these common problems going away. But it's a slow and painful process... it is our presence mainly on site and the inspections and the repeat visits and talking about how and what we are changing." Head

Office: Participant T

However, it appeared that the success of episodic feedback in this way relied both on a Project Team individual at a lower hierarchical level seeking to learn and ask for feedback, and on sufficient resources being available within the Quality Team to be able to respond in a timely manner. As the Quality Team consisted of a small group of people, it was challenging for them to meet every demand. Regardless of whether *institutionalising* took place through feedback within or across organisations, the process was a slow, resource-intensive and repetitive means of achieving multi-level learning.

Conversely, in Region 2, learning the *quality management routine* had become more systemic through the enactment of the *Construction Stage Completion forms* on the tablet. While feedback across the region also took place on an ad hoc basis between Site Teams and the Quality Team, the tablet allowed feedback to become a continuous process. The tablet recorded items of non-conformance against each Trade organisation as a part of the inspection information required. Over time, this built up evidence of poor workmanship, maintaining pressure from the start on Trade individuals to perform. A Site Team could use this to enforce quality standards by asking a Trade individual to go back and put something right, which meant quality standards were slowly improving:

"All the inspections are now on the tablet along with photographs and then when you do it, you just press the button and you send that straight to...all of [the Housebuilder organisation] and straight to the [Trade organisation]. So, it makes [the Trade organisation] look bad doesn't it? So, when [the Trade organisation] get all this bloody hell on site, they speak to their Supervisor, 'I don't want to see this anymore'. Yes, [the tablet] is working. It just takes a bit of time." Region 2: Participant H

At the same time, the forms highlighted continuing instances of poor performance to the Commercial Team members on site, who were responsible for paying Trade organisations. As Trade individuals were motivated by these payments, having documented instances of non-conforming items, compared to previous verbal reports, made it easier for the Housebuilder organisation to justify not paying Trade organisations for substandard workmanship.

Recording items of non-conformance in this way, as part of daily activities, improved learning, by drawing the attention of individuals at higher hierarchical levels within the Trade organisations to substantiated instances of the poor-quality workmanship attributed to their Trade individuals. Therefore, there was potential for superiors within Trade organisations to put pressure on their staff to change their working practices, given possible financial implications for non-compliance. This appeared to be a less resource-intensive and slightly faster way to feedback learning from both the organisational and Site Team individual levels to individuals from Trade organisations carrying out the work on site.

In summary, this theme highlights how the frequency and timing of *institutionalising* influenced multi-level learning. From an intra-organisational perspective, the instances, or episodes of *institutionalising* occurred more frequently as a housing project's life cycle played out. The *quality management routine* did not come into effect until construction, but then *institutionalising* intensity built with a *Site-wide Quality Control Inspection*, the idealistic completion of *Construction Stage Completion booklets* and Site Team members asking the Quality Team to clarify their queries. Conversely the frequency of inter-organisational *institutionalising* started intensely and remained intense throughout, otherwise quality standards fell. Both scenarios describe a resource-intensive episodic *institutionalising* process. In contrast to this, individuals in Region 2 used the tablet to systemically build a record of defects. These were shown to Superiors in Trade organisations to illustrate the unsatisfactory quality of their employees' workmanship. Therefore, providing a less intensive way to encourage QA Handbook compliance in Trade organisation staff, as Superiors in Trade organisations also pressured their staff to comply.

7.8 Concept 6a: Informal Project-to-Project Team learning

Learning from one project to another occurred through an informal trial and error process carried out by the Project Team over time. In many cases, this was due to unforeseen parts of the design changing during the construction process, resulting in a slightly different outcome than originally anticipated. In each study region, it was hard to meet the *QA Handbook* standards on site, as aspects of the design for each site often changed during the construction phase. One factor frequently cited was that the design phase was incomplete prior to construction starting on site. Matters thus had to be quickly resolved during that construction process. In Region 1, a

participant described how a carpenter felt the organisation was ‘running before it could walk’ by asking for Trade individuals to meet high quality construction standards on site when a site was being built using incomplete design information. In Region 2, a participant described how, with their previous employer, they did not start construction work until the design work was complete in its entirety. In contrast, the Housebuilder organisation did not wait, and went out to tender before the Consultant organisations had completed all the design work. Therefore, if a Consultant individual made a design change as part of the last tender pack, this affected earlier drawings, which needed subsequent revision. However, Trade organisations had already priced these earlier drawings, resulting in multiple variations and cost uncertainties during the construction process.

During construction, design changes became most problematic on bespoke projects, as it was harder for the individuals involved with the project at all levels to anticipate how the project’s life cycle would unfold over time. Therefore, it was challenging for Regional Superiors to devise a realistic construction programme with appropriate timescales before any building work started. Participants in each region described the impact of designing bespoke schemes, which often meant ‘reinventing’ construction details or ‘starting from scratch’ with other elements of the design. This required extra thought during the design stage, as well as adding uncertainty into the construction stage, as each new detail was untested until Trade individuals tried to build it. This led one participant in Region 3 to explain how Trade individuals used the show houses on one site as a test bed to work out design discrepancies in real time (see Appendix 2 on page 318).

In some cases, where the schemes were overly complex, the organisation's phased information release process for tender during the detail design phase hindered the success of the construction on site:

"You have got so many variables, every one of them will throw up another detail that you haven't thought of... in the original thought process and it's impossible to capture every one of them from day one, so ...the design process is going to be fluid... It is starting to be recognised by the company that ... we need to adopt different procedures around delivering [design]. I think both programming

and... how we go about developing the design of [bespoke] projects."

Region 1: Participant E

This suggests Project Teams simply tested each bespoke design proposal through an informal trial and error process over time during the construction process, rather than having any design certainty prior to the start of construction. Project Team members then carried over this learning through trial and error to their future projects.

For standard housetypes, a similar informal trial and error learning pattern was observed. Given that large sites were developed incrementally in phases, when a housetype on the first phase was altered slightly, the same housetype on the next phase was also altered by the Project Team which refined the end-product and improved efficiencies. In some cases, the original technical drawings were amended by the Consultant organisation, and at other times, the Site Team instructed the Trade individuals to do something different (see Appendix 2 on page 318). This, however, resulted in a diverse and varied housetype portfolio developing over time across the organisation as a whole and, as regions rarely communicated between themselves or Head Office, it was unclear whether there was any overlap or duplication of designs across the organisation. Project Teams arguably controlled the consequences of these housetype design evolutions. Only the successful aspects were likely to be informally carried forward to the next project, and these were assessed during, rather than at completion of, the project. It can be argued therefore, that project-to-project learning across the organisation was the culmination of successful standard housetype evolutionary design 'tweaks' formally and informally gathered by Project Team members from numerous regional silos in response to planning requirements, local market conditions and geographic factors. If the Consultant organisation had drawn up the 'tweaks', they were housed in the relevant project folder in each region's digital server. However, Project Team members also stored 'tweaks' tacitly in their memories. Therefore, the Housebuilder organisation relied on an individual's memory of 'tweaks' to transfer from project to project, as there were no formal accounts of the subtle housetype changes described above.

Similarly, ensuring the continuity of the *QA Handbook* know-how from project to project also relied on an individual's memory. In Region 3, one participant

described how they had forgotten key parts of the *QA Handbook* used during Phase 1 of a site, which they needed at the start of Phase 2:

"It's another one of those where you've got to keep revisiting [the QA Handbook] ... You can't just assume... So, we were [following it] on the first phase and then we've gone to start another phase and it's been forgotten about. So, we have had to pick it up again and that happens on a lot of things." Region 3: Participant L

In this instance, it was up to an individual in a Project Team to remember what to do and when, without reminders being issued from Head Office or Regional Directors. Therefore, there was a risk that an individual would forget the learning for next time, or that they would make the same unsuccessful modifications in future, thus replicating previous actions, because other individuals were not privy to this learning in the first place and thus unable to intervene.

This local-level approach impacted each study region differently, as staff turnover rates varied dramatically across regions. In Region 3, as staff turnover was low, lessons learned around the *quality management routine* were assessed at a Project Team level and, as Project Teams tended to stay the same, this informal learning was often carried over to the next project. Region 2 on the other hand experienced a much higher staff turnover, particularly across their Build Team. Any learning informally accumulated in the same way as Region 3 was thus lost when an individual left the organisation, leaving the next new individual liable to repeat previous mistakes. The Housebuilder organisation's ability to learn in this way is therefore questioned, as there was no formal feed-forward of learning from team to regional and organisational levels between projects, or formal feedback to the next design phase from the construction phase.

To summarise, Project Team members and external organisations learned through informal trial and error from project to project. This was because the Housebuilder organisation built a high proportion of bespoke homes, where Consultant organisations designed the construction details from scratch. Consequently, the *QA Handbook* standards could not be used, meaning the performance of the details was untested and therefore uncertain. Added to this was the standard organisational practice of tendering the drawings and starting to build

before the design work was fully complete. Changes in later drawings rippled back through earlier drawings causing problems and adding another degree of uncertainty to production programmes. Individuals learned locally by tweaking repeated housetypes on subsequent phases. Successful tweaks were continued; however, the formal drawings were not always changed. Therefore, the organisational level accrued no formal memory though feed-forward, and Project Team individuals had to remember what they did last time from project to project. It was easier to remember in Region 3 as staff turnover was low, compared to Region 2, where staff turnover was extremely high.

7.9 Concept 6b: No formal review of past project practices

Once a site was completed, no one allocated time for regional Housebuilder teams, Consultant and Trade individuals involved in the project to review project successes and failures collectively and formally. Instead the expectation was that Housebuilder individuals or teams would carry forward lessons learned to their next project. However, participants felt that they had insufficient time to individually reflect on their past actions, and that often at the end of a project, they did not have the energy or enthusiasm to even want to look back and reflect. This suggests that neither formal nor informal, collective nor individual, reflection was encouraged or supported across the organisation, as there was no requirement at the organisational level to do so.

Housebuilder organisation individuals were thus unable to formally improve their understanding of others, either within, or outside of, the Housebuilder organisation and across multiple disciplines or time periods. Participants across all study regions in Commercial, Technical and Build Teams agreed that adopting some form of project deconstruction, or post-project review, as a standard practice would be beneficial to themselves, their colleagues, and their Consultants in order to improve learning across the organisation as a whole:

"What we don't have, which we should, is a project deconstruction meeting, where design teams and technical managers etc. everyone together, go through what went well and what didn't. And a four or five item action plan comes out of it... You need everyone there to get a balanced view of what went well. These

meetings used to happen, but they were sporadic and never been policy. People move on to the next project. It's tough to allocate time for them. They need to become company policy otherwise they won't happen." Head Office: Participant S

Methods for capturing informal project-related learning were limited and recorded on an ad hoc basis, in different formats depending on the circumstances. In Region 1, participants described instances where Trade individuals were invited into the site cabin to talk through projects at the design stage. In Region 2, changes were made to a Trade organisation's Phase 1 and Phase 2 scope of services, in order to amend something that did not work effectively on Phase 1. In Region 3, informal conversations occurred between Project Team members and their Technical Consultants at the start of each new project. However, from a Head Office point of view, these isolated incidents were not captured consistently at an organisational level.

"There are local examples scattered around where [Project Teams] just, by second nature they go through that [review] process but what we don't do is capture it... information just stays very locally within that particular Project Team and there is no sort of mechanism for sharing that more widely." Head Office: Participant U

Consequently, the organisational level only had access to part of the overall picture of what went well or poorly on site to learn from. Participants cited time as a major factor for post-project reviews not taking place, alongside a lack of enthusiasm to do so at the end of a project (see Appendix 2 on page 318).

An individual's enthusiasm tended to wane prior to project completion, as time pressures mounted on Project Teams and they rushed plots. Even when project outcomes had been overwhelmingly positive, formal post-project reviews were not carried out. As projects often finished in line with the organisation's financial year-end, pressure on Site Teams increased as noted above. Intentions to follow organisational procedures, such as the *quality management routine*, became compromised, as teams needed to finish plots on time. Individuals centred efforts around the short-term goal of meeting plot targets for year-end. In addition to having permission to stop, individuals needed motivation or incentivisation to carry out such

a review, accompanied by the time and effort to physically organise the review itself. Participants described 'drawing a line in the sand' to denote the relief at finishing one project and optimism towards the next. The reluctance of individuals to look back and potentially admit their mistakes in front of others was described as an industry norm, and not specific to the Housebuilder organisation.

Unlike other industries that analyse past actions through research and development to shape future products, the construction industry historically has not shared this practice at Head Office level. This suggests that even if post-project reviews were carried out, the Housebuilder organisation might not be in a position to use the findings effectively, as it does not have the day-to-day procedural mechanisms in place to collate, analyse and use this feed-forward.

To sum up, organisational and Regional Superiors did not grant individuals at any level the time to pause, look back and reflect on their actions. As projects often finished at year-end, individuals had no energy or enthusiasm to review a project's successes and failures. Consequently, Housebuilder individuals were unable to gain a wider insight and understanding of other teams within their organisation or others in Consultant and Trade organisations. Many participants commented that some form of post-project review would be useful to improve learning, as currently little learning was formally captured and none fed forward to Head Office or the Quality Team. However, as the organisational culture was one of looking forward and not back, the organisation had no way to use any post-project review learning if fed forward and collated.

7.10 Theme 6: Project-to-Project multi-level, multi-disciplinary learning

First-order concepts five and six examine how there were no formal learning sub-processes to link informal learning at the individual and team levels to other levels across the Housebuilder organisation from one project to the next, especially between the design and construction phases. As a result, the organisation was unable to develop a reliable organisational memory through formally reviewing and recording previous actions against their consequences.

Participants perceived themselves to be too busy to learn by reflecting on feed-forward or feedback from their past actions. The organisation's learning culture around quality suggests that any time spent looking backwards or reflecting on past actions was not valued, as it did not prioritise plot production. In addition,

organisational procedures granted no formal way for individuals to justify looking back and evaluating previous projects. This lack of reflection did not appear to be limited to lower hierarchical levels, as Regional Superiors were described as following the same strategic ambitions year after year without any assessment of their success. Therefore, a disconnect existed between actions and understanding their consequences across hierarchical levels, with only guesswork or opinion to drive learning:

"Quite often what happens is [the Region] will buy a site and then they look at the numbers for the year-end and go, 'right we need this many units in so we will start on that one now', without anything in place and it's just a repeated circle, that happens consistently year after year after year." Region 2: Participant J

As a result, multi-level learning across the organisation was hindered and behaviour change around the *quality management routine* enactment was slow to pass from project to project. Learning appeared to occur at the team level over time, as sequential Project Teams made incremental changes from plot to plot, from phase to phase, and from site to site. However, as multiple projects often overlapped (as an individual usually worked on more than one project at once) there was some continuity at the Project Team level between and across Commercial, Technical and Build Team disciplines.

In contrast to other industries, housebuilding appears not to set aside time at the end of a project to investigate successes and failures encountered during the housebuilding process and improve this in future. One participant found this linear approach unique in their experience:

*"As a business 90% of the management information and activity is forward-looking... There's very little historic effort to look at what's happened...I have been around lots and lots of businesses...I have never experienced something that is so unconcerned with what's just happened, and so concerned with looking forward." Head Office:
Participant W*

This suggests the practice of looking back at the organisational level was not part of the culture of the Housebuilder organisation either. While this current procedural approach did not allow the organisation to develop an overall memory in relation to project successes and failures, it was however, still possible at all levels for individuals to reflect in part on the *quality management routine*.

Individuals taking part in a *Site-wide Quality Control Inspection* were granted both time and permission to reflect on their actions and consequences during the construction process. In Region 1, while observing a *Site-wide Quality Control Inspection*, participants were asked whether, if they had the opportunity to repeat the experience, they would have done the same thing again. Notably, the Project Architect described several actions they would have done differently next time. Therefore, the opportunity given to pause and collectively examine previous decisions prompted a degree of reflection, and potentially led to learning (see Appendix 2 on page 318). Whether the learning continued, was uncertain as the *Site-wide Quality Control Inspection* report did not formally record the conversation. Therefore, this learning had the potential to benefit the Project Team, but would go no further, unless an individual participant chose to subsequently informally communicate insights to others.

In addition, the written reports from the *Site-wide Quality Control Inspection* and *Construction Stage Completion forms* on the tablet were constantly assembling quality-related learning, or feed-forward. Therefore, individuals were starting to build a retrievable memory at the organisational level, which spanned projects and regions. This was extremely positive and powerful; however, at that point in time, the learning only benefitted those at the organisational level. At the team, individual and inter-organisational levels, there was no connection between Build Team and Trades teams from one project to the Development Team and their Consultants on the next project, to facilitate the continuity of formal, cross-project, multi-level, and multi-disciplinary learning.

In summary, Head Office and the Quality Team were starting to build a quality-related organisational memory with data from the *Construction Stage Completion forms* and *Site-wide Quality Control Inspection* reports, which was starting to support multi-level learning. Nevertheless, the Housebuilder organisation's culture did not support or value reflection at any level or encourage any multi-disciplinary or

multi-organisational post-project review process. The only instances of reflection described or observed were during *Site-wide Quality Control Inspections*, where Project Team members were able to pause and think about what to do differently next time. Instead individuals in Project Teams had to learn through trial and error or *experimenting*. This *experimenting* process continued across plots, phases and sites, as Project Team members were often involved in multiple projects at the same time. Project Team members were driven to this by the high proportion of bespoke projects undertaken by the housebuilder in conjunction with the emergence of unresolved design issues on site. However, as the Site Teams did not always inform Technical Teams or Consultant organisations of design changes on site, there was no feed-forward between individuals in Trade organisations and individuals in Consultant organisations, meaning history was constantly repeated.

7.11 Chapter summary

In this chapter, various findings relating to the aggregate dimension of time were discussed. The first two first-order concepts and second-order theme identified a dichotomy between short-term financial goals and longer-term *quality management routine* learning goals. The organisation's reporting cycle was shorter and more rigid than the average housebuilding cycle. Accelerating the housebuilding process in the run up to a financial deadline resulted in little learning, as there was no time for individuals to engage with, and enact, new *quality management routine* working practices.

First-order concepts three and four culminated in second-order theme two, which found that the timing of multi-level *quality management routine* feedback was crucial to facilitating learning at lower hierarchical levels. In all regions, learning at the individual level was slow and resource-intensive through the need for multiple repetitions of episodic feedback. In Region 2, learning occurred at a slightly faster rate through the systemic application of feedback using the tablet. This was due to poor workmanship being captured as photographs and used by Site Teams as a visual reminder to Trade organisations about acceptable quality standards.

The last second-order theme explored how project-to-project learning over time stayed informal and within disciplinary silos at the team and individual levels. The *quality management routine* was found to be creating a formal memory in relation to quality standards during the construction process. However, there was no

over-arching formal project-to-project communication between multiple hierarchical levels across the organisation, or Consultants and Trade organisations involved in the housebuilding process over time. Therefore, no learning sub-processes linked individuals at the end of one construction project to those at the start of the next.

CHAPTER 8. FINDINGS - TRUST

8.1 Introduction

This chapter discusses the third aggregate dimension, trust, in relation to the *quality management routine*.

In this chapter, nine first-order concepts describe:

- Firstly, how trust between individuals at team level was stronger than at other levels. This influenced attitude formation at the individual level, as well as the selective reporting of events by teams to higher levels, ultimately shaping feed-forward and feedback learning sub-processes.
- Secondly, how trust, based on power, between Regional Superiors and individuals, and between Regional Superiors and the organisational level, created emotional responses at the individual level. Feelings such as fear of blame, defensiveness and resentment hindered the feed-forward of learning.
- Thirdly, how the Housebuilder organisation had to trust multiple external organisations. This inter-organisational trust and associated learning was managed by the organisation having high expectations of external organisations, despite being unable to closely monitor their actions.
- Lastly, how trust between individuals within the organisation developed differently over time, in relation to trust established between individuals from different organisations working together over time.

These first-order concepts were found to be interrelated and they are grouped into four second-order themes. These theoretical constructs explore:

- Firstly, social relationship tie strength and multi-level trust.
- Secondly, the relationship between trust and emotions when multi-level trust is derived through hierarchically-based power.
- Thirdly, trust within inter-organisational relationships.
- Lastly, trust over time across intra- and inter-organisational relationships.

By examining these first-order concepts and second-order themes, links are established between them and generate the aggregate dimension of *trust*. Table 21 illustrates how the nine first-order concepts are grouped into the four second-order themes and aggregate dimension of trust.

Table 21: Trust data structure

<i>First-order concepts</i>	<i>Second-order themes</i>	<i>Aggregate dimension</i>
<i>Within team trust</i>	<i>Trust between levels</i>	<i>Trust</i>
<i>Selective reporting from lower to higher levels</i>		
<i>Trust in superiors</i>		
<i>Emotional response to organisational level interference</i>	<i>Trust and Affect</i>	
<i>Fear of blame</i>		
<i>Expectations of inter-organisational performance</i>	<i>Inter-organisational trust</i>	
<i>Inability to monitor inter-organisational practices</i>		
<i>Development of respect and friendship</i>	<i>Intra- vs. inter-organisational trust over time</i>	
<i>Development of inter-organisational relationships</i>		

8.2 Concept 7a: Within team trust

Individuals working as part of a Site Team developed strong working relationships and a high degree of trust between themselves. Site Team participants in all three study regions described how their team had to collectively work out what to do when unforeseen problems occurred so that construction progress continued. Site Team members often relied on assistance from others within the organisation at those points in time. When Technical Teams did not clarify construction details in time, or suppliers could not supply materials as anticipated, Site Teams frequently used what was available to them regardless of the consequences:

"There are a lot of build delays... at the moment we have had probably four months of particularly bad issues with the kitchen supplier... we suffer the knock-on effect where we have houses pretty much finished and we are waiting for a kitchen... 'your house is ready but the kitchen that is in, is not the one you picked... [We can] take it

out and put the other one in [later]'. Occasionally you're lucky and the customer will come round and say, 'I like it'. That has happened."

Region 1: Participant B

These resourceful make-do solutions maintained plot production but did not always comply with the *QA Handbook*. This meant that quality standards suffered, due to differences between intended and realised designs; availability, as opposed to quality, was the driver behind the action. Consequently, Site Teams learnt to work together autonomously, as they were geographically remote from the rest of the organisation, building strong relationships based on trust to resolve problems and regain control of the site's construction programme.

8.3 Concept 7b: Selective reporting from lower to higher levels

Regional Superiors had to trust individuals in Site Teams to follow the *quality management routine* and report honestly about its enactment. This was due to the geographic separation between the regional office and housebuilding sites, meaning Regional Superiors were unable to physically oversee site activity in person, and form their own interpretations of quality standards on site. Site Managers were based on site, Regional Superiors in the office, with Build Managers acting as the face-to-face communication conduit between the two. Build Managers oversaw numerous sites and spent time commuting between them, meeting with their subordinate Site Managers to obtain verbal updates of that week's site-related matters. As the window of opportunity for face-to-face communication was limited, Site Managers tended to communicate aspects of plot progress accurately and in detail, as this information was most important to Regional Superiors, and thus, was given highest priority. Issues around *quality management routine* compliance may have been discussed but the main reason for the conversation was plot progress and not compliance issues. Therefore, it could be argued Site Managers were selective in what they fed forward to their superiors about the *quality management routine*.

The lack of transparency in communication negatively affected trust between Site Team members and Regional Superiors. The situation described by Site Managers to Regional Superiors sometimes differed from the reality they faced, negatively influencing communication transparency by portraying progress in a more positive light. Site Managers reported directly to their Executives at the end of every

week. Reporting involved the Site Manager assigning a Construction Stage number to each plot (see Chapter 5) on a digital spreadsheet to denote each plot's weekly progress against the site's overall programme. Despite this digital reporting to Regional Executives in all study regions, Regional Executives also needed greater contextual descriptions of site activity to aid understanding around problems and delays. This contextual reporting was based on the Build Manager's verbal account of the conversation they had had with the Site Manager the week before. Therefore, the Build Manager communicated their interpretation of the Site Manager's account of events. The Site Manager was immersed in the environment, whereas the Build Manager was privy to a snapshot of it. As a result, restricted aspects of problems could be emphasised by either the Build Manager or Site Manager to suit the circumstances.

Construction programmes were planned at the regional level with a certain degree of slack, timewise. However, this assumed a near best case scenario unfolding over the construction period, as programme end dates rarely moved. This appeared a somewhat unrealistic expectation given the number of disruptions caused by discrepancies generated early in the housebuilding process, or by Trades individuals or suppliers on site. These factors, being beyond the Site Team's control, added complexity to the daily juggling of tasks by a small group of individuals. Against this backdrop, Site Team individuals did not want to be seen to be performing poorly, or to be shown in a bad light in front of peers or superiors. Therefore, there was potential for individuals to hide their mistakes, as they chose not to communicate specific items, instead apportioning blame beyond the team to protect their teammates.

The introduction of the *quality management routine* through the tablet in Region 2 partly helped to rebalance trust between the team and regional levels, as it increased Regional Superiors' ability to monitor Site Team actions remotely. However, individuals were then unsure what to record on the tablet for fear of the consequences, if Regional Superiors perceived a Site Team's performance as poor:

"[Site Teams] are afraid of [the tablet] because if they do an inspection and they put too much stuff on it and it goes straight to everybody...it makes the Site Manager look bad...So they might go, 'yes'...And you think, 'bloody hell guys, what's all this?' 'Oh, do we put

all that down?’ ‘Yes, you have to put all that down and you have to take the photographs.’” Region 2: Participant H

This highlighted the Site Team’s tendencies to omit details they were unsure of, to prevent them communicating a negative picture of site progress beyond the site. This, arguably, helped contribute to a reporting culture where transparency between different parts of the organisation was limited. A similar trust dynamic was observed between team, regional and organisational levels which viewed the *institutionalising* of the *quality management routine* as organisational level interference.

Distinctly different levels of trust were observed between Regional Superiors in study regions and individuals at the organisational level, based on the geographic proximity between them. In Regions 1 and 2, Head Office staff were based in the same building as the Regional staff, and hence geographically close together. Therefore, face-to-face contact between individuals across levels could be achieved reasonably easily. As a result, ties between individuals at multiple levels were relatively strong. In contrast, Region 3 was geographically remote from Head Office, resulting in weak ties and associated low levels of trust through less frequent communication. *Institutionalising* of the *quality management routine* was more challenging in Region 3 than Regions 1 and 2, given this limited trust between the regional and organisational levels.

In summary, Site Teams could selectively report *quality management routine* learning if problems arose on site and individuals did not wish to appear incompetent in front of their superiors. These limiting conversations arose from Build Team members seeking to exonerate themselves and their teammates when they collectively faced difficulties on site that were not within their control. Against this backdrop, Site Team members in Region 2 were apprehensive about using the tablet, i.e. what they could inadvertently communicate beyond the team to the ‘outside world’, and how other individuals would interpret their competency levels as a result.

8.4 Concept 7c: Trust in superiors

The level of trust an individual placed in their superiors influenced their personal attitude towards learning the *quality management routine*. This was particularly apparent within Site Teams, as they were geographically isolated from other teams. Across all three study regions, interpersonal relations within each Site

Team were shaped by a unique dynamic, which was influenced primarily by the Site Manager's working practices. In general, Assistant Site Managers looked up to their Site Manager in a mentoring capacity, as a way to learn the role (see Appendix 3 on page 325). Site Manager attitude, working practices and ways to achieve their goals influenced what Assistant Site Managers learned. This became relevant in relation to the *quality management routine*, as a Site Manager would pass their lack of commitment to a practice on to Assistant Managers. This was observed in Region 2 where one Site Manager kept his tablet locked in his drawer and never used it for any inspections. However, when he went on holiday and was temporarily covered by another Site Manager, who was keen to learn how to use this tablet, tablet use became more commonplace across the site. For those few days, the replacement Site Manager encouraged the Assistant Site Managers to use their tablets where possible.

At the next hierarchical level up, a similar effect was observed. Individuals who placed a high degree of trust in their Regional Superiors also mirrored the latter's views on the *quality management routine*. If Regional Executives undervalued learning the *quality management routine*, individuals at lower levels followed suit. This was very visible in Region 3, where the *Managing Director* (MD) had been in position for a long time. Talking to participants from the region, many of his staff revered him. The tight-knit team relationships observed at Site Team level in other study regions expanded into this region to encompass the hierarchical level above. Therefore, the whole region behaved like a large and cohesive Site Team which had absolute faith in their MD (see Appendix 3 on page 325). In this instance, these strong social ties hindered the region's ability to learn the *quality management routine*, as the MD's attitude towards it was not favourable. While individuals in the region enacted the *quality management routine* when necessary, there was little affection for it, and the feeling that Head Office individuals were interfering was palpable.

At the next hierarchical level up, the observed relationships were quite different. Regional individuals placed far less trust in the organisational level than the lower hierarchical levels. The relationship between Head Office and each region changed through enactment of the *quality management routine* and particularly the *Construction Stage Completion form* on the tablet. In Region 2, the tablet was frequently referred to as "Big Brother", as individuals felt their Head Office was spying unnecessarily on them:

"It's like Big Brother with this [tablet]. It's not only us that see it." Region 2: Participant Z

Both the *Construction Stage Completion form* on the tablet and *Site-wide Quality Control Inspection* provided the Head Office with a direct link and detailed insight into site activity, rather than following the previously adopted convoluted communication path through Regional Superiors. This meant that the Quality Team could see and interpret live data for themselves and learn far more about the organisation's actual working practices than before. This arguably empowered the Head Office in a new way but did little to build trust with the lower levels of the organisation.

To summarise, individuals in positions of power at team and regional levels were able to influence the attitudes and behaviours of their subordinates. Therefore, if superiors' attitudes to and practices of the *quality management routine* were supportive, subordinates mirrored their positive attitude. However, the degree of trust decreased between regional and organisational levels. Between Region 3 and Head Office there was little trust and a perception of intrusion, compared to a higher degree of trust and lower perception of intrusion across the other two study regions. The amount and detail of data collated at Head Office level through the *quality management routine* negatively influenced the degree of trust between regional and organisational levels. This was due to the *quality management routine* making site practices visible beyond a region's boundary for the first time.

8.5 Theme 7: Trust between levels

The three first-order concepts above explore how the level of trust between individuals within Site Teams, i.e. at a single hierarchical level, was stronger than that between levels, i.e. adjacent hierarchical levels. As unforeseen problems frequently occurred, and with limited help from those geographically distant from site, Site Team members learnt to rely on each other, drawing on their collective experience and abilities. This generated strong relationship ties and associated trust between individuals. The varying degree of trust between levels influenced both feedback and feed-forward learning sub-processes. *Institutionalising the quality management routine* was negatively affected both by low levels of trust between levels (e.g. regional and organisational), and high levels of local trust within teams. Similarly, subsequent

feed-forward learning sub-processes were influenced by varying degrees of trust between adjacent levels.

The introduction of the *quality management routine* challenged the strong ties between Site Team members, as Regional Superiors could now check quality conformance, and the Quality Team at the organisational level, through using the tablet in a more transparent way – thereby quickly exposing incidents where Site Team members were not necessarily in control of activities on site. This influenced how Site Team members learnt the *quality management routine*. This was most observable in Region 2.

In Region 2, Site Teams had to complete *Construction Stage Completion forms*, as Regional Superiors could easily detect their non-compliance. Learning to use the *Construction Stage Completion forms* on the tablet meant individuals had to take more responsibility for their actions, as they now had to record items relating to quality standards electronically. Previously, inspecting site progress was a verbal exercise, where Site Teams walked the plots and, on seeing an error, would find the Trade individual responsible at that point in time and ask them to put it right. Whether the two individuals formally recorded the conversation explicitly on paper was at the Site Team member's discretion. As a result, it was possible for an individual to deny knowledge of sanctioning an action. By contrast, the tablet-based *Construction Stage Completion forms* requested specific information at each stage of construction, alongside accompanying photographs. This meant the Site Team had to input text using a stylus on a keypad to record instances of non-compliance. This created an outstanding item on the electronic form against a specific Trade individual for that plot, with a photograph of the defective work attached to the form. It also noted who completed the form and when, creating an accountability trail. Thus, for Site Team members there was a degree of nervousness about what to put, how honest to be, how far the information could travel, and perhaps most importantly, what the possible repercussions could be if the information were not well received. This was particularly problematic in terms of trust because the pro-forma report on the tablet was unable to capture the richness of the issues they encountered, compared to their previous reporting practices; it was viewed as lacking the flexibility needed to report inconsistencies in progress comprehensively.

To cushion this effect, an informal practice “work-around” was developed discretely at the team level. This allowed Site Teams to become more adept at enacting the new routine without appearing less competent to regional office executives, and thereby damaging the faith placed in them to do a satisfactory job. To encourage tablet use, another member of the Build Team in Region 2 had adapted the formal process using their iPad (which was not part of the *quality management routine’s* practices) to carry out pre-inspections. Therefore, before the Site Team carried out their quality management inspection on the organisation’s official tablet, they would first complete a pre-inspection with that Build Team member, using their iPad, to assist the formal process:

" I write [the defects] all down and take some photos myself and I just send it off [to the Site Team members]. I go, ‘You [to Site Team member]. I have done your inspection, and this is what I found from my inspection’." Region 2: Participant H

This allowed site staff to rehearse and learn part of the *quality management routine* in a protected environment where they did not lose their integrity as competent members of staff. Thus, the amount of trust the Regional Superiors placed in them was maintained, against unwavering expectation, while they learnt how to work in a new way. Despite this local practice adding an unanticipated and non-transparent extra step to the *Construction Stage Completion forms*, it assisted the *quality management routine* learning process in Region 2.

To sum up, team trust between individuals is stronger than at other levels. This limits feed-forward of learning beyond the team level, especially Site Teams. Site Teams often tempered what they fed forward to exonerate themselves. When Regional Superiors enforced the systemic practices of tablet use in Region 2, Build Team members supported the development of feed-forward working practices by creating a ‘work around’ so Site Team individuals could practice what they fed forward first.

8.6 Concept 8a: Emotional response to organisational level interference

As trust varied between regional and organisational levels, a range of emotional responses by individuals within study regions also emerged, following

institutionalising of the *quality management routine*. Where trust between the two levels was low, the emotions generated were defensive and negative. This was most observable in Region 3 after the introduction of the *Site-wide Quality Control Inspections*.

In Region 3, individuals viewed *Site-wide Quality Control Inspections* negatively. Individuals in that region did not see the inspections as a way to improve plot build quality but as a way for Head Office to criticise regional staff. As the Quality Team at Head Office level carried out the *Site-wide Quality Control Inspections*, participants in Region 3 described disliking the intrusion, as it called their working practices into question. From their perspective, their practices worked well and did not require the reform expected by Head Office. The inspection reports generated a defensive emotional response from Region 3's Executives, who resented individuals from outside the region criticising their staff. As a result, confrontations took place between Region 3 Executives and Head Office staff when the inspection was first introduced:

"[A Region 3 Executive had] a pop at me on email... and [they] did apologise in the following email...It wasn't anything serious. It was more like, you know, 'why are you coming to site, telling us we're doing things wrong when we are doing very well.' I think [they] take it to heart...I think [they're] very proud of what [they're] doing in [their region] ... and I take my hat off to [them]; [they're] doing a good job" Head Office: Participant Y

This suggested that Project Team individuals in Region 3 were unlikely to proactively learn to enact the *quality management routine* as it drew negative emotions to the fore.

One possible factor for the defensive reaction could relate to language used in the *Site-wide Quality Control Inspection* reports (see Section 5.4.4.3). The colour coding of text within *Site-wide Quality Control Inspection* reports led to Project Team or Regional Superior readers filtering out what they deemed to be their action points, and ignoring the rest. Consequently, anything written in black text had the lowest priority while anything written in red or amber colour text had a higher priority. Scrutinising *Site-wide Quality Control Inspection* reports in detail, the Quality Team

tended to focus on inconsistencies found across sites in relation to the *QA Handbook*. However, much of the praise and good practices discussed verbally during the inspections themselves did not manifest as text in these reports, and when they did occur, they were written minimally in black text, as illustrated in Figure 48 below.

OJ8	Quality of mortar joints; all joints fully filled inside and outside of cavity		Very Good	
OJ9	Cleanliness of cavity and wall ties; no excessive debris		Very Good	
OJ10	Is cavity consistent width and in line with design		Yes	

Figure 48: Site-wide Quality Control Inspection report extract showing praise

As text referring to praise was black and not brightly coloured, it did not stand out on the page. This suggests the reader's attention was not drawn to any reported positive points of praise around best practice, which might have generated a positive emotional response. Readers ignored black text, as black text did not require the reader to take further actions. Regional Superiors instead potentially overlooked these points, thus missing an opportunity to highlight a Project Team's achievements.

How Regional Superiors received the *Site-wide Quality Control Inspection* report was also found to generate a negative emotional response in individuals at team and regional levels (see Appendix 3 on page 325). Project Team members often had to justify or defend reported actions on site, that regional office staff may not have been aware of:

"Sometimes you feel that when [the Quality Team] turns up to do [the Site-wide Quality Control Inspection], that things don't turn out as they should do, or something is picked up that is not quite right, instead of it being, 'all right, we need to do this and this', it's more often the case that a report gets sent by [the Quality Team] to everybody...and all of a sudden you are getting emails from [Regional Directors] saying, 'What the effing hell is going on here? Why have you done this?'" Region 1: Participant A

Following conversations with Project Team participants, individuals lost the general sense of learning and trying to improve build practices fostered during the inspection

when the Quality Team circulated their report to Regional Superiors, who were not in attendance on site. Participants recalled how Regional Superiors often called their Project Team's ability and performance into question when they read the reports. This resulted in a negative emotional response for Project Team individuals and future avoidance of similar feelings and associated blame.

In summary, low degrees of trust between levels fuelled negative emotions at the individual level. This was most acute for *Site-wide Quality Control Inspections*. Project Team and Regional Superior readers ignored any text written in black, and focused instead on text in other colours. Therefore, Regional Superiors often overlooked any positive points and concentrated on the negative defects instead. This made Project Team individuals defensive, despite having a positive learning experience during the inspection itself.

8.7 Concept 8b: Fear of blame

The Housebuilder organisation's culture exacerbated the issue of trust between hierarchical levels, and with this learning between levels. Errors in the housebuilding process can be extremely expensive to resolve. Regional Superiors often attributed blame for errors to specific individuals within a Project Team, and sometimes dismiss them from the Housebuilder organisation, thereby missing an opportunity to learn from their mistakes. As a result, the tolerance for making mistakes across the organisation was described as low:

"We fire a lot of people because we say, it didn't work because you must have been a bad person. We have got a region here which has turned over staff massively with very damaging results and not all the people that are brought in are poor. In fact, I would say very few of them are." Head Office: Participant W

This created a defensive atmosphere amongst Project Team individuals when errors were detected. This was most acute in Region 2, which had a history of lower quality standards and high staff turnover. Project Team participants expressed their fear in all study regions about being blamed for items of quality non-conformance detected during *Site-wide Quality Control Inspections*, which were not necessarily the fault of the Project or Site Team. Participants described defending themselves to avoid blame associated with the 'witch hunt' that followed *Site-wide Quality Control Inspections*,

where Regional Superiors subsequently reprimanded them for their actions (see Appendix 3 on page 325). Participants in Regions 1 and 3 described blame in relation to the *Site-wide Quality Control Inspections*. In Region 2, participants referred to blame associated with the *Construction Stage Completion forms* on the tablet. Therefore, the *quality management routine* and associated atmosphere of blame hindered an individual's ability to proactively learn.

To summarise, Project Team individuals feared their Regional Superiors blaming (and possibly dismissing) them for mistakes that led to poor build quality. Participants discussed blame associated with the *quality management routine*, especially when it was no single individual's fault. This fear subsequently impeded *quality management routine* learning at the individual level.

8.8 Theme 8: Trust and affect

First-order concepts 4 and 5 above examine the relationship between multi-level trust and the power dynamics associated with organisational hierarchies. Trust, together with an asymmetric power relationship, had the potential to generate both positive and negative emotional responses at the level of the individual. Here, negative emotions hindered feed-forward learning, as errors were not often communicated beyond the team, and rarely beyond the region, as levels of trust decreased with each ascending relationship layer in the organisational hierarchy.

The introduction of the *quality management routine* changed the dynamics of this relationship across the organisation. Firstly, Head Office and the Quality Team implemented it, and this was seen as an external influence intruding on regional daily life. Secondly, its purpose was to expose multiple instances of failure, therefore casting doubt on individuals and their collective ability. Lastly, it presented the findings in an accessible way that made all failures visible for everyone across the organisation to see. The adoption of the *quality management routine* thus required a massive cultural shift from regional autonomy to a collaborative organisation.

The act of checking work through the *quality management routine* generated different emotional responses from individuals across the organisation. In Region 1, a Site Team member described their response to the *Site-wide Quality Control Inspection* as laid back. This was considered to be due to a) the good working relationship they had with members of the Quality Team, b) the senior position they held within the organisation, c) the support their Regional Executives showed for the

quality management routine and d) their self-efficacy, which had developed over many years with the organisation. However, individuals on other sites were described as taking a far more aggressive stance during inspections when the Quality Team detected items of non-conformance. One participant suggested that one of the reasons for the aggression and defensiveness towards the *quality management routine* was that the Quality Team did not celebrate or acknowledge examples of best practice found on sites more widely. They described how parts of their site had been used for photographs in the *QA Handbook* but that no recognition was attached to that. As a result, this left them feeling somewhat downcast:

"They are always out to look for the negative rather than the positive. That's not meaning I'm asking them to go around saying everything is, 'ooh yes'; their job is to look for the bad stuff but it's also to say, 'yeah', take the good stuff that we are doing as well and then try and implement that on other sites... quite a bit of the stuff that I have done on previous sites is actually in the [QA Handbook]... [there's] no names or anything but I know from the picture that that is my fan on my fourth floor." Region 1: Participant A

Another Region 1 Site Team member's behaviour became defensive during an observed *Site-wide Quality Control Inspection*. Their resigned manner, facial expressions and lack of enthusiasm were visible signs of how they felt about the Quality Team inspecting their work, despite being on good terms with the Quality Team member conducting the inspection.

Conversely, in Region 3, where Regional Superiors' attitudes were not supportive of the *quality management routine*, Trainee Site assistants in their early 20s engaged positively with a *Site-wide Quality Control Inspection*. They took the *QA Handbook* out on site with them during the inspection to compare items of non-conformance with benchmarked images. Consequently, they asked many questions to clarify their understanding of *QA Handbook* items and construction details with both Project Team and Quality Team members as the inspection continued. Therefore, individuals at team and organisational levels collectively discussed their interpretations verbally, using the *QA Handbook* as a reference. This suggested that individuals viewed learning the *quality management routine* as positive but that this

positive view hinged on several factors, in conjunction with an individual's readiness to receive feedback. Rather than treating the inspections as an opportunity to improve, individuals viewed them as a personal criticism. Under these circumstances, it was challenging to be positive, as the inspection focus tended to be negative. In a culture of regional autonomy, the unknown repercussions of this new way of working unnerved Project Team individuals, adversely influencing their appetite for learning.

To sum up, negative emotions experienced by individuals hindered the feed-forward of learning. The *Site-wide Quality Control Inspection* meant outsiders made Project Team errors very visible to trusted others within their region. Some individuals were more comfortable with receiving negative feedback in this way, others were more wounded. It depended on the individual's confidence in their ability, familiarity with Quality Team members, Regional Superior support and length of service. Also, level of superiority and readiness to learn influenced individual attitudes towards negative feedback and associated blame.

8.9 Concept 9a: Expectations of inter-organisational performance

The Housebuilder organisation had to place a high level of trust concurrently in multiple external organisations, as they lacked the in-house skills to be able to build the houses themselves. The Housebuilder organisation performed a project management role in relation to housebuilding; Consultant individuals designed sites, Trade individuals built them, and the Housebuilder organisation endeavoured to control the quality of the end product by defining what each other organisation did, and the quality standards expected as part of that work. The Housebuilder organisation's expectations appeared to be similar for both Technical Consultant and Trade organisation, as the company sent information to each external organisation, expecting that it would be read, understood, interpreted 'correctly', then communicated to the person carrying out the work. This included the *QA Handbook* which the Quality Team and Commercial Teams sent to Consultant and Trade organisations respectively before they carried out any work. However, participants in all regions described how both individuals in Consultant and Trades organisations did not always read what was sent, and as a result, what was designed by Consultant organisations was not always compliant with the *QA Handbook* or buildable in a compliant way by Trade individuals (see Appendix 3 on page 325).

The Housebuilder organisation assumed that Consultant and Trade organisations would meet their expectations. However, this was often not the case. Technical Teams gave Consultant individuals detailed briefing material alongside the housebuilder's standard specification, construction details and *QA Handbook* to interpret into construction drawings and accompanying information. On bespoke projects this could result in Consultant individuals producing hundreds of technical drawings, which Trade individuals had to read in conjunction with vast numbers of written documents. Consultant individuals sent all the drawings and specification documents to the Technical Team to check. After this, the Technical Team sent them on to the Commercial Team, who forwarded them to Trades organisations. Technical Team members described including additional information from their previous experience into this briefing material, to avoid Consultants repeating mistakes, but conceded that Consultants often failed to read it (see Appendix 3 on page 325). Commercial Team members described how they did not think individuals in Trade organisations had the time to read all the information they sent them. As a result, Trades organisations used past experience as a guide when pricing the work (see Appendix 3 on page 325).

The Housebuilder organisation sought to improve Consultant and Technical Team trust by creating a small framework of semi-permanent Consultants. That way, through repeat work, external Consultant organisations would become more familiar with the Housebuilder organisation's expectations, and ultimately learn to reduce the number of mistakes made. However, from observing the behaviour of architects at one of the framework meetings, it appeared that the Architectural organisations valued their relationship with the Housebuilder organisation much more than their relationships with each other. This implies that, despite the Housebuilder organisation's efforts to make individuals in rival Architectural organisations work collaboratively, Consultant individuals struggle to overcome their competitive relationships, focusing on their own goals, rather than sharing the Housebuilder organisation's goal. So, while the Housebuilder organisation sought to change the cultural behaviour of the architectural profession, insufficient time had passed for Consultants to build the same level of trust they had with the Housebuilder organisation with other Consultants in the framework.

Another different inter-organisational relationship existed at the organisational level, between the Quality Team, manufacturers and suppliers. As part of the *QA Handbook* writing process, members of the Quality Team spoke to numerous suppliers to standardise the building products used across the organisation and how they would work as part of a standard housetype. Therefore, they incorporated manufacturer guidelines into the *QA Handbook* to show how specific items should be installed. Trust was built through these relationships at a strategic and organisation-wide level. As a result, the organisation had deals with specific manufacturers and suppliers on the basis that for every project, the Technical Teams and Consultants could only specify, purchase and install their product. However, like the attempt to gain adherence to the *quality management routine*, not all sites in the study regions followed this policy. For a variety of reasons, Technical Teams and Consultants across the study regions specified other manufacturers' products instead, to suit the region's circumstances.

In summary, to build houses, trust between the Housebuilder organisation and external organisations was a given. However, Consultants and Trades organisations did not always correctly interpret the Housebuilder organisation's information, therefore expectations between the Housebuilder and external organisations did not necessarily match. This was mainly because Consultants and Trade individuals did not read all the documentation they were sent. To address this at the design stage, the Housebuilder organisation had a framework panel of Consultant organisations who carried out repeat work for the Housebuilder. The Housebuilder organisation's aspiration was that Consultants would learn to meet their expectations over time, but this challenged the way Consultant organisations usually worked together. A moderate to high level of trust was built between individuals within the Housebuilder and Consultant organisations but not between Consultant individuals in different organisations. The Quality Team also had strategic inter-organisational relationships where they shared knowledge with suppliers and manufacturers. Another crucial factor influencing the level of trust between the organisation and an external organisation was the ability to monitor or control activities against the organisation's expectations, which is considered next.

8.10 Concept 9b: Inability to monitor inter-organisational practices

At the design stage, high levels of trust between Technical Team members and Consultants also hindered the process of learning. Often the former had little time to audit the work of the latter, prior to sending it out for Trade organisations to price. For Technical Teams, thoroughly checking Consultant work was time-consuming, especially when facing deadlines. The detailed design phase appeared to end with the Consultants issuing all drawings at once, leaving very little time for Technical Team members to check them before having to pass the information on to the Commercial Team:

"On a Design Team, you've got four Consultants... all working on it in the background in this digital environment. All of a sudden when the package is due to be issued, they all co-ordinate and go, 'there you go, there's your 3000 drawings [Technical Team].' I've now got to look at 3000 drawings now in 24 hours and then issue it to the Commercial Team because they want to start." Region 1:

Participant C

This often resulted in interpretation discrepancies going undetected, only to later be manifest on site, thus causing problems further down the line. This trust between Technical Teams and Consultants was referred to as Technical Team members 'protecting the team', rather than resolving the issue.

Build Teams faced a similar challenge, as they had to rely on the word of multiple Trade individuals all at once. On site, Site Teams had to trust Trade individuals to carry out their work, and meet the organisation's quality standards, as the former were not able to inspect every detail. Site Team members inspected and signed off completed work stages but could not physically oversee every action on site. Therefore, Site Team members had to hope that multiple Trade individuals from a wide range of disciplines constructed plots using the information they were given by the Housebuilder organisation. Site Managers on the other hand viewed their role as managing people rather than being experts in every Trade. Site Team members came from a wide range of backgrounds, with varying degrees of Trade experience. However, the range of skills across a building site was vast and a Site Manager was

extremely unlikely to be proficient in all of them. Therefore, they had to take what each Trade individual said at face value:

"You put a lot of faith in the [trades] that you've got on site... I know probably a bit more than the basics but... I don't confess to be an Electrician or a Plumber. So, when I say to the guys, 'is that boiler plumbed in correctly?' And he says to me, 'yes', then I will go 'fine'." Region 1: Participant A

This view led some Head Office participants questioning a Site Manager's ability to enforce the organisation's quality standards, if they were unsure what each Trade individual should be doing in the first place, especially as the honesty of some Trade individuals and their organisations was questioned by participants (see Appendix 3 on page 325). Site Team participants described the introduction of the *QA Handbook* as useful, as they could quickly check a standard for themselves, giving them confidence to then approach a Trade individual with conviction about an item of non-conformance that needed rectifying.

In summary, individuals from multiple teams across the Housebuilder organisation were unable to micro-manage and check the work of individuals in external organisations. Housebuilder individuals had to trust individuals in external organisations, which was challenging, as sometimes this trust was misplaced. However, Site Team members used the *QA Handbook* on site as a reference to check the quality of Trade individuals' work.

8.11 Theme 9: Inter-organisational trust

First-order concepts 6 and 7 explore how inter-organisational trust was essential for housebuilding to occur. At this Housebuilder organisation, two levels of inter-organisational interaction were observed; one at the strategic level, and the other at the operational level. At the strategic level, the trust relationships were based on the theoretical understanding of products in the organisation's context and the Quality Team updating the *QA Handbook* to reflect associated best practice. In contrast, at the operational level, the Housebuilder organisation apportioned trust differently.

At the team level, parties appeared to establish a baseline trust between themselves at the start of a project, which was built upon or lost as the project

progressed. To limit their level of risk, the Housebuilder organisation placed emphasis on formally defining expectations in detail, through written information and technical drawings. However, it appears that it was somewhat unrealistic to assume that all external organisations were familiar with the *QA Handbook* standards from day one. Therefore, there was a large interpretation gap between what the Housebuilder organisation expected from each external organisation and what each individual external organisation thought it was doing.

Trust also appeared to differ between different regional teams and the expertise of those they worked with. This suggests that inter-organisational trust was related to specific groupings: Technical Team with Consultant individuals, Build and Site Team individuals with Trade individuals. Relationships across these inter-organisational groupings were different, and each had their own way of establishing and regulating trust between the case and external organisations.

From a Technical Team–Consultant individuals’ perspective, Region 1 checked the interpretations of Consultant individuals against that of the Technical Team’s expectations collectively to audit their work. They asked Consultant organisations to present the scheme to them, and this quickly highlighted interpretation gaps:

"Bring the Consultant team in, don't just give me the drawings, present the drawings, and we will look at the drawings as a team. Now we are pulling it apart because you haven't looked at the landscape drawing, you haven't looked at the M&E [mechanical and electrical] drawing, you haven't looked at the constraints. And 10 times out of 10 you will walk away from that with a list of stuff to sort out. And that I have found useful." Region 1: Participant C

As a result, Technical Team members could then gauge whether the level of trust placed in Consultants was realistic.

From a Site Team–Trades individuals’ perspective, trust between Site Teams and Trade individuals on site was determined by the Trade individual’s motivation on site. These could be both short- and long-term motivators. For example, when a Trade individual could not build what was set out in their formal instructions, Site Teams trusted the Trade individual to highlight the discrepancy; however, that did

not always happen. There were times when what a previous Trade individual built conflicted with what a current Trade individual had been formally instructed to do. In those instances, the Trade individual doing the work had to decide what actions to take, as following the formal drawings was not always the best approach, given there may have been errors on those drawings. There appeared to be two common choices for Trade individuals when this happened: i) work collaboratively with the Site Team to solve the problem and build trust with the Site Team; or ii) build it as shown on the drawing even if the Trade individual did not believe it would work, thereby negatively impacting trust between the two. Trade individuals who chose to work collaboratively could potentially secure future work from the organisation: a long-term benefit. However, rather than flagging up the issue, if the Trade individual simply built what was shown on the drawing, they were entitled to be paid for it by the Housebuilder organisation, which was a short-term benefit, at the expense of potentially securing work in the future (see Appendix 3 on page 325).

These differences in practice suggest trust impacted the feed-forward of multi-level learning. Site Teams and Trade individuals often collectively assessed problems on site as they occurred and agreed actions, rather than involving Technical or Commercial individuals back in the office. However, Site Team members did not always communicate actions that deviated from the technical drawings back to the regional office in ways beneficial to learning. If a design-construction discrepancy on-site involved a structural element, the Site Manager would speak to a member of the Technical Team about the solution. If it were superficial, the Site Team often looked to the relevant Trade individual for the solution and did not inform the Technical Team of the change. Depending on the change made, it may or may not have been in line with the *QA Handbook*. In addition, participants in the Technical Team found this lack of feed-forward problematic, as they were unable to learn that what Consultant individuals drew could not be built:

"That's stuff you've got to just pull out of people... You'll speak to... the guy in the trench doing it, and say, 'why don't you do that detail there?', 'I've never done that detail that way. It'll never work.', 'well no one has ever told me that it doesn't work', and I'm 10 steps removed from that guy; never mind my Consultant who's never going to speak to the guy on site." Region 1: Participant C

Therefore, the feed-forward of learning between different groupings in geographically separate locations was influenced both by the level of trust in on-site inter-organisational relationships, and by the severity of the potential defect.

This also impacted on the feed-forward learning processes at higher hierarchical levels within the Housebuilder organisation; as Site Teams did not feed this learning forward to Technical Teams, Technical Teams could not feed-forward to Regional Superiors, or feedback to Consultant individuals. If Regional Superiors were unaware of the learning, subsequently it could not be fed forward to the Quality Team at the organisational level. As there was no indirect feed-forward of learning through adjacent levels, the Quality Team only gained insight into the parts of the *QA Handbook* that were and were not working when they conducted *Site-wide Quality Control Inspections*.

In summary, trust between the Housebuilder and external organisations was a given, and it existed at two levels; inter-personal trust and inter-organisational trust. Trust at the individual level determined whether individuals exchanged knowledge or the knowledge of one overruled another. Severity of defect coupled with trust within and between separate silos of inter-organisational relationships at the individual level affected whether learning was fed forward to other silos. Often an interpretation gap existed between the Housebuilder and an external organisation, which lessened over time.

8.12 Concept 10a: Development of respect and friendship

Trust between individuals within the same team had the potential to develop into long-term friendships over time. This became possible when Regional Superiors regularly brought usually isolated Site Team members together to support each other informally and share similar experiences collectively. Site Managers across Region 1 described how they communicated frequently between each other, both informally over the phone and formally in scheduled meetings (see Appendix 3 on page 325). They shared common problems and found out how those on other sites addressed them. Over time an informal social network thus developed between individuals, specific to their needs. A Site Manager in Region 3 described talking about the challenges they faced, away from the office, as a beneficial exercise. This participant described how, when they joined the Housebuilder organisation from a rival housebuilder, they were disappointed to learn that the region held no formal

meetings for Site Managers to get together and discuss common problems. He found this invaluable in his previous organisation, as a way to develop an informal community when they found themselves in a position of geographic isolation. Friendships had emerged from the group which were still ongoing:

"We don't have a Site Managers' meeting [here]... [The previous company] I worked for... we used to do it once a month; we'd all get together in a hotel... there would be 15 to 20 Site Managers round the table... it was very good. It was one of the first questions I asked when I came here, and they said, 'no, we don't do it'... [At those meetings] we got to know everybody from that era, we've stayed friends and... once a year we get together and will go for a drink and go for dinner." Region 3: Participant L

In Region 2, Assistant Site Managers described how they valued support and advice from their Site Managers. Both participant perspectives described increasing their collective experience, which an isolated Site Team member could draw on informally, the benefit being that communications and confidences did not have to go beyond a single team. They could informally explore their problems with peers without exposing any vulnerabilities to others beyond that trusted group.

Conversely, multi-level relationships developed differently over time. Despite communications taking place less frequently between individuals in multiple teams than conversations within teams, over time, teams within a region learned to trust and respect each other's professional disciplines. In addition, individuals used humour as they became more familiar with each other. Participants in Region 3 described their working environment as extremely positive:

"I've been in [other regional offices] and just feel like everyone in [this regional office] has respect for each other's job but equally there's that element of banter and stuff that make it quite a pleasant environment " Region 3: Participant N

As staff turnover in this region was low, team members had remained constant for a long time. Therefore, everyone had communicated face-to-face numerous times with colleagues across teams. Individuals across multiple teams appeared to have built

trust on positive rapport, and with teams sitting near each other, informal face-to-face conversation was easy.

To summarise, individuals in the same teams within a region, especially Site Teams, had developed long-term friendships. Members were able to informally discuss their problems confidentially within their trusted peer group. Individuals across different Housebuilder organisation teams developed respect for one another over time. They used humour and the familiarity associated with years of frequent informal face-to-face communication. Participants described relationships between the Housebuilder and external organisations as different from those within the Housebuilder organisation.

8.13 Concept 10b: Development of inter-organisational relationships

Technical Teams appeared to develop an affinity based on trust with their Consultants, whereby over time the individuals saw the relationship as one between two peers. When the Housebuilder organisation assigned Consultants to the framework, they acquired experience of working for the Housebuilder organisation centrally, while at the same time building trust with regional Technical Team members. If their performance was continuously poor, the Housebuilder organisation removed them from the framework after a number of years and several warnings. Therefore, only Consultants who gained a Technical Team's trust over a prolonged period continued to work for the Housebuilder organisation. One participant described it as easier to build on an established relationship with a Consultant individual, than start a new one for the sake of it, as the performance outcome was unknown and involved extra effort:

"All you are trying to do is improve, or add someone else to the list to try and make your life easier, from a selfish basis, from somebody that you know that you have a good rapport with, who you know is going to deliver a good job, then it makes your life a hell of a lot easier than if you start from scratch with somebody that you don't even know." Region 1: Participant E

When comparing trust between the Housebuilder and Consultant organisations, and the Housebuilder with Trade organisations, the Housebuilder organisation applied a separate set of selection criteria. Consultants across the

framework were all paid the same; i.e. the Housebuilder organisation applied the same payment matrix to Consultants, which depended on size of the site, number of plots, and the production of a specific set of technical drawings. However, no framework existed for Trade organisations. Instead, Commercial Teams selected Trade organisations based on their price for the work, as well as their ability to meet the Housebuilder organisation's quality standards based on past performance.

For Site Teams, the duration of relationships with Trade organisations varied widely. Some external organisations had worked with the Housebuilder organisation for many years, others were an unknown quantity. Therefore, trust levels varied and there was a different power dynamic on site; managing Trade individuals and organisations involved Site Team members having to use the threats of discipline, dismissal or non-payment to control Trade individual actions. Here, this was relevant around *QA Handbook* compliance:

"Implementation [of the QA Handbook] and making sure it stays there because they all slip back to, as [the Site Manager] says, '60% animal, 40% child'. That's what you're dealing with." Region 2:

Participant O

Compared to the Consultant organisations, Trade organisations had far less warning before the Housebuilder organisation dismissed them from a project, or 'chucked them off a job' – a much shorter timescale. As a result, Site Team members built a high degree of trust with external Trade organisations who consistently performed, and far less with others who were yet to demonstrate their ability. In cases where there was little trust, Site Team members had to work hard to enforce the Housebuilder organisation's quality standards, as Trade individuals were often described as trying to be paid more than what they were due, or getting away with doing less work than they had agreed to. Participants in all three study regions referred to not letting Trade individuals 'take the piss'.

To summarise, Technical Team members built peer relationships with Consultant individuals over time through a long-term framework. Conversely, Site Team members took on a supervisory role with individuals from Trade organisations, which involved short-term threats of discipline or dismissal for building to a poor standard of quality. Consequently, some Trade organisation relationships had

developed high levels of trust over the years, whereas others were based on little more than the promise of high quality work.

8.14 Theme 10: Intra- vs. inter-organisational trust over time

Time also played a fundamental role in the formation of trust at this Housebuilder organisation, and while relationships developed differently depending on whether they were intra- or inter-organisational, two factors influenced trust: expertise-based groupings and geographic location. Within the Housebuilder organisation, individuals were more willing to expose their fears and vulnerabilities to others, especially those with similar experiences. Exposure of those potential weaknesses increased organisational risk, as communicating errors beyond the organisation could have negative consequences for the company. Alternatively, it could alter the power balance between those designated to supervise on site and those Trade individuals under supervision. For example, a Site Manager who revealed a lack of experience in relation to managing Trade individuals, could open themselves up to exploitation by the latter, especially if there was little trust across the relationship.

On any single project, different individuals used many professional 'languages' within groupings to describe the same thing. Continually forging, developing and maintaining group relationships where both parties were unfamiliar with each other required time and effort. Over time and across multiple projects, as individuals within and beyond the Housebuilder organisation gained experience of working together, it became easier for interpretations across different groupings to align. Therefore, over time, each party started to better understand the other, creating a beneficial relationship for both sides. This was talked about most in relation to the Architects who were part of the Consultant Panel:

"We don't have to tell Architects how to design for us; through repeated use they know what we want. They know pet hates and standards. We don't need to re-tender or keep training them. Yes, we make mistakes but hopefully we learn from them." Head Office:

Participant S

Individuals described wanting to work with others they liked, where conversations came easily, values and interests aligned, ability had been proven, and relationships

were positive. However, this led to more informal communications between parties, which became harder to make explicit and feed-forward over time to higher hierarchical levels, ultimately hindering learning across the organisation.

In summary, trust developed over time between individuals from the Housebuilder organisation and individuals within an external organisation based on communication frequency and on a shared expertise or geographic location. Therefore, individuals collectively developed a common language over time to reduce the inter-organisational interpretation gap and improve the shared understanding reached. Individuals within the Housebuilder organisation preferred to work with individuals from external organisations whom they liked, had done an excellent job in the past and had shared values or interests. However, as familiarity between individuals increased, less learning was formally fed forward to higher hierarchical levels. Also, trust was only present between each external organisation and the Housebuilder organisation, not between individual external organisations, due to inter-organisational competition.

8.15 Chapter summary

In this chapter, findings relating to the aggregate dimension of trust were discussed. The first three first-order concepts and first second-order theme identified trust across the Housebuilder organisation as a multi-level concept, with stronger ties within the internal teams, which became progressively weaker as one progressed up the hierarchical levels. Trust across these ties influenced the *institutionalising* of the *quality management routine* from organisational to individual levels, and subsequent feed-forward of learning back up the hierarchical levels.

The next two first-order concepts and second second-order theme examined the relationship between trust across hierarchical relationships and associated emotions of blame. Feed-forward of learning was found less likely to occur in conditions where emotions at the individual level were negative and multi-level trust was low. These negative emotions were exacerbated by the *quality management routine* as it focused on negative outcomes and communicated these to a wider multi-level audience than before.

The following two first-order concepts and third second-order theme explored inter-organisational relationships and identified two distinct levels of inter-organisational associations. The first involved building trust at a strategic level

between the Quality Team and manufacturers and suppliers. The second established a baseline of trust at the operational level between Technical or Site Teams and Consultants or Trades organisations, respectively, which evolved positively or negatively. However, there was little to link Consultants to Trade organisations over time, thus obstructing multi-level learning.

The last two first-order concepts and last second-order theme found that trust between individuals developed informally over time. Trust depended on both individuals' fields of expertise and geographic distance, as this influenced the type and frequency of communication and the language used to share and interpret meaning. However, paradoxically, as such informality between individuals increased over time, learning was less likely to be made explicit for communication up hierarchical levels.

CHAPTER 9. DISCUSSION

9.1 Introduction

This chapter draws on the aggregate dimensions of communication, time and trust (see Chapters 6-8) to present a view of organisational learning which differs in important ways from that presented in the literature (see Chapters 2 and 3).

9.2 Exploring aggregate dimensions and multi-level learning

The aggregate dimensions and second-order themes from Chapters 6, 7 and 8 are summarised in Table 22 below. These constitute the study's main findings.

Table 22: Summary of second-order themes

Aggregate dimension	COMMUNICATION	TIME	TRUST
Second-order themes	<i>Changing lines of communication</i>	<i>Multi-level short-term financial goals vs. long-term learning goals</i>	<i>Trust between levels</i>
	<i>Siloed inter-group communication</i>	<i>Timing of episodic vs. systemic feedback</i>	<i>Trust and affect</i>
	<i>Communication and interpretation</i>	<i>Project-to-project multi-level, multi-disciplinary learning</i>	<i>Inter-organisational trust</i>
			<i>Intra- vs. inter-organisational trust over time</i>

Chapter 2 explores the feed-forward and feedback learning sub-processes scholars have attributed to multi-level learning, which are illustrated in Figure 4 on page 31. Summarising what is outlined in Chapter 2, learning starts as an idea, which is germinated through the subconscious sub-process of *intuiting* at the individual level. *Attending* and *inquiring* complement this learning sub-process. The informal learning sub-process of *interpreting* communicates the idea to the group level to create shared understanding. This learning sub-process is complemented by *experimenting* and supported by the social-political process of *influence*. At the group level, social networks form through *communities of practice*, where *boundary spanners* play a role *integrating* the idea. As the idea distils and formalises, the sub-process of *integrating* or *internalising* takes place, supported by the social-political

process of *force* to develop a common consensus, resulting in *institutionalising* at the organisational level. This is where the idea becomes embedded in the organisation's formal routines and lives on in the organisation independently of the original individual who thought of it. Similarly, social networks form through *communities of practice* at this level. Extending the 4I framework, *boundary spanners* pass learning beyond organisational boundaries, and *intertwining* occurs between organisational and inter-organisational levels. These multi-level sub-processes, occurring in the order described, constitute the *feed-forward* of learning.

Learning sub-processes, through which learning occurs from the inter-organisational down to the individual level, constitute the *feedback* of learning. External organisations pass new learning into an organisation through *intertwining* using *boundary spanners*. At the organisational level, *community of practice* networks *institutionalise* the organisation's formal routines down to group and individual levels, supported by the social-political process of *domination and discipline*. Alternatively, *quasi-institutionalising* occurs between the organisational and individual levels, or *re-internalising* takes place between the organisational and group levels. Similarly, as with feed-forward learning sub-processes, social networks form through *communities of practice*, where *boundary spanners* play a role *integrating* the organisation's formal routine at the group level. Between the group and individual levels, individuals collectively *reinterpret* the routine to finally complete the learning process with individual intuition.

However, this thesis has shown that learning sub-processes relating to *institutionalising* unfold very differently in a Housebuilder organisation case study. It is seen that the *institutionalising* of a *quality management routine* did not follow a single set of sequential recursive steps between learning sub-processes, as Figure 4 on page 31 suggests. Instead, a more fragmented and chaotic learning process was observed. The following sections show how the three influential aggregate dimensions of communication, time and trust shaped this process.

9.3 Communication

Examining the three second-order themes (changing lines of communication, siloed inter-group communication, and communication and interpretation) in Chapter 6, one overarching theoretical construct links them together: communication. Firstly, *institutionalising* was more successful through

direct organisational- to individual-level communication, and was either supported or impeded by competing goals at other levels. Secondly, *institutionalising* occurred in many small silos. The membership of each silo varied, comprising a mixture of disciplines from the Housebuilder and external organisations, and changed over time. Each silo developed a unique collective interpretation of the *quality management routine*, and learning involving silos was largely vertical as opposed to horizontal. Lastly, *institutionalising* involved individuals developing or changing their interpretation of the *quality management routine*. This took time and resources, and used a mix of communication methods. Together, these three second-order themes present a view of *institutionalising* that differs from the view presented in the literature.

While the wider literature has studied the *institutionalising* effects of organisational routines and behaviour (e.g. Cyert and March 1963; Nelson and Winter 1982), the learning literature has focused little on the processes through which learning may happen in a top-down fashion; implied as *institutionalising* to *integrating* to *interpreting* to *intuiting*, and *institutionalising* directly to *intuiting* (Crossan *et al.* 1999).

By comparison, the findings here suggest that *institutionalising* occurs through many separate short bursts of communication. Direct sets of learning sub-processes connect the organisational- to team- or individual-levels. Time, hierarchies, competition between regional peers and geographic proximity between individuals simultaneously influence communication across social networks at the team level. This creates numerous team-level silos, connected through gatekeeping Regional Superiors, who occupy central communications positions within the overall network (Contractor *et al.* 2006; Barzilai-Nahon 2008). This also results in non-uniform learning across the whole Housebuilder organisation, as the social networks necessary for learning to expand horizontally across levels are severely constrained (Schulz 2001). This fragments learning across the Housebuilder organisation, and leads to a diverse range of interpretations across all silos.

9.3.1 Communities of learning

The composition of each team-level silo differs, but relationships between silos become more complex as the levels of analysis ascend. Individuals in single-discipline teams, work with multiple external organisations, where they share similar

practices, interests, terminology and values around their part of the housebuilding process. For example, individuals in Technical Teams and individuals at the organisational level within Consultant organisations make up one *community of practice* with the aim of designing new housing sites. Another comprises individuals in the Commercial Team and individuals at the organisational level within Trade organisations, with the former aiming to procure the services of the latter. Lastly, Build Team individuals and individuals from Trade organisations on site form a third *community of practice*, with the aim of physically constructing new homes. Therefore, the findings here suggest multiple distinctive multi-level *communities of practice* work together as a project team, over time, to accomplish the pre-determined task of turning land into saleable new homes. These *communities of practice* encompass the individual and group levels within the Housebuilder organisation (Lionzo and Rossignoli 2013), as well as the inter-organisational level (Pyrko *et al.* 2019). However, it is posited here that learning occurring differently in a complex project team environment than within a typical *community of practice*.

Examining the core concepts and structures behind *communities of practice* and project teams, it is possible to identify why learning may occur differently in each circumstance. Wenger *et al.* (2002) make a clear distinction between project teams and *communities of practice*. They state that a project team has a leader who keeps team members focused on pre-prescribed shared objectives, which are achieved when team members complete a series of set tasks. Conversely, they argue that in a *community of practice*, it is an individual's interest in, and commitment to, a specific topic, that drives a desire to learn and results in an individual gaining a sense of satisfaction. Therefore, a project team's motivation and cohesion are determined by the project's hierarchy, timeline and goals, compared to the self-selected membership and organic timeframe adhered to by a *community of practice*. Wenger *et al.* (2002) do not assign any learning attributes to project teams, thus implying that a project team's purpose is to accomplish set tasks and goals, not learn. While the findings from this study show that learning takes place within project teams, it occurs at a local level and stays there. Examining these key distinctions thus implies learning takes place differently within complex project teams, therefore, the term *community of learning* is proposed here. A *community of learning* is the collective term for the multiple and diverse *communities of practice*, temporarily tied together for a defined

duration, and led by members of the Housebuilder organisation to design, procure and build houses (in that order) as they work, and serendipitously learn.

This learning takes place within what Wenger-Trayner and Wenger-Trayner (2015) describe as a *landscape of practice*. This is when *communities of practice* operate in complex systems, where individuals in one *community of practice* have 'knowledgeability' of others' practices beyond their own *community's* boundaries but not the competence to enact them. However, this notion of *landscapes of practice*, while acknowledged by Wenger-Trayner and Wenger-Trayner (2015) as dynamic, does not describe in detail the temporal effects on *communities of practice* within a project-based context, or when they are required to work together and follow a set sequence of practices over time.

The linear sequence of tasks, and transformation of knowledge, in a *community of learning* over time influences how multi-level learning occurs during a project. Pyrko *et al.* (2017; 2019) imply that *communities of practice* operate across organisational boundaries in a reciprocal capacity; Organisation A learns from Organisations B and C, and vice versa. In this study, the three teams and their members within the Housebuilder organisation control communication channels between each *community of practice*. Styhre *et al.* (2006) posit that design and construction *communities of practice* learn through different means of communication, thus suggesting that Housebuilder organisation team members perform a transformational role to ensure that they understand how the previous *community of practice's* knowledge fits within their working context (Bechky 2003; Pyrko *et al.* 2019). The way this transformation process plays out over time suggests that learning in a community of practice primarily takes place towards the end of a project, when the actions and interpretations of earlier *community* members cumulatively play out when they physically manifest on site. For example, communication between the Technical Team and Consultant organisations results in collective knowledge being codified as drawings and text. The Technical Team passes this to the Commercial Team, who transform the knowledge so it can be understood by the individuals from Trade organisations responsible for pricing work. The Commercial Team along with the Technical Team pass their codified knowledge in multiple forms onto the Build Team, who transform it again, so it can be understood collectively by their team members, and the individuals from Trade organisations

under their supervision. At the end of a project, each *community of learning* disbands; members disperse, taking their accrued and mostly tacit learning with them to help form new complex *communities of learning* on future housing projects. Into this established and repeating environment, the Quality Team intermittently initiates the learning sub-process of *institutionalising* the quality management routine.

As the number of individuals, and diversity of practices increases within a *community of learning*, compared to a single *community of practice*, *institutionalising* the *quality management routine* becomes resource-intensive. This is because the Quality Team needs to communicate with every *community of learning*, or project team, working within the Housebuilding organisation, and this new learning needs to be subsequently communicated across the community.

It is seen that the *institutionalising* process triggers a *quality management routine learning cycle* within each *community of learning*. This comprises a complex sequence of reciprocal learning sub-processes, similar to the process of *interpretation* and *reinterpretation* described by Akinci and Sadler-Smith (2018), in addition to the continued process of *institutionalising* at the inter-organisational level below the individual level. These learning sub-processes unfold over time, connecting multiple levels repeatedly, as each *community of learning* develops a collective interpretation of the Housebuilder's quality standards.

For this Housebuilder organisation, the speed at which this local interpretation process takes place is important. Developing understanding rapidly results in individuals quickly *institutionalising* learning with authority and conviction to others in external organisations. This temporal dimension of interpretation is not described in Crossan *et al.*'s (1999) 4I framework (see section 9.2.2), nor are related inter-organisational relationships at the individual level responsible for the *institutionalising* process.

From an intra-organisational perspective, while 'learning speed' is discussed in the multi-level learning literature (Berends and Antonacopoulou 2014), the concept is not synonymous with interpretation speed at the individual level, and how an individual's understanding of multi-level languages evolves over time to facilitate learning. In this study, new knowledge communicated between levels clearly influenced the receiving level's interpretation, where interpretation is the act of making sense of new information before any actions are taken (Daft and Weick 1984).

Building complex and rich languages within *communities of learning* through *interpreting* is time-consuming. Collective *interpreting* facilitates individual comprehension by aligning meaning within an organisation across *communities of learning*. Developing a common language thus allows individuals to share and develop collective interpretations quickly, and to build trust between community members (see Section 9.5).

Individuals check their interpretations against those held by others in their *community of learning*, by referring to past experiences, the experiences of others and by discussing reference images. It is seen that individuals rapidly interpret the *quality management routine* through imagery accompanied by verbal communications. Therefore, the feedback learning sub-process could be conceptualised as a continuous and iterative *reinterpreting* of others' *interpretations* until a common understanding is reached and meaning is shared (Akinci and Sadler-Smith 2018). Akinci and Sadler-Smith (2018) posit that these reciprocal feed-forward and feedback learning sub-processes operate across adjacent levels, as opposed to non-adjacent levels. In this study, it was seen that individuals kept checking their interpretations with individuals at the organisational level as well as with those within their *community of learning*. Therefore, reciprocal learning sub-processes operated across non-adjacent levels, bypassing hierarchical levels, such as the Regional level. Thus, it is argued that interpretation speed is influenced by iterations between *interpreting* and *reinterpreting* learning sub-processes between individual and team, and individual and organisational levels within a *community of learning*. As the learning sub-processes operate in rapid succession, interpretation develops quickly, and the learning cycle could effectively be visualised through the metaphor of a multi-level spiral that emerges rapidly over time.

Inter-organisational communication across *communities of learning* illustrates the diversity of individual backgrounds. Site Managers and individuals from Build Teams were seen to act as *boundary spanners* at the individual level, contrary to Zeimers *et al.* (2019) who posit that *boundary spanners* operate at the group level, and as described in Chapter 3, *institutionalising* rather than *intertwining* (Jones and Macpherson 2006) took place between these individuals in positions of authority and individuals from external organisations. Holmqvist (2003, p.107) posits that *intertwining* involves two organisations “acting, opening-up, experimenting and

focusing” in relation to each other. However, here it is seen that Build Team individuals were not seeking to learn from external organisations, instead they wanted individuals from external organisations to follow the *quality management routine* without question. This suggests an inter-organisational *institutionalising* process occurring within a *community of learning*.

9.3.2 Boundary objects supporting feed-forward and feedback

When English is not the default language across a *community of learning*, photographic images play a crucial part in the rapid *interpretation* process for both individuals across intra- and inter-organisational relationships. Individuals across professional disciplines with varying levels of experience may call building materials or construction practices by different names, resulting in the same thing having a different interpretation. In Chapter 2, artefacts that span multiple disciplines are referred to as *boundary objects* (Bechky 2003). In this study, *boundary objects* played a fundamental role in *communities of learning* where similar working practices were shared (Benn *et al.* 2013) but described in different languages by each discipline. Photographs included as part of *quality management routine* guidance conveyed meaning across and between levels quickly, regardless of an individual’s native language. Therefore, photographs allow individuals to develop an informal shared language that is not reliant on written words. In this housebuilding context, at the construction phase, the language required to verbally communicate the same information conveyed in a photograph, or communicate in a written form was more complex and time-consuming to deliver. In instances where the boundary object image did not represent an individual’s interpretation at that point in time, the individual would attempt to express their interpretation by sketching alongside the image, and then make comparisons between the two images, while at the same time asking questions of other individuals to try to reach a common meaning within the group. Therefore, boundary objects can be seen to assist this part of the *institutionalising* process.

Furthermore, by interacting with physical objects and photographs, individuals improve collective interpretations related to build quality, conveying clarity in meaning, given the complexity of an entire site. Bechky (2003) found that communication between individuals was simplified if they were interacting with a physical object, such as machinery parts. In this study, individuals stood next to part

of a plot where a construction detail was unclear and used photographs, technical drawings and verbal communication to collectively interpret how the detail should go together and what the project should look like when complete. However, individuals did not formally or explicitly record acknowledgements of shared interpretations or informal languages developed, which meant that such learning could not be fed forward beyond their *community of learning*. This may have been because individuals found their shared interpretations hard to capture explicitly in written text, as well as time-consuming to write down.

Similarly, boundary objects also support feed-forward learning sub-processes. Expanding on this, from temporal and spatial perspectives, images are very effective in communicating visual records as instantaneous complex time-stamps, showing current contextual conditions, over a large geographic distance, when additional expertise is sought within a *community of learning* to correct a situation quickly (Pritchard and Symon 2014). In this study, individuals within *communities of learning* used photographs as boundary objects to record and question the working practices of individuals from Trade organisations. For example, when one individual from a Trade organisation said they had enacted the *quality management routine*, photographs taken by an individual from the Housebuilder organisation could clearly show other individuals in both organisations that the first individual in question had not met the required standard.

9.3.3 Adhocracy

This pattern of learning contrasts starkly with the housebuilder's rigid formal hierarchy. Instead, this complex unfolding process shares features of an adhocracy, where individuals at lower hierarchical levels are involved in the formulation of an organisation's strategy. As a result, rather than following the organisation's existing strategies, new ones emerge (Mintzberg and McHugh 1985). This arises when organisational power is decentralised to allow for sudden changes to an organisation's operating environment (Mintzberg 1979).

In contrast to *institutionalising* in a bureaucracy, where an "entrepreneurial leader" achieves standardisation through centralised control, the more impulsive approach of *institutionalising* in an adhocracy can lead to a lack of focus in future directions (Mintzberg and McHugh 1985). Mintzberg (1979) and Mintzberg and McHugh (1985) sketch out a criteria for the structure of an adhocracy. Such

organisations 1) operate in a dynamic environment where things change and unforeseen problems have to be overcome, 2) produce bespoke products, 3) use specialised teams working collaboratively but temporarily on projects, 4) decentralise the supervision of activities, rather than a blanket application of standardised rules, and 5) are selective with regard to supervision and decision-making, as those closest to an unforeseen issue address the problem. The above points describe the conditions in which the Housebuilder organisation operated. Of particular note is point three which refers to specialised teams working together for short periods, reflecting similarities with the *communities of learning* presented in this case study.

Palos and Stancovici (2016) describe adhocratic culture as one that encourages entrepreneurial spirit, and identifies both experimentation and risk-orientated leadership as part of this culture, especially where there is a need to adapt to a rapidly changing environment. The findings of this study echo their view, along with the fragmented practice of *institutionalising*, where the learning sub-process of *experimenting* occurred in isolated *communities of learning*. At the Housebuilder organisation, multi-level learning between projects occurred through feed-forward from team level *experimenting*. Similarly to Swan *et al.* (2010), this learning stayed within the *communities of learning*, without *integrating* taking place between regional and organisational levels. For example, Technical Teams members revised housetype designs through an iterative and improvisational process by feed-forward and feedback learning sub-processes, without the learning moving beyond their *community of learning*. In addition, and similar to Zietsma *et al.*'s (2002) findings, learning based on *experimenting* was seldom formalised into an organisational routine, as individuals set aside little time to formally document and communicate explicitly to other levels, the refinements they had made. Instead refinements were known solely and tacitly by members within a *community of learning*, with the latter potentially communicating *experimenting* successes rather than failures to higher hierarchical levels. Subsequently, project-to-project learning becomes "superstitious" (Kim 1993) and based on informal, team and individual level *experimenting*, which is not formalised at the organisational level. *Communities of learning* then disband at the end of a project and take their accrued learning with them as they join a completely new *community of learning*. Also, the temporal separation of external organisations within communities means they are unable to learn from each other.

To try to unify disparate interpretations across the silos, the Quality Team initiated *institutionalising* on many occasions through direct face-to-face communication during *Site-wide Quality Control Inspections*. This did not always lead to successful *institutionalising* at the individual level. However, individuals on site were also able to *interpret* problems they encountered with the *quality management routine*; thus, creating a feed-forward in their learning. Jansson *et al.* (2015) posit that a direct communication channel like this encourages a high volume of low quality learning feeding forward to the organisational level, which requires an audit before it is useful. This suggests that even though the learning process bypasses the group level, crystallising what individuals interpret up to the organisational level still requires the learning sub-processes of *integrating* (Crossan *et al.* 1999), or *internalising* (Akinci and Sadler-Smith 2018). In this study, as the organisational level recipients were individuals, as opposed to a digital database in Jansson *et al.*'s (2015) case, they could carry out this *integrating* process without regional-level interference, in order to refine the *quality management routine*. However, as there are multiple power conflicts between the levels, it was easier for individuals at the lower levels to initiate *interpreting* with an adjacent level. The findings here suggest individuals required confidence to initiate *interpreting* with the organisational level directly.

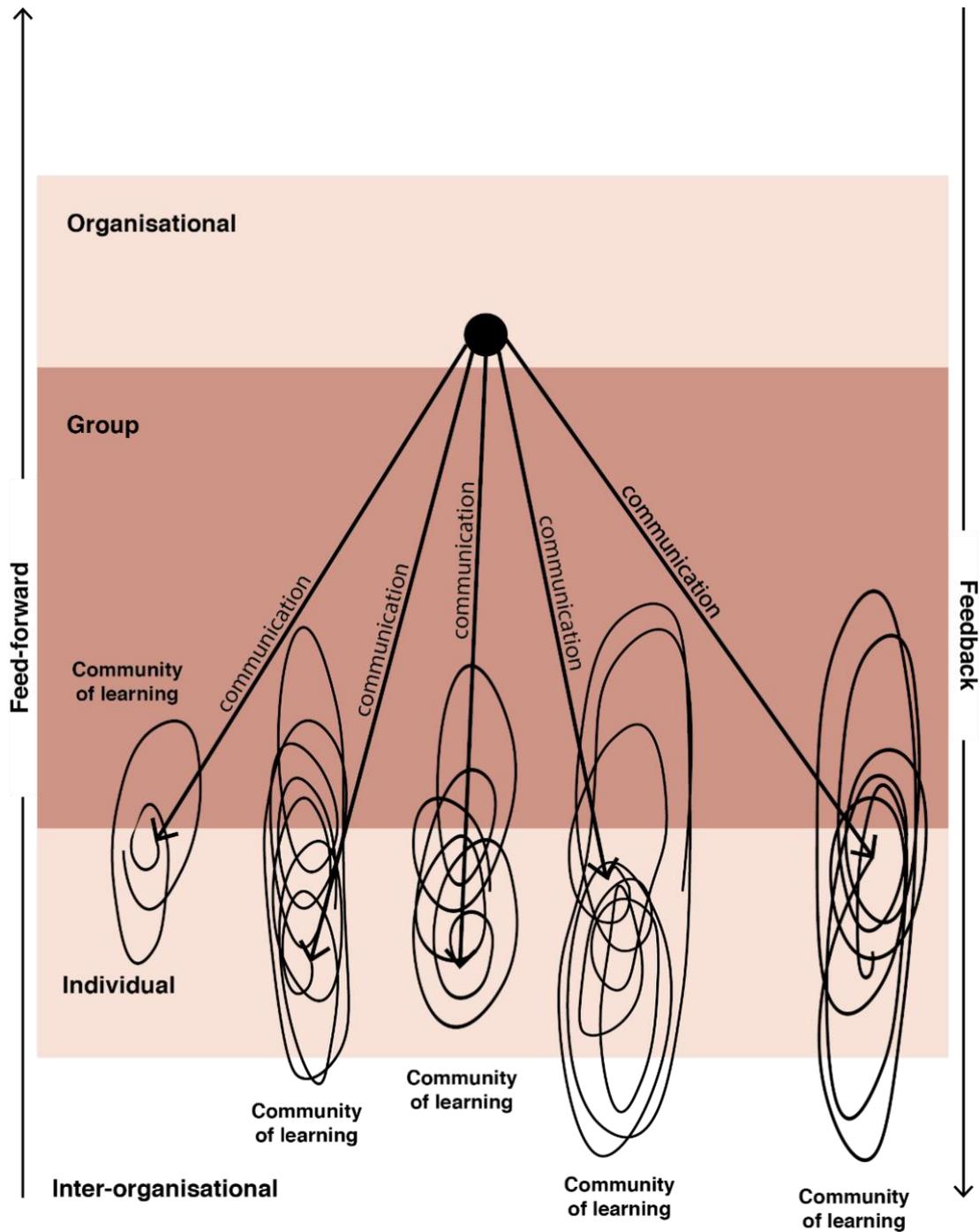


Figure 49: Multiple institutionalising triggering unique communities of learning

Figure 49 shows the multiple learning sub-processes at a structural level. For ease of reference, the diagonal arrangement of levels shown in Crossan *et al.*'s 4I framework diagram (Figure 3 on page 20) is adjusted to reflect this study's *institutionalising* focus, i.e., the diagram replicates the Housebuilder organisation's formal hierarchy with the organisational level at the top, down to regional and team

levels (which are combined to represent the group level in the darker red box), then the individual level and inter-organisational level at the bottom. The lighter red box, encasing the organisational, group and individual levels, represents the single Housebuilder organisation.

In sum, *institutionalising* across this Housebuilder organisation occurs through multiple communications at the organisational level to many *communities of learning*. This triggers a *quality management routine* learning cycle within each *community*, made up of continuous reciprocal learning sub-processes, forming a messy spiral. From these learning spirals, individuals within a *community of learning* build a collective interpretation of the *quality management routine* before being able to continue the *institutionalising* process with individuals in external organisations. Boundary objects facilitate this *post-institutionalising interpretation* process, as well as subsequent feed-forward to other hierarchical levels. Lastly, learning in this way can be described as adhocratic, given the chaotic, fragmented and decentralised nature of the *institutionalising* and subsequent learning sub-processes, as opposed to a single uniform, connected or recursively sequential process. However, within a *community's* learning spiral, time plays several roles in facilitating the multi-level learning process, which is discussed next.

9.4 Time

Examining the three second-order themes (multi-level short-term financial goals vs. long-term learning goals, timing of episodic vs. systemic feedback, and project-to-project multi-level, multi-disciplinary learning) in Chapter 7, one overarching theoretical construct is argued as linking them together: time. Firstly, learning cycles for housebuilding and financial reporting conflicted with each other, thus highlighting inconsistencies between clock time and other types of time, which led to individuals negatively impacting build quality through processes of improvisation. Secondly, the organisational-level application of episodic or systemic *institutionalising* affected the speed of learning across the organisation, as both mechanisms reacted differently with each *community of learning*. Lastly, the lack of formal support for reflection through any kind of review process led to *communities* learning through *experimenting*. At the same time, the organisational level was starting to build up a retrievable memory from feed-forward learning collected

through the *quality management routine*. Consequently, time plays a critical role in how fast *institutionalising* takes place at all levels.

Crossan *et al.* (1999) do not explore temporal processes in any significant depth in their 4I framework. They posit that for learning to feedback or feed-forward between levels, the relevant levels need to align; however temporal conditions surrounding the act of alignment are not acknowledged (Morland *et al.* 2019). As discussed in the previous section, the findings here suggest that it takes time for individuals to (independently and collectively) interpret *quality management routine*-related learning. Each *community of learning* has its own learning cycle specific to learning the *quality management routine*. The *institutionalising* process triggers this learning cycle, thereby energising it into a messy spiral of multi-level learning sub-processes that unfold over time, until consensus is reached at the local level, or the energy, which is transferred to the *community of learning* during the *institutionalising* process runs out.

9.4.1 Learning spiral energy and resource

This notion of learning discontinuing because energy ‘runs out’ over time differs from Berends and Lammer’s (2010) study where discontinuity in learning processes stemmed from organisational-level intervention. Engeström *et al.* (2007, p.321) describe this kind of learning discontinuity through a lack of energy as *mundane*, and inherent in project-based work. As a result, a mundane discontinuity “is seldom actively reflected upon, simply because it manifests itself as an absence of actions – things just do not happen anymore”. This suggests that for the *institutionalising* process to continue, each *community of learning* needs to maintain energy levels and momentum over time. For this to happen, it requires *communities of learning* to feed-forward *quality management routine* learning back to the organisational level, especially if organisational level to *community of learning institutionalising* is being supported through the application of episodic power.

Lawrence *et al.* (2005) state that for *institutionalising* to be successful it needs to be accompanied by the social processes of *discipline* and *domination* applied through the ongoing application of *systemic power* (see Chapter 2), as opposed to ad hoc injections of episodic power. In this study, both forms of power were used at the organisational level to facilitate *quality management routine* institutionalisation. In all study regions *institutionalising* occurred through the application of *episodic power* at

various points in time. Episodic power is time-dependent, as success relies on the organisational level initiating short-term power bursts and repeatedly doing this at the right point in time. Lawrence *et al.* (2005) argue that deploying power in this way is less stable than applications of systemic power, consequently *institutionalising* is likely to be unsuccessful. The authors assert that systemic power, carried out through efficiency investment, is a stable, more effective and longer-term power initiative in this environment (Lawrence *et al.* 2001). The introduction of the tablet in Region 2, demonstrates how the organisational level used systemic power through material technologies as part of the *institutionalising* process, to change *quality management routine* enactment and enforcement at the team level. While part of the *quality management routine* required multiple short-term (episodic) bursts of organisational level pressure, the tablet required individuals to change their daily *quality management routine*-related work practices through long-term (systemic) technology use. Also, as regional- and organisational-level superiors could quickly detect which individuals were not using the tablet, they could apply additional pressure through episodic power to non-conforming individuals; in other words, *dominate* their behaviour (Lawrence *et al.* 2005).

In this study, when the organisational level applied episodic power to a *community of learning*, *institutionalising* occurred through communication. But the success of the *institutionalising* process and transfer of energy to continue *institutionalising* then depended on where that *community of learning* was within its learning spiral at that point in time. Therefore, the *community* was not always ready to receive the energy to continue learning within the *community*, let alone feed-forward learning up to the organisational level. Therefore, it meant that the organisational level had to communicate many times before learning continued as feed-forward or feedback – very resource-intensive at the organisational level. Much of this has to do with the organisational level communicating at a point in time when a *community* was not ready to learn. This readiness reflects the notion of *attending* (Zietsma *et al.* 2002) and *inquiring* (Akinici and Sadler-Smith 2018), as an individual in a *community of learning* seeks out information, implying a propensity, or readiness to learn. Therefore, for *institutionalising* to be successful when the organisational level applies power in an episodic fashion, individuals at both the organisational level and

within the *community of learning* need to believe the learning has value in practice, and be in a position to send or receive learning at the right point in time.

Conversely, when systemic power was applied at the organisational level through the tablet, individuals in *communities of learning* had little choice but to be ready and feed-forward routine-related learning, as not doing this would be noticed by their Regional Superiors. However, in this systemic as opposed to episodic scenario, the *community of learning* was also better positioned to feed-forward learning, and at the right point in their learning spiral. This was because a *community's* new working practices included an automatic feed-forward communication mechanism. This in turn required the organisational level to be ready to receive learning from a *community*. But as there was only one Head Office compared to many *communities of learning*, this was easier to achieve, and thus less resource-intensive at the organisational level. As the Head Office captured this learning consistently in a digital format, individuals at Head Office level were effectively ready to receive it. Therefore, over time, by careful co-ordination of feedback and feed-forward learning sub-processes, the organisational level and *community of learning* could support *quality management routine institutionalising*. This perspective adds richness to the literature around timing and the timeliness of learning, as outlined in Berends and Antonacopoulou's (2014) overview. However, timeliness is only one aspect of time that influences the *institutionalising* process in this thesis. Conflicts between several "types" of time are also problematic.

9.4.2 Clock time conflicts

When examining time, Ancona *et al.* (2001) posit that time can be viewed in different ways. They describe 'clock time' as the equal delineation of time in perpetuity, and this reflects Western society in particular. They go on to identify 'cyclical time', which relates to predictable repeating patterns of events, such as season, and predicable and unpredictable 'event time'. Predictable event time refers to culturally constructed events or celebrations around the Gregorian calendar. For example, while Christian events of Christmas fall on the same date every year, and Easter changes annually, the events will still occur on an annual basis. Unpredictable event time relates to the irregularities of time, and while events such as earthquakes could be predicted, it is impossible to predict when they will occur with great precision. Lastly, Ancona *et al.* (2001) describe 'life cycle time', where time is finite

and events normally occur in a predictable sequence but of unknown duration. For example, humans are born, have an infancy, adolescence, adulthood and progress to old age and then die.

Adopting a project-based approach, such as the case Housebuilder organisation, clock time is organised into formal windows, and specific periods are identified when there is enough time for *institutionalising* to take place. Berends and Lammers (2010) argue that this clock time approach creates tensions at the team and individual levels, when the natural learning cycle within a project falls outside the allocated window. They describe how attempts to 'speed things up' by individuals at senior level, increased the tempo of activities and disrupted associated learning cycles as a result. The findings in this study likewise highlight this tension: activities related to housebuilding are organised into specific projects, but both the housebuilding, and associated learning cycles, are elastic.

The housebuilding process in this thesis can be compared to a life cycle, as it takes place following a predictable pattern but undeterminable duration. The feasibility and design phases (see Chapter 5) can take far longer than anticipated once on site, where building in a specific sequence is what matters at the team level, as opposed to the duration of each construction stage. In contrast, at the organisational level, financial deadlines occur at six-monthly intervals, which are unlikely to match the longer lengths of housebuilding life cycles. However, the duration of a housebuilding life cycle is also affected by several of the other types of time described above. For example, changes in the seasons affect when site activities such as bricklaying take place. Laying bricks at low temperatures compromises the mortar and causes defects in the brickwork later. Also, predictable event time affects the housebuilding process, as sites close at Christmas, or it may be harder to find additional labour during school holidays as individuals from Trade organisations are on holiday. Lastly, unpredictable event time also plays a significant role in the housebuilding process, as housing projects can come to a standstill for months, if not years, if planning permission is not granted, or prolonged, or when starting on site an ancient Roman burial ground is unearthed.

Therefore, it is argued that the Housebuilder organisation's slavish use of clock time due to mandatory annual financial reporting, while necessary to maintain order and consistency across all the parties involved in the housebuilding process, is

steeped in unpredictability. As many types of time play out simultaneously, they each impact the programme of a housing life cycle, dragging out how long it takes to complete a housing project. Individuals developing a housing project's programmes can make an estimated guess as to how long it will take, but with limited accuracy.

The cumulative effect of this imprecise programming process has serious repercussions for *communities of learning* trying to learn the housebuilder's *quality management routine*. The learning cycle length of a *community of learning* is also unpredictable and indeterminable, as community members do not know how long it will take them to reach consensus. As a financial deadline, such as year-end approaches, individuals at the organisational and regional levels intervene, directing team- and individual-level efforts towards increasing the speed of housebuilding activities, and prioritising this over the correct sequencing of work – thereby, speeding up the housebuilding process to meet imposed shorter financial deadlines. This highlights how the two processes, one financial and the other operational (i.e. housebuilding) rarely align; as a result, these processes did not work in harmony.

The conflict between the financial and housebuilding cycles that negatively impacted on *community of learning* cycles was driven by the Housebuilder organisation's Shareholders and associated share price following year-ends of good or poor performance. Also, as the Housebuilder organisation is a public limited company (PLC), the UK Government requires it to publish its annual report. This suggests a compounded structural problem, as the short-term reporting of more new homes, and associated profit, to Shareholders and Government fails to acknowledge that a longer reporting period may better suit the housebuilders, facilitating individuals to learn to improve quality standards, and have time to enforce them. As Davey *et al.* (2006) point out, if project timescales are too short, quality is compromised when housebuilder staff are willing to accept a lesser standard from Trade individuals to save time.

9.4.3 Improvisation

The consequence of this disharmony between organisational-level financial reporting and housing project life cycles creates a tension in *communities of learning*. Political intervention through the use of episodic power is used as a mechanism to artificially accelerate subordinate-level activities for the benefit of superior-level commitments (Berends and Lammers 2010). Therefore, individuals have insufficient

time to carry out their usual working practices, let alone learn how to change them, forcing individuals in a *community of learning* to change their behaviour.

This behaviour could be described as a form of improvisation, or a “possible response when individuals find themselves under pressure to act but have neither the time to plan nor an understanding of the environment.” (Crossan *et al.* 2005, p.134). Improvising has been described as a learning strategy, effectively a coping mechanism, for times of crisis (Antonacopoulou and Sheaffer 2014). When an encountered problem is solved through improvisation and not recorded explicitly, situational learning occurs (Kim 1993). At year and half- year-ends, when both time pressures and uncertainty were high, the Housebuilder organisation operated in a state of “full-scale improvisation” (Crossan *et al.* 2005). This involves individuals “wad[ing] into situations with fallible knowledge, secure in the belief that they can recombine that knowledge by shifting their fallibilities around. Faith in their ability to ‘make do’ infuses confidence into their balance of knowledge and doubt” (Weick 1998, p.59). Given that the contextual conditions at the Housebuilder organisation required sequential sensemaking, the time individuals at team level could devote to creative collective sensemaking was insufficient. This type of learning is typical of crisis management. Two things happen in a *community of learning*; firstly, the sequence of *interpreting* and *reinterpreting* learning sub-processes speeds up, and secondly, the learning spirals are cut short. This means individuals only have time for local collective *interpreting* and *reinterpreting*, with no time to check their collective interpretation with the organisational level. Instead individuals fall back on their previous experience of how to speed up the housebuilding process. As a result, *communities of learning* use an incorrect interpretation of the *quality management routine* as the basis for subsequent inter-organisational *institutionalising*, and the learning is then not formalised through formal feed-forward learning sub-processes to higher hierarchical levels. This also becomes problematic if the individual communicating the *quality management routine* to individuals in external organisations lacks conviction in the routine itself, thus undermining their ability to persuade the other. *Institutionalising* in this environment is daunting in any case, as the individuals in external organisations are likely to have a higher level of expertise in their own field, than the Housebuilder individual telling them to change the way they normally build something.

9.4.4 Temporal modality and separation

Earlier in this section, it was posited that learning across this Housebuilder organisation occurred both through a process of trial and error, and improvising. Miner *et al.* (2001) describe how there are temporal differences between improvising and trial and error; the first occurs in ‘real time’ and the second waits for outcomes before making subsequent changes. This suggests temporal modality plays a role in *communities of learning*. Temporal modality is described as a process by which, “a person’s experience at any moment extends from the present into the past and into the future” (Berends and Antonacopoulou 2014, p.439). It relates to perspective, where an individual can stand at one point in time, the present, look one way down a continuum of past, present and future, to review their past whilst simultaneously anticipating the future (Berends and Antonacopoulou 2014). One of the findings in this study was that, as individuals had no time to formally pause and reflect on a regular basis, they had to learn in other ways. Therefore, individuals learnt through improvising in response to real-time issues, thus, learning in the present, although the impending arrival of year-end could also mark another point in time ahead in each *community of learning’s* spiral. Beyond that, a *community of learning’s* members look forwards towards the next plot, the next phase, the next site and must rely on what they remember when they arrive at that point in time.

By negating individuals’ access to collective memories through a lack of a review process, individuals are not able to examine an action against its consequences. This suggests learning from retrospection is not possible if insufficient time is set aside for it (Rahmandad 2008). Oswick *et al.* (2000) argue that reviewing past actions is critical to learning, as it allows retrospective sensemaking to take place through participants constructing, deconstructing and reconstructing meaning over time. The situation is compounded by a lack of organisational level commitment to understanding “the temporal proximity of doing and thinking” (Berends and Antonacopoulou 2014, p.444), or the relationship between action and consequence (Elkjaer 2004). Therefore, learning cannot take place (Keegan and Turner 2001; Elkjaer 2004). Subsequently superstitious learning occurs by inferences being drawn at each level based on supposition and hunches (Kim 1993; Berends and Antonacopoulou 2014), and fed forward to future projects. This undermines the organisation’s ability to draw inferences from learning, and create a reliable

organisational memory, which further deepens differences between *communities of learning*.

In the construction and housebuilding industries, the lack of project-to-project continuity is a much-reported issue. Styhre *et al.* (2006) assert that this lack of continuity is due in part to Consultant and Trade organisations not learning from each other, as each discipline learns through different and non-compatible methods of communication. In this study, the communication point above is expanded to include a temporal dimension, as not only do individuals in Consultant and Trade organisations learn through different forms of communication, they are temporally separate from each other as well. Therefore, neither external organisation can learn from the other through this time gap. This was most relevant for individuals in Consultant organisations, as they marked the start of the linear housing project life cycle. This temporal gap generated tensions between teams within *communities of learning* when a site was at the construction stage, as there was little continuity of inter-organisational learning between each *community of learning*. Therefore, rather than one *community of learning* moving smoothly into a new *community of learning* on another project, the whole learning spiral started afresh with a new group of members.

In summary, each *community of learning's* cycle stretches out for an unspecified duration, following a chaotic unpredictable pathway, and moving at its own speed, as members change constantly over the life cycle of a housing project. Consequently, learning within a *community of learning* depends on the amount of energy or resources available within the *institutionalising* process, as learning spiral resources wane over time without the continuation of vertical feed-forward and feedback learning sub-processes between a *community of learning* and the organisational level. However, *quality management routine* learning within each *community* is prey to the constant conflicts between clock time and other types of time. These conflicts disrupt the *institutionalising* process. Also, as individuals have no time to look back and reflect, learning occurs instead by always looking forward; from the present time through *improvising*, or further forward in the learning spiral. This negatively influences learning, as individuals imperfectly examine actions and consequence from their own singular perspective. This is most relevant for individuals

in external organisations who are temporally separate in a *community of learning*; thus, history continues to repeat itself from project to project.

9.5 Trust

The four second-order themes (trust between levels, trust and affect, inter-organisational trust, and intra- vs. inter-organisational trust over time) in Chapter 8, are together under the overarching theoretical construct of trust. Firstly, trust was strongest between individuals in the multiple *communities of practice*, determined by expertise and geographic proximity that made up *communities of learning*, and also strong between members of a *community of learning*, making feed-forward less likely. Secondly, ‘outsiders’ to the *community of learning* made site-specific errors visible to trusted Regional Superiors through *quality management routine* practices. This generated negative emotions, such as fear and blame, within *community of learning* individuals, demotivating their propensity to learn the *quality management routine*. Thirdly, trust between Housebuilder and external organisation individuals within a *community of learning* determined whether the Housebuilder individual enforced or ignored the *quality management routine*. Lastly, trust between Housebuilder and external organisation individuals within a *community of learning* strengthened over time, as individuals developed a common language, understanding and familiarity between each other through increased communications. As trust strengthened, feed-forward to higher hierarchical levels reduced, as communication between *community of learning* members moved to what was implied in speech rather than what was written down. Trust therefore played a vital role in controlling the order and uniformity of learning between *communities of learning* horizontally and vertically within the organisation.

From the four second-order themes above, three aspects of trust were found to influence multi-level learning across the Housebuilder and associated external organisations; firstly, trust and intra-regional *communities of learning*; secondly, trust between inter-regional *communities of learning*; and lastly, between a *community of learning* and the organisational level. These are explored in turn.

9.5.1 Trust and intra-regional communities of learning

As discussed in Section 9.3.1, multiple *communities of practice* make up *communities of learning* across a Housebuilder organisation. Crossan *et al.*'s (1999) 41

framework takes a simplistic view of an organisation's composition, compared to the more complex picture presented in this case. Individuals within a *community of practice* were usually based in the same location, resulting in frequent face-to-face informal conversations about shared working practices. This suggests individuals in close physical proximity benefit from communication efficiency (Borgatti and Cross 2003; Škerlavaj *et al.* 2010). Conversations with individuals in external organisations may have taken place using more indirect forms of contact but individuals across organisations shared the same work-based language. As a result, homophilic relations form between individuals, building trust (McPherson *et al.* 2001). Trust, and by association, relationship tie strength, is strongest between individuals that share a common language around expertise, frequent informal communications and close geographic proximity.

Communities of learning brought multiple *communities of practice* together for the shared goal of building new homes. However, as a housing project's life cycle extended over several years, different *communities of practice* were involved at different points in time, temporally separate but still involved to some degree in the same learning spiral. Trust, therefore, was weaker between *communities of practice* within a *community of learning* but still strong, as all individuals had a shared interest in a specific housing project.

Another reason for a high degree of trust within both *communities of learning* and *communities of practice* was related to the practice of Regional Superiors outside a *community of learning* blaming members for mistakes. In this study, participants described the Housebuilder organisation as having a 'blame culture' when Project Team individuals made mistakes. As a result, individuals at all levels took little accountability for their actions in order to avoid blame in future. *Community* members could avoid claiming responsibility for a mistake, as there were so many individuals involved in the housebuilding process. Therefore, they could place blame on those who were no longer involved in the project, or *community* members could collectively claim to have little recollection of events leading up to a mistake. This impacted the feed-forward of learning beyond a *community of learning*. The trust literature describes a strong link between trust and emotion, as attachment forms over time between individuals, with the emergence of reciprocal feelings of care (Rousseau *et al.* 1998). In addition, Vince (2001) asserts that power, emotion and

learning are inter-linked. The emotional feeling of disappointment across a relationship links to feelings of failure which can generate anger towards others, resulting in blame.

In this study, individuals in *communities of learning* across all three study regions sought to avoid blame through temporal discrepancies in technical drawings. Trying to ensure all individuals working on a development had an up-to-date interpretation of requirements was a never-ending task, and inevitably, it did not happen. Similarly, Bechky (2003) found that engineers made mistakes by using out-of-date technical drawings; these were then used to excuse their behaviour and deflect blame. The findings from this case show that when *community of learning* members make mistakes on site, they tried to hide problems, only for them to become worse over time when finally reported to Regional Superiors. It also suggests some *community of learning* members lacked the confidence to confess to Regional Superiors that outcomes from actions they took were not what they expected, and now required substantial remedial action. While hiding errors in this manner may avoid negative repercussions at the *community of learning* level with regard to operational performances, other *communities of learning* missed valuable learning opportunities. Learning involves an element of trial and error, and if the latter is absent, then the learning sub-process of *experimenting* (Zietsma *et al.* 2002) is severely constrained.

Blame is a topic common to construction and housebuilding literature. Love and Smith (2016) discuss how organisations aspire to operate in ‘no blame’ environments. However, for this to occur and lead to learning, organisations need to actively manage errors. They argue this requires “a style of leadership that engages transparent decision making and is open to learning from experiences that emerge from practice” (Love and Smith 2016, p.8). This suggests that individuals in positions of power need to encourage individuals to admit mistakes while *experimenting*, so that multiple individuals across the organisation can proactively address and simultaneously learn from team-level *experimenting*. Individuals behaving in this way encourage positive emotions in subordinates, improving communication between the levels, and building trust and feelings of psychological safety (Vince 2001; Edmondson 2002; Liu *et al.* 2017).

Examining the temporal aspect of blame suggests that individuals experience negative emotions when actions are not timely; the moment passes, mistakes are unavoidable and not easily rectifiable. Real-time communication between a *community of learning* and Regional Superiors builds trust and supports the feed-forward learning sub-processes of *experimenting*. In this study, introducing the new digital technology through the tablet in Region 2, changed the temporal dynamic of feed-forward learning sub-processes. Rather than waiting until the end of the week, *community of learning* members communicated on-site progress as it occurred, in real time, to Regional Superiors. Regional Superiors were able to identify potential problems early and offer support, before an action became a mistake that a *community of learning* members had to relay hesitantly later. This built trust and confidence between *community of learning* members and Regional Superiors, which had a positive impact on multi-level learning across Region 2. Therefore, Regional Executives were aware of *community of learning experimenting* and able to help manage errors as and when they inevitably happened.

In Region 3 it was possible to see how *communities of learning* relationships built over extended periods of time and became family-like in their traits, with individuals conducting most conversations informally while completing work tasks. In contrast to relationships within family-based organisations, where interactions span long periods of time creating mutual trust between members (Lionzo and Rossignoli 2013), high staff turnover creates a series of short relationships with little trust. In Region 2, conversations within *communities of learning* were more formal; relationships had not existed long enough for individuals to be collective and informal. Van der Werff and Buckley (2017) posit that trust develops between individuals at a non-linear rate, meaning trust builds quickly in the first month of a relationship, and stabilises after that. However, individuals limit the disclosure of personal information to others when they have little experience of working together. This suggests that informality through long working relationships promotes a higher degree of openness between individuals in a *community of learning* (as seen in Region 3), and conversely short-lived working relationships limited the degree of openness resulting in formality (as seen in Region 2).

The high degree of inter-personal trust across individual relationships in Region 3 resulted in *communities of learning* not formally recording learning, as

members simply knew what to do next, or prompted each other verbally. Therefore, there was little learning captured explicitly to communicate to the organisational level, if individuals chose to do so. Also, as trust existed across social relationships, if those relationships did not exist, it was not possible for inter-personal trust to develop either. This is relevant for the development of horizontal networks between *communities of learning* across the organisation. Until individuals in each region meet, it is unlikely trust will exist between *communities of learning* across regional offices.

When examining the inter-organisational relationships within *communities of learning* over time, this study shows that the Housebuilder organisation chose to work with the same Consultant organisations over time. At the organisational level, a framework panel for Consultant organisations was established to build close relationships with a few trusted external organisations. As a result, stronger inter-organisational relationship ties were created through mutual and reciprocal trust (Serva *et al.* 2005). Each Consultant organisation and their staff developed a better understanding of the Housebuilder organisation's expectations. This may be due to individuals repeatedly working with each other, communicating frequently, and as a result learning more about each other over time. Borgatti and Cross (2003) assert that as individuals become more familiar with each other, they develop stronger relationship bonds. Therefore, the passage of time gave individuals in each organisation the opportunity to demonstrate their ability to meet the other individuals' expectations, in tandem with both individuals' benevolence being established and integrity examined (Mayer *et al.* 1995).

9.5.2 Trust between inter-regional communities of learning

Beyond the *community of learning*, fewer face-to-face informal conversations took place, professional disciplines diverged further, and communication became more formal. As geographic proximity increased between individuals at each hierarchical level, and as backgrounds and skill sets become more diverse, the level of trust decreased. This trust reduction had the greatest impact on the feed-forward learning sub-process, specifically between *communities of learning* and between a single *community of learning* and the organisational level. Physical distance was less relevant in Regions 1 and 2, as the regional offices were located in the same building as the Quality Team and Head Office respectively. Thus,

individuals across levels could achieve face-to-face contact between themselves easily. In contrast, Region 3's office was geographically remote from Head Office; communication between individuals was sporadic, more indirect and with less continuity than in the other two study regions. This suggests that relationship tie strength and associated levels of trust were weaker and lower respectively than in the other two study regions, as mutual trust between individuals creates strong relationship ties (Levin and Cross 2004; Rashman *et al.* 2009). Therefore, trust influences the success of learning feed-forward (Crossan *et al.* 1999) between *communities of learning* and the organisational level.

As each region comprised many *communities of learning*, and as competition only existed between regions, trust was higher within a single region's *communities of learning*. Through this lack of horizontal connections between *communities of learning*, regional offices maintained a beneficial competitive advantage over each other in terms of performance. Bendig *et al.* (2018) assert that a degree of competition between groups within organisations has positive learning effects but that inter-group cooperation is necessary to prevent extreme competition occurring between groups. Also, Tjosvold *et al.* (2004) state that an absence of cooperation between groups hinders individuals within the groups learning from their mistakes. This is relevant in a housebuilding context as competition between regions disincentivises *communities of learning* from establishing whether their peers have already solved a problem. Therefore, trust forms the connection between *communities of learning* across regional offices in a way that dictates whether *institutionalising* is ordered or chaotic. Without communication, trust is unlikely to occur. If *communities of learning* fail to share their collective interpretations of the *quality management routine*, learning remains fragmented and chaotic, rather than becoming more uniform and ordered over time.

9.5.3 Trust between communities of learning and the organisational level

Moving on to discuss *community of learning* relationships between Housebuilder and external organisation individuals, and subsequently the organisational level, trust was an essential part of inter-organisational relationships. An external organisation's ability to demonstrate competence is an antecedent to trust and a factor of perceived trustworthiness, alongside benevolence and integrity (Mayer *et al.* 1995). The findings suggest that individual-level relationships and

associated trust were central to the operational practices around *quality management routine institutionalising*. This is reflected in the trust literature; Ashnai *et al.* (2016) state that inter-personal trust exists at the individual level and is defined as, “the extent to which the employee/employees of the [first organisation] perceive the employee/employees of the [second organisation] to be honest and benevolent” (Adapted from Ashnai *et al.* 2016, p.130). Inter-personal trust between individuals involves emotion, such as faith between parties, which if undermined, can lead to feelings of betrayal (Zaheer *et al.* 1998).

Inter-personal trust was a complex phenomenon in this study, as many individuals within the Housebuilder organisation were *boundary spanners*. Relationships were based around *communities of practice* within a *community of learning*. The most influential inter-organisational relationships were those between Build Team individuals as they supervised individuals from lower levels of a Trade organisation. Limba *et al.* (2019) argue that as top-down initiatives such as the one in this thesis are often resisted, a cycle of feed-forward learning needs to occur before genuine *institutionalising*, as opposed to *quasi-institutionalising*. This suggests that individuals at lower levels need several top-to-bottom learning cycles to occur over time, before a new routine can be enacted effectively. Therefore, feed-forward of learning between each *community of learning* and the organisational level is essential to successful *institutionalising*. However, differences in levels of trust within a *community of learning* compared to the *community* and the organisational-level threatened the success of the *institutionalising* process.

While Build Team individuals may have informally asked for a Trade individual's operational knowledge, and asked for their opinion on a construction detail (*intertwining*), they formally had to ensure the Consultant's technical drawings and *quality management routine* were followed (*institutionalising*). However, part of the *institutionalising* process involved Build Team individuals having to change a Trade individual's beliefs and behaviour through communication. To do this, the individual initiating *institutionalising*, needed additional leverage to make the receiving individual comply with the *quality management routine*, and “do as they were told”. Jones and Macpherson (2006) describe this as *coercive learning*, where top-down learning is forced on unwilling recipients. Therefore, Build Team individuals may or may not have instructed Trade organisation individuals to

construct a detail in a new way, using conceptual or operational knowledge, contrary to the Trade individual's own opinion. How the Trade individual constructed the detail was determined by the level of inter-personal trust between Build Team and Trade individuals (or *boundary spanners*) within a *community of learning*, compared to the level of trust between the *community of learning* and organisational level individuals. *Institutionalising* also depended on whether *community of learning* individuals were positively incentivised to learn the *quality management routine*. Therefore, individual-level attitudes as to whether they chose to act in accordance with the routine or not, were determined by the degree of trust between a *community of learning* and the organisational level, as opposed to the degree of trust between members within that community. As Build Teams encountered complications on site, they would collectively discuss options with trusted Trade individuals, to solve the problem. Therefore trust between specific individuals on site influenced *interpreting* and *reinterpreting* learning sub-processes, while individuals collectively engaged in sense-making and sense-giving activities (March and Olsen 1975; Brix 2017). Therefore, for the *quality management routine* to be learnt, trust between a *community of learning* and the Quality Team needed to be stronger than trust within a *community of learning*.

Interestingly, there appeared to be very little trust between individuals in different external organisations. For example, Consultant individuals developed high levels of inter-personal trust with individuals in Technical Teams, not other individuals within those Consultant organisations. This could be due to each external organisation perceiving little benefit in investing in a relationship with the other, deciding to withhold trust as the other organisation's trustworthiness was not yet known, or to negative consequences from previous past experiences (MacDuffie 2011).

In summary, the uniformity of *quality management routine* learning across the organisation depends on high levels of trust between inter-regional *communities of learning* and between *communities of learning* and the organisational level. Through trust and associated communications networks developing between each region's *communities of learning*, learning becomes ordered and uniform. Without this trust, learning remains fragmented and chaotic in multiple single *communities of learning*. As *institutionalising* relies on the relationships between multiple individuals

from the organisational down through to external organisational levels, high levels of trust within the organisation's vertical hierarchy are essential.

9.6 Chapter summary

In this chapter, the main theoretical findings relating to the aggregate dimension of communication, time and trust were explored. The first aggregate dimension of communication introduced the concept of *institutionalising* occurring within *communities of learning*, with the aid of *boundary objects*. In this study, *communities of practice* were found to comprise teams from a single discipline and the external organisations the teams worked with, as their interests and disciplines were similar. However, multiple *communities of practice* made up a Project Team, and as a result Project Teams became the product of many disciplines, hierarchies, geographic locations and organisations. This diverse group of individuals all brought together at a specific point in time for a singular purpose was argued as making *communities of learning* distinctive from *communities of practice*. As learning within the Housebuilder organisation was found to be chaotic, as opposed to ordered, the Housebuilder was likened to an *adhocracy* in terms of learning.

For the second aggregate dimension of time, learning cycles within each *community of learning* were described as messy spirals, following an undeterminable path for an unknown duration. Conflicts between clock and other types of time were identified as leading to individuals *improvising*, which halted the *institutionalising* process and negatively affected *experimenting*. Also, as individuals were unable to look back and reflect on their actions, learning strategies in each *community of learning* centred around the present and the future.

The last aggregate dimension of trust, relationship ties, were found to be strongest between intra-regional *community of learning* members from similar disciplines working in the same geographic location. This creates informality within each *community*, and hinders the feed-forward of learning as less is formally recorded. Within each region, addressing mistakes in real time builds trust between *communities* and Regional Superiors. However, as trust is weakest between inter-regional *communities* and between each region's *communities* and the organisational level, the uniformity of learning across the Housebuilder organisation is negatively influenced. Without trust, *communities of learning* keep *quality management routine* learning to themselves.

CHAPTER 10. CONCLUSION

10.1 Introduction

The aim of this study is to enhance understanding of multi-level learning and build quality standards in a UK housebuilder environment. Chapter 1 identified a need for UK housebuilders to learn new quality management practices and thus maintain build quality in newly built homes, while building at an increased rate to meet demand.

Chapter 2 explored the extant organisational learning literature and surmised that learning was a multi-level enterprise with learning passing between individual, group, organisational and inter-organisational levels. Crossan *et al.*'s (1999) 4I framework and subsequent scholarly adaptations differentiated between bottom-up and top-down learning through feed-forward and feedback learning sub-processes respectively. The need for organisation-wide learning of new quality management practices suggested top-down learning through feedback sub-processes to all individuals across a UK Housebuilder organisation. Therefore, the study focused on the learning sub-process of *institutionalising* (using Crossan *et al.*'s (1999) terminology). The chapter also reviewed influential multi-level constructs identified in the extant literature: power, communication, time, trust and emotion.

Chapter 3 investigated how poor build quality through rapid construction increased the number of defects or imperfections in new homes. Therefore, negatively affecting home environmental performance and lowering homeowner satisfaction levels. Housebuilding scholars argued that the organisation-wide *institutionalising* of quality management processes reduced the number of defects in new homes. However, the context in which individuals within the housebuilding industry learnt was influenced differently by the multi-level constructs (identified in Chapter 2) than other sectors. Specifically, multi-level learning sub-processes in this study could be affected by: the concentration of time into projects; housebuilders operating in regional offices; an over-reliance on inter-organisational trust; end-product expense and time lag between housebuilder investment and return; and an industry intolerance of mistakes, defects and associated rectification costs.

Chapter 4 set out the methodological basis for this study's approach. The research question that guided this study was, *how does learning occur at multiple levels when an organisation institutionalises new quality management standards?* With

a focus on understanding: firstly, the *conditions under which multi-level learning occurs*; secondly, *how the multi-level learning sub-processes unfold under these conditions*; and lastly, *how, when and why these conditions are influential to learning*. As emphasis was on the multi-level learning processes over time, as opposed to multi-level learning outcomes, in a specific context that directly influenced the learning sub-processes, a case study approach was adopted.

The case organisation (Housebuilder) was purposely selected. A practice view of organisational routines was used to inform the means of inquiry. The Housebuilder organisation's *quality management routine* was identified at the start of the study. Methods included and combined participant observation, semi-structured interviews and document analysis. Three individuals from three housebuilder disciplines (teams) in three regional offices were chosen to participate in the study based on their day-to-day involvement with the *quality management routine*. In addition, three individuals from the Housebuilder organisation's Head Office were interviewed. However, the sampling strategy changed with participants numbers nearly tripling during the study to gain a broader insight into the phenomenon. An inductive approach to data analysis was proposed using the Gioia *et al.* (2013) methodology. This later changed to also include an abductive approach, where a learning model was developed to assist the analytic process and 'visualise' the learning sub-processes. This made it possible to identify the aggregate dimensions (Gioia *et al.* 2013) in action.

Chapter 5 outlined the complex contextual background of the Housebuilder organisation. The hierarchical make-up and distribution of staff in the Head Office and three regional offices were shown. Team disciplines were described, along with the housebuilding process, from inception, design and construction. Finally, the housebuilder's *quality management routine* was explained.

Chapters 6, 7 and 8 set out the study's findings. In Chapters 6, the study's first aggregate dimension, **communication**, was explored. Here it was found that, firstly, *institutionalising* the *quality management routine* through feedback was challenging, as compared to other goals simultaneously communicated to an individual, quality was perceived as less of a priority than plot production. However, creating a direct link between the organisational- and individual-levels supported the feed-forward of learning. Secondly, the *institutionalising* process resulted in the

organisational level communicating the *quality management routine* into many isolated silos at lower hierarchical levels, each with its own unique interpretation of the Housebuilder organisation's quality standards. Lastly, that it took individuals at lower hierarchical level time to learn the quality management routine before they were able to effectively continue the *institutionalising* process beyond the Housebuilder organisation to individuals in External organisations carrying out the work.

Chapter 7 investigated the study's second aggregate dimension of **time**. Here, it was found that, firstly, there was a dichotomy between the Housebuilder organisation's short-term financial reporting cycles and longer-term learning cycles meaning individuals had no time to learn the quality management routine. Secondly, the timing of *institutionalising* was crucial to learning at lower hierarchical levels, and that learning speed differed depending on whether the organisational level instigated *institutionalising* through episodic or systemic power. Lastly, no learning sub-processes linked Housebuilder, Consultant and Trade individuals from one housing project to the next. Instead, project-to-project learning occurred informally in silos at lower hierarchical levels.

Chapter 8 described the study's findings around the aggregate dimensions of **trust**. This chapter found that firstly, strong relationship ties and a high degree of trust existed at the team level, and weakened as the hierarchical levels ascended. Secondly, that feed-forward was less likely to occur between lower and higher hierarchical levels where the Housebuilder organisation's blame culture meant trust between hierarchical levels was low. Thirdly, how strategic and operational relationships existed at organisational and individual levels respectively, each developing a different kind of trust between Housebuilder and external organisation individuals. Lastly, that trust built between individuals over time, changing the formality of inter-personal relationships, particularly when individuals shared the same discipline and worked in the same location. However, feed-forward became less likely, as informality between individuals increased over time, resulting in implicit, rather than explicit, communication between inter-organisational individuals.

Chapter 9 drew on these findings to develop a number of theoretical contributions to the literature as set out in Chapters 2 and 3. These contributions are positioned against the research question and objectives from Chapter 4, with the aim of answering the research question in this chapter. The first aggregate dimension of

communication introduced the concept of *institutionalising* occurring within *communities of learning*, with the aid of *boundary objects*. For the second aggregate dimension of **time**, learning cycles within each community of learning were described as messy spirals, following an undeterminable path for an unknown duration. The interplay of different types of time was found to negatively affect these spirals. For the last aggregate dimension of **trust**, relationship ties, were found to be strongest between intra-regional *community of learning* members from similar disciplines working in the same geographic location. Hence, without trust, *communities of learning* were found to keep *quality management routine* learning to themselves.

Therefore, this chapter summarises the outcomes of this study and identifies the study's contribution to theory. The chapter then goes into more detail to answer the research question and satisfying the study's three objectives. This is followed by practical implications for UK housebuilders. This includes individuals working in external organisations for housebuilders, individuals working in the wider construction sector and policy makers. Lastly, the chapter considers the study's limitations and opportunities for further research.

10.2 Key research findings and theoretical contributions

This study contributes to theoretical understanding by positing that *institutionalising* initiates many separate and chaotic multi-level learning cycles. Consequently, in bureaucratic and rigidly hierarchical organisations, learning through *institutionalising* occurs in many silos, which may or may not be interconnected, reflecting elements of an *adhocracy* as opposed to a bureaucracy (Mintzberg and McHugh 1985; Waterman 1990). Here the term *communities of learning* is introduced to describe these multiple silos. The degree to which these *communities of learning* are connected is shaped by *communication, time and trust*. This contrasts with existing approaches to multi-level learning literature which describe *institutionalising* as a single recursive sequence of feed-forward and feedback learning sub-processes that eventually trickle down from the organisational to the individual level over time (Crossan *et al.* 1999; Zietsma *et al.* 2002; Lawrence *et al.* 2005; Jones and Macpherson 2006; Schilling and Kluge 2009; Lionzo and Rossignoli 2013; Akinci and Sadler-Smith 2018; Zeimers *et al.* 2019). In summary, *institutionalising* under these conditions was fragmented, unpredictable, chaotically complex and, in some instances, not necessarily successful.

10.2.1 Communication

When *institutionalising* is initiated at the organisational level, it triggers a chain reaction of separate learning cycles at lower hierarchical levels. Figure 50 illustrates how these learning cycles connect multiple levels over time forming a messy spiral of sequential learning sub-processes, as individuals come together with different isolated groups, or communities, to learn. These *communities of learning* comprise individuals from a range of disciplines, locations and organisations, crossing hierarchical, disciplinary, geographic and organisational boundaries. This divergent set of interests makes them distinctive from *communities of practice*.

With this creation of many sub-process spirals of learning, levels of analysis become blurred as individuals assume positions of importance within local spheres, as opposed to wider formal organisational roles. This unfolding process shares features of an adhocracy, as reflected in the criteria set out by Mintzberg (1979) and Mintzberg and McHugh (1985). Such forms operate in 1) a dynamic environment where things change and unforeseen problems have to be overcome, 2) produce bespoke products, 3) use specialised teams working collaboratively but temporarily on projects, 4) decentralise the supervision of activities, rather than a blanket application of standardised rules, and 5) are selective with regards supervision and decision-making, as those closest to an unforeseen issue address the problem. Therefore, despite the housebuilder's rigid hierarchy, culturally, the organisation encourages individuals to think creatively, actively experiment and take risks to cope with the ever changing housebuilding environment (Palos and Veres Stancovici 2016). However, in contrast to Zietsma *et al.*'s (2002) findings, *experimenting* and associated *improvising* in this study often took place with and without permission at the regional level, as learning sub-processes alternate between team, individual and inter-organisational levels where possible.

The *institutionalising* process either continues through one *community of learning* communicating with another at a specific point in time, or when the community disbands at the end of a project. In the latter case, each member takes their accrued learning with them to a new project, forming another unique *community of learning*. This suggests that strong and enthusiastic communication down the organisation's hierarchy is important for the initial *institutionalising* process

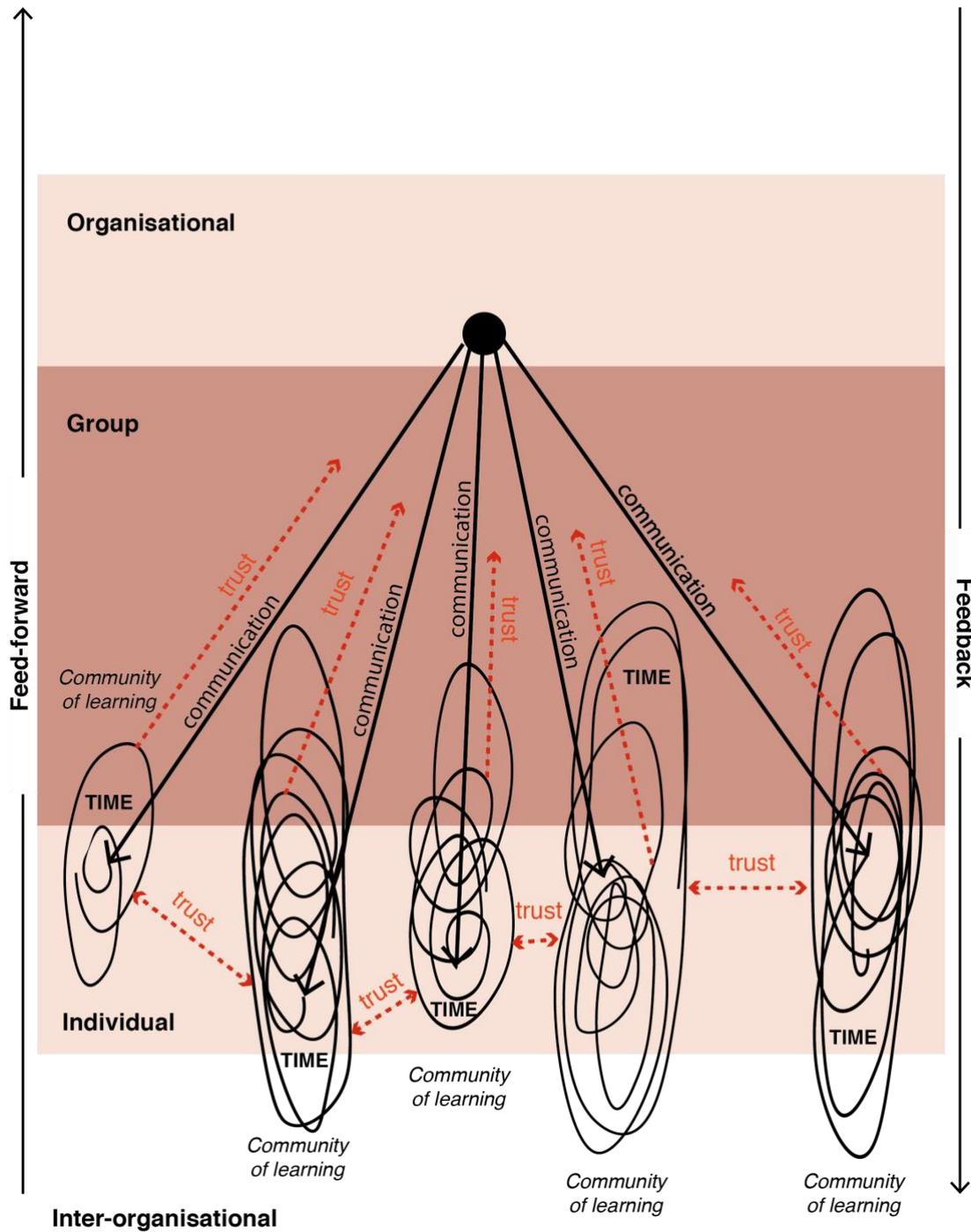


Figure 50: Thesis contribution

Institutionalising at the organisational level triggers multiple chaotic multi-level learning cycles within communities of learning. Multi-level communication takes time. With communication, trust develops, improving subsequent feed-forward, thus facilitating uniform institutionalising.

to infuse and energise learning cycles at lower hierarchical levels to learn the routine (which could be described as routine-related learning).

10.2.2 Time

Time determines how individuals at lower levels collectively interpret routine-related learning following the initial *institutionalising* process. Each learning cycle stretches out over an indeterminate amount of time in a chaotic and messy spiral of local learning until a consensus is reached, and interpretation is common to all local learning community members. Therefore, the process unfolds at the rate necessary for learning to occur given other goals within the community of learning. This means learning within each community, moves at its own speed, the sequence of learning sub-processes between levels being unique to each community.

Berends and Lammers (2010) highlight how the literature views learning as timeless, with few precursors encouraging multi-level learning to occur. They argue that learning does not occur once a series of sequential steps are complete, as the literature suggests. Instead, they assert that learning faces more interruption, bypasses and bridges than the literature implies. Their metaphor, that learning follows a path like a “delta” in a river is effective. However, in comparison, the findings here suggest a more chaotic and noisier process than water moving through a delta.

Berends and Lammers (2010) show how learning cycles do not sit comfortably with organisational timescales. Forcing a learning-cycle tempo increase to fit with an organisation’s ‘clock time’ (Ancona *et al.* 2001) proved detrimental in their case, and a similar argument could be made here. In this study, the conflict between ‘clock time’ and other types of time is exacerbated. The housebuilding process follows predictable stages but each one is of unknown duration, or ‘life cycle time’ (Ancona *et al.* 2001), also being prey to the environmental changes associated with the seasons, or ‘cyclical time’ (Ancona *et al.* 2001) (which affects when some activities can be done), ‘predictable event time’ (Ancona *et al.* 2001) (such as religious or school holidays that influence the behaviour of large numbers of individuals), and lastly ‘unpredictable event time’ (Ancona *et al.* 2001) (such as the discovery of an ancient roman burial ground under a site). Therefore, the slavish use of clock time in housebuilding means that it is difficult for individuals within the Housebuilder organisation to accurately predict how long events will realistically take to complete. The whole housebuilding process is susceptible to unpredictable clock time because many other types of time are also playing out at once. This also applies to

housebuilding learning cycles; as events unfold, individuals do not know how long it will take for a community-level consensus to emerge, suggesting shared sensemaking and routine-related learning.

However, when individuals have insufficient time to learn, two things happen; firstly, the *interpreting to reinterpreting* process speeds up, and secondly, learning sub-process spirals are cut short. This means individuals only have time for collective *interpreting* and *re-interpreting* at the lower hierarchical levels, without checking back with higher organisational levels. This results in *communities of learning* using incorrect interpretations as the basis for subsequent *institutionalising*, and in individuals lacking the conviction when convincing other individuals, potentially with a higher level of expertise than their own, to change their behaviour as the routine dictates.

Therefore, each learning cycle has its own speed, pathway and length that does not necessarily align with clock time, but comes from the combination of multiple types of time, all simultaneously impacting on the learning process. For *institutionalising* to be successful, each local cycle of multi-level learning needs enough time to run its course, which is difficult to predict in advance.

10.2.3 Trust

Each *community of learning* may occur independent of others. One determining factor behind being structurally connected and interdependent is trust. Also, trust between communities of learning not only determines how ordered the *institutionalising* process is at lower hierarchical levels, and thus, successful, but also whether learning is fed forward to the organisational level to refine the original routine, prior to its re-institutionalisation. Limba *et al.* (2019) argues that as top-down initiatives are often resisted, a cycle of feed-forward learning needs to occur before genuine *institutionalising*, as opposed to *quasi-institutionalising* can take place. Thus, suggesting individuals at lower levels need several top-to-bottom learning cycles to occur over time before a new routine can be enacted effectively.

As part of the *institutionalising* process, individuals have to change one another's individual beliefs and behaviour through communication. However, the individual initiating *institutionalising* needs additional leverage to make the receiving individual comply with the routine, and "do as they are told". Jones and Macpherson (2006) describe this as *coercive* learning, where top-down learning is forced on

unwilling recipients. If individuals at the lower levels are not positively incentivised to learn the routine, collectively within their community of learning, they then choose whether to act in accordance with the routine or other not. Therefore, individual-level attitudes towards the routine are determined by the degree of trust between a particular community of learning and the organisational level, as opposed to the degree of trust between members within that community.

The degree to which learning occurs across separate *communities of learning* is determined by levels of trust. This horizontal aspect of routine-related learning can create a uniform understanding of the routine. However, if these structural feed-forward and horizontal connections are not in place across an organisation, it can negatively affect the uniformity of *institutionalising*, in addition to severely hindering the feed-forward of routine-related learning back to the organisational level.

10.3 Answering the research question

Table 23 below outlines the study's research question and three objectives. In the previous chapter, the conditions of communication, time and trust were identified as influential to multi-level learning; thus, satisfying Objective 1. By collectively examining these conditions further, it is possible to explore how the associated multi-level learning sub-processes unfold, and why. Thus, satisfying Objectives 2 and 3 respectively.

Table 23: Research questions and study objectives

Research Question:	<i>How does learning occur at multiple levels when an organisation institutionalises new quality management standards?</i>
<i>Applying this question to new home build quality, the study objectives are:</i>	
Objective 1	<i>Identify the conditions under which multi-level learning occurs</i>
Objective 2	<i>Explore how the multi-level learning sub-processes unfold under these conditions</i>
Objective 3	<i>Explain how, when and why these conditions are influential to learning</i>

Therefore, in this section, Objectives 2 and 3 are addressed in turn to answer the research question.

10.3.1 Objective 2: How multi-level learning sub-processes unfold

Chapter 2 sets out an overview of how multi-level learning sub-processes convey learning up and down an organisation in relation to Crossan *et al.*'s 4I framework and subsequent adaptations by other scholars. In a number of these studies, the focus is only on the feed-forward and subsequent feedback of learning across an organisation. Conversely, as explained in Chapter 9, this study focuses on the feedback (through *institutionalising*) and subsequent feed-forward and feed-across of learning within an organisation, as well as with multiple external organisations associated with the Housebuilder organisation.

One of this study's key findings is that the movement sequence of learning sub-processes, initiated through feedback, is chaotic and fragmented; a different pattern compared to the recursive sequence of learning sub-processes suggested for the 4I framework. A prominent distinction is that feed-forward in this study relates to an individual conveying *problems* with implementing the *quality management routine*, rather than an individual's innovative *ideas* which may be formalised at the organisational level. The next part of this sub-section explores how the learning sub-processes across the Housebuilder organisation were found to work; thus, describing the learning sub-processes in action and how they unfold under the conditions outlined in Chapters 6, 7 and 8, satisfying study Objective 2.

Learning a new routine through *feedback* starts with the learning sub-process of *institutionalising* (Crossan *et al.* 1999; Zietsma *et al.* 2002; Lawrence *et al.* 2005; Jones and Macpherson 2006; Lionzo and Rossignoli 2013; Zeimers *et al.* 2019) between the organisational and individual levels. However, *institutionalising* needs to occur many times with individuals in multiple silos, or *communities of learning*, across the Housebuilder organisation. Simultaneously, each community member receives additional competing messages conveying organisational, regional and team level goals, on top of their own individual goals. Therefore, for learning to be fed forward, either to an adjacent level, or back to the organisational level, recipient individuals need to be in some ready state of *attending* (Zietsma *et al.* 2002) and *inquiring* (Akinci and Sadler-Smith 2018). If they are already attending and inquiring, the energy and impetus associated with the *institutionalising* process triggers individuals to discuss the new routine-related learning with community members, through the reciprocal learning sub-processes of *interpreting* and *re-interpreting*

(Akinci and Sadler-Smith 2018). Therefore, effectively forming a new learning ‘spiral’ over time (or re-invigorating an existing one) until members reach a mutual understanding.

If, through this process, a *community* member fails to understand what the new routine means, the learning spiral extends to encompass learning sub-processes between the individual and organisational levels using *interpreting* and *institutionalising* over time as a reciprocal pair of learning sub-processes. However, they may choose not to clarify their interpretation at the organisational level, either through a lack of confidence or trust in the direct individual-organisational level relationship, or a lack of time to extend the learning spiral. This leads to a siloed interpretation forming that influences the uniformity of learning across the whole organisation. The time a *community* member takes to understand the routine as part of a *community of learning* is crucial, as the *interpreting* and *re-interpreting* process (Akinci and Sadler-Smith 2018) requires an indeterminate amount of time before understanding becomes truly shared. However, the process can be accelerated using *boundary objects* (Benn *et al.* 2013), such as photographs or physical objects.

With their new understanding, the Housebuilder *community* member may choose to enact and enforce the routine; although this depends on whether they are pursuing short-term financial goals or longer-term learning goals. If they enact the routine, they act as a *boundary spanner* (Zeimers *et al.* 2019) and *institutionalising* occurs between them and individuals from external organisations within the *community of learning*. This inter-organisational *institutionalising* process is supported through the social-political process of *domination* (Lawrence *et al.* 2005) for the Housebuilder *community* member to maintain a supervisory role over individuals in external organisations. The individual in the external organisation may ask questions through *interpreting* back to the original Housebuilder *community* member through a reciprocal process to aid their understanding before choosing to enact the routine. Again, the time the recipient external organisation *community* member takes to understand the routine is important, and likewise the duration of the process is unpredictable.

Similar to the intra-organisational *interpreting* process described above, the inter-organisational *institutionalising* process can be sped up using *boundary objects* (Benn *et al.* 2013) such as photographs and physical objects. Therefore, the aim of the

institutionalising process in this study is for individuals within the Housebuilder organisation to learn the *quality management routine* and ensure individuals within external organisations learn and enact it. This all occurs within a single *community of learning*.

Examining subsequent feed-forward learning sub-processes within the same *community*, the process starts again at the individual level within the Housebuilder organisation. A *community* member discusses an aspect of the routine that they cannot enact with one or more individual *community* members through *interpreting* and *re-interpreting* (Akinci and Sadler-Smith 2018) over time. This reciprocal process takes an unknown amount of time to complete. Depending on who they know and trust in their *community* and wider organisations, and are confident enough to communicate with, the *community* member may discuss the problem directly with an individual at the organisational level (i.e. a *community* ‘outsider’) by *interpreting* their problem. Feed-forward accrued at the organisational level in this way can lead to periodic *routine refining* at the organisational level, for *re-institutionalising* later, as part of a *quasi-institutionalising* (Limba *et al.* 2019) process. This direct approach between *communities of learning* and the organisational level results in multi-level learning happening at a faster rate. However, members require more confidence to pursue this approach, and need to trust the individual at the organisational level, as they are an outsider to the *community*. It may also result in power conflicts between organisational and regional levels, as different goals may be pursued at those levels.

An alternative approach is for a *community* member to use the organisation’s vertical communication hierarchy, where the multi-level learning process is slower and less reliable. As there is no cross-team network between each region’s *communities of learning* to discuss the problem, it may be communicated through *interpreting* with Regional Superiors, who sit at the periphery of several *communities* within one region. These individuals have a strategic, rather than operational, understanding of the routine’s enactment across each of the region’s *communities of learning*. Therefore, in a similar way to *communities of practice*, they are unable to fully participate in these routine-related *communities* (Lave and Wenger 1991). Communicating in this way may facilitate the feed-forward of learning between regional *communities of learning* or alternatively convey the problem up to the

organisational level. If successful, this may lead to periodic *routine refining* at the organisational level (as before).

The routine refinement process could involve *intertwining* (Jones and Macpherson 2006) at the organisational level, separate to *community learning spirals*, as individuals at the organisational level act as *boundary spanners* (Zeimers *et al.* 2019) and share knowledge with external organisations to resolve the problem originally reported at the individual level. The feed-forward multi-level learning process finishes with *routine refining* and subsequent *re-institutionalising* to all *communities of learning*, and starting the multi-level learning process again through feedback.

In sum, the findings in this study firstly answer the research question by showing that the initial *institutionalising* process (Crossan *et al.* 1999) at the organisational level to multiple *communities of learning* across the housebuilder and associated external organisations. This triggers the learning sub-processes pairs of *interpreting* and *re-interpreting*, *interpreting* and *institutionalising* in that order, or *institutionalising* and *interpreting* in that order. Therefore, forming a learning spiral that connects different hierarchical levels over time. By completing top to bottom cycles between the organisational level and a *community of learning*, *institutionalising* supersedes *quasi-institutionalising* (Limba *et al.* 2019) over time as, at the organisational level the routine is periodically refined.

10.3.2 Objective 3: Why communication, time and trust are influential

In addition to identifying, exploring and explaining the multi-level learning sub-processes in action across the Housebuilder organisation, this study found three aggregate dimensions, representing conditions, as influential to multi-level learning across the Housebuilder organisation; *communication*, *time* and *trust*. However, these three conditions are interrelated within *communities of learning*. These are now examined in turn, satisfying study Objective 3.

Multi-level learning of the *quality management routine* was found to be most effective when learning sub-processes worked in pairs between the organisational level and individual level within a *community of learning*. However, direct communication channels were limited and depended on there being a positive working relationship between the *community* member and organisational levels. Consequently, feed-forward and feedback learning sub-processes through communication channels within the organisation were controlled by Regional

Superiors. As no horizontal networks existed across regional teams allowing *communities of learning* to communicate, learning moved up and down adjacent levels of the organisation's formal hierarchy through feed-forward and feedback learning sub-processes.

Time pressures at the regional level interrupted direct *institutionalising* between organisational and individual levels, as *community* members were incentivised to pursue performance-based goals. With year-end approaching, each *community of learning's* spiral either sped up or it was cut short. Both instances effectively resulted in members ignoring the *quality management routine*, as they had insufficient time to enact it in full and achieve multi-level performance goals. Instead, *community* members collectively started *experimenting* (Zietsma *et al.* 2002) through improvisation (Miner *et al.* 2001; Crossan *et al.* 2005); potentially *internalising* (Akinci and Sadler-Smith 2018) their successes with their Regional Superiors and learning informally as a *community* through their experiments. Within each *community of learning*, this created different coping strategies. Each *community* member remembered and adopted discipline-specific tactics in the run-up to year-end, rather than learning to enact the *quality management routine*. Thus, unsubstantiated feedback and superstitious learning (March and Olsen 1975; Levitt and March 1988) accrued in many facets of a *community*, and little, if any, formal memory at the organisational level. The pressure on members to improvise lessened after year-end. However, as there was still pressure to work towards next year's performance targets, there was no time for individuals within or beyond a *community of learning* to pause and reflect on the previous year's actions.

Also, a lack of trust between Regional Superiors and the organisational level interrupted feed-forward learning sub-processes, as restricted communication occurred between the two levels. This perpetuated a poor *learning community* culture, where *community* members viewed time spent learning from and communication with individuals beyond a region's boundaries as an impossible luxury. Therefore, learning relied on improvising (Miner *et al.* 2001; Crossan *et al.* 2005), informal *experimenting* (Zietsma *et al.* 2002) and no trust building beyond *community* members associated with each regional office's *communities of learning*.

With the Housebuilder organisation and Shareholders committed to building more new homes every year but with minimal resource increases, individuals

within *communities of learning* became fearful of making mistakes. This was because individuals on site only had one opportunity to build something correctly before it was covered over by the next sequence in the housebuilding process. There was no time to rectify any mistakes, meaning individuals became defensive. Regional Superiors trusted *community* members, particularly on site, to meet the performance and quality targets set. If *community* members were not meeting these expectations, communications up the channel between levels restricted. As *community* member defensiveness increased to avoid blame, feed-forward between a *community of learning* and Regional Superiors slowed down.

Trust within and between *communities of learning* also influenced the uniformity of routine-related learning across the organisation. As trust centred around professional and geographic homophily (McPherson *et al.* 2001), relationship ties between individuals within a *community of practice* were strongest (Levin and Cross 2004). Across a *community of learning* the ties were weaker but still stronger than relationship ties beyond the community. Consequently, when time pressures hindered *quality management routine* enactment, within a *community of learning* at the individual and inter-organisational levels, housebuilder members had a choice between either *intertwining* or *institutionalising* with individuals in external organisations. As individuals on site were remote from the organisational level, through extended hierarchical and geographic communication channels, punishment or reward for choosing to *intertwine* (Jones and Macpherson 2006) or *institutionalise* came from the regional level. Therefore, the assessment of possible negative repercussions drove an individual's actions. For example, if there was no regional level support for the *quality management routine*, trust between the regional and organisational levels was low, and there was little time was available for action, the ramifications of informal *intertwining* rather than the expected *institutionalising* within a *community of learning* were likely to be less severe, than if *quality management routine* support and regional-organisational level trust were high and the *community* was under no time pressures.

Taken together, the three aggregate dimensions of communication, time and trust interrelate to influence the direction, energy, duration, speed, timeliness, uniformity, order and ultimately the success of multi-level *institutionalising*, and

constitute this study's key findings, as outlined in the previous section, and answer Objective 3.

10.4 Practice contribution

From a practice perspective, the study's three key findings offer avenues for UK housebuilders wanting to improve both top-down and subsequent bottom-up learning across their organisation. While the findings here are only applicable to one UK volume housebuilder, there are three aspects that could benefit housebuilders experiencing similar situations to the ones described in this study.

The practice contribution outlined here focuses on the importance of firstly, how the clock time of Housebuilder organisation financial cycles continuously conflict with the natural rate at which the housebuilding process unfolds. As a result, individuals at all levels are unable to devote time towards learning, and changing their working practices. Also, without a diverse and collective assessment of actions and consequences, learning cannot occur (Elkjaer 2004). Secondly, developing a horizontal and vertical communications infrastructure across the organisation facilitates the transfer, as well as the uniformity, of learning from top to bottom levels (Schulz 2001). Lastly, building intra-organisational trust between individuals at top and bottom levels rebalances the feed-forward and feedback learning sub-processes, as knowledge flows up and down the organisation, therefore improving learning through collaboration. These are discussed in turn.

10.4.1 Making time to learn

A common problem across the housebuilding industry is the sector's focus on forecasting as opposed to assessing previous performance, which makes the sector unlike others. In this study, Stakeholders and the UK Government demanded that the Housebuilder produced more homes every year, increasing stress on the Housebuilder organisation's programme which in turn added stress to individuals at the 'coal face'. This approach needs to be challenged, as otherwise it is unlikely the build quality of new homes will improve. The UK Government's response to addressing the UK's current housing crisis is to build new homes faster (DCLG 2017) but this approach does not acknowledge it takes time for the housing industry to learn to do this, and be able to do it well.

Housebuilder, Consultant and Trade individuals currently have no time to make mistakes through their normal working practices, which subsequently leads to learning. Instead individuals have to get it right first time, and to achieve this, they rely on their tried and tested working practices, as opposed to trying out new ones. Participants spoken to during this study expressed a desire to learn; however, there were no structural mechanisms in place across the UK housing sector, or within Housebuilder organisations for them to do so, except at an individual or very local level.

In other aspects of the construction industry, the adoption of a 'Soft Landings' approach is advocated (Way and Bordass 2005; Bordass and Leaman 2014). This is where a construction projects is evaluated at multiple stages of its life cycle, from inception to post-occupation, with the aim of improving the buildings' in-use performance (BSRIA 2015). All parties involved in the construction project agree to follow a Soft Landings framework at the project's inception, and this includes a post-project review at the end. The findings from this study suggest there is scope to tie in Soft Landings principles with the systemic build quality inspections adopted by the Housebuilder organisation, as new home performance and build quality are linked. These additional inspections could evaluate and identify potential build quality issues earlier in a housing project's life cycle than the Housebuilder organisation's *quality management routine* currently does. That way, individual and collective reflection comes at the right point in the housing project's life cycle.

While the adoption of a Soft Landings framework is mandatory on all construction projects procured by the UK Government, there is no housing-specific version of Soft Landings for volume housebuilders. Developing and adhering to a mandatory Soft Landings framework in this context could support UK volume housebuilders as they learn to build faster, while moving away from the annual short-term deadlines that currently bind volume housebuilders to unrealistic clock time targets.

However, without structural change to the UK's financial reporting system for volume housebuilders, or their shareholders accepting share prices could dip in the short-term while housebuilder organisations focus on achieving longer-term learning goals, learning options for housebuilder organisation are limited. Within the Housebuilder organisation, the increasingly demanding annual clock time cycle

results in individuals at each level having less and less time to pause and reflect on their past actions and learn (Elkjaer 2004). Part of the *quality management routine* encouraged reflection (making it unique against the Housebuilder organisation's usual working practices), but the inspection itself also added to a Project Team's workload. The additional workload was necessary to improve quality standards but did not aid Project Teams with their immediate deadlines.

Construction literature advocates post-project reviews as a way for the diverse individuals involved in the housebuilding process to reflect on their collective past performance and find ways to improve performance for next time (Von Zedtwitz 2002; Ron *et al.* 2006). However, post-project reviews rarely occur in housebuilder organisations, as they are resource-intensive, centre around individuals admitting their mistakes, and are not viewed by Organisational Superiors as an essential part of the housebuilding process. Furthermore, this study's findings suggest that individuals move from one project onto another over time, leaving few people at the end of a project with the enthusiasm, or availability, for a post-project review. These reviews are also representative of a longer-term learning strategy, where organisations are willing to invest in multi-level learning.

In this Housebuilder organisation, individuals at lower hierarchical levels work at an accelerated pace towards year-end. This is the same for all volume housebuilders; however, their year-ends are spread across the calendar. Frequently, a project is programmed to finish at year-end, and individuals pause for breath once the year-end rush is over and the new financial year begins. Therefore, any short-term learning strategies need to fit in with the clock-time Housebuilder focus.

Contrary to the literature, the findings here suggest that the best point in time for individuals to reflect on their performance, from a clock-time perspective, is after year-end. However, this may or may not tie in with the end of a project, but it marks the one point in the Housebuilder's budgeting calendar where the Housebuilder organisation may grant time for staff to learn. The suggestion here is that after year-end, every project has an annual review, and includes the individuals involved with the project at that point in time. Individuals are at liberty to talk about the project as it currently is, rather than what they remember at the end of a project; thus resulting in the organisational level formally capturing individuals' experiencing, rather than reflecting, selves (Kahneman 2012) and developing an annual pattern of

project reviews, as a minimum, with the explicit purpose of learning, and building a reliable organisational-level memory. These review sessions could also be used as a way to connect Consultant individuals with Trade individuals, to join up the temporal gap between the two diverse disciplines during a project's life cycle. Also, appraising projects in this way could start to familiarise multiple organisations with the practice of reviewing projects from a learning perspective. This may encourage housebuilder organisations to invest in longer-term improvement processes such as Soft Landings. However, the annual learning reviews suggested above are guided by clock-time, and as such, are unlikely to facilitate learning in the same way Soft Landings reviews could, given the latter approach matches key points in a housing project's life cycle time. Therefore, annual learning reviews in this context are suggested as a stop-gap measure until structural change through Soft Landings aligns clock and life cycle time.

10.4.2 Building informal horizontal social networks

In this study, the Housebuilder organisation had a limited horizontal social network, resulting in a competitive rather than collaborative environment, and hindering the feed-forward of multi-level learning sub-processes horizontally between *communities of learning*. In a construction setting, Grove *et al.* (2018) acknowledge that collaboration requires informal social networks. Study participants described how they often attend training courses with colleagues from other regions but rarely spoke to them as the focus was the training rather than social network development. McPherson *et al.* (2001), posit that informal social networks are more easily formed by those with a degree of homophily. Therefore, creating an environment where individuals from the same team in each region can meet informally may help build horizontal social networks. Barlow and Jashapara (1998) describe how informal social events were used, as well as formal team building events, to develop new construction-based collaboration networks. Therefore, informal cross-regional team building events, where individuals are put into inter-regional groups, may assist this network development. This could be combined with formal cross-region team working events, giving individuals an opportunity to put their new networks into practice.

10.4.3 Building intra-organisational trust

This point contrasts with the point above as it focuses on building trust primarily between regional and organisational levels. In this study, multi-level learning was achieved at a faster rate through individuals communicating directly with individuals within *communities of learning*, bypassing the regional level. Therefore, a practical recommendation could be that for quality-related routines such as this, the organisational level should seek to ignore the regional level and communicate directly with *community of learning* members. However, this is unlikely to be conducive in the long run, as Regional Executives may challenge this approach. Therefore, in a similar way to the point above, organisational and regional level relationships need to become more collaborative and less competitive to encourage learning and build trust. Dahl (2014) suggests one way to achieve this is for Organisational and Regional Superiors to collectively reform the goals and rules used for governing their interactions; thus making goals more shared than they currently are. Also, part of this process could focus on offering some positive incentivisation for individuals when they enact the routine.

10.5 Limitations

When reflecting on this study's limitations, one was the result of time constraints. This study was originally planned as a two-wave longitudinal study, and both six-week waves of fieldwork were carried out. However, the amount of data generated through 12 weeks of participant observation was too vast to analyse in the timescale of a PhD thesis for a single individual. Therefore, the Researcher and Supervisors made the decision to analyse only the first wave of data for this thesis. Consequently, a limitation in this study is that it only reflects one six-week period, rather than the 12-week period spanning two years, as first planned. However, returning to the organisation provided an opportunity to revisit events held at the end of the first wave, and follow up one or two outcomes from actions taken during the first wave of data collection, thus adding a degree of certainty to the reported findings.

Also, a fundamental limitation is that multi-level learning is difficult to measure, especially as learning related to the *quality management routine* was interwoven with learning from other organisational routines. During the analysis period, this made it hard to separate out just *quality management routine*-related learning, as

learning associated with an individual's working practices could have an impact on how that individual enacted the *quality management routine*. To counteract this, the data was re-examined and recoded in NVivo to focus solely on the learning following the publication of a peer reviewed article and comments received from the reviewers.

For qualitative studies, it could be argued that by using different analytic strategies, emergent themes would differ, and with them, different study conclusions. To counteract this, the Researcher triangulated different data collection methods (participant observation, semi-structured interviews and document analysis), discussed results with supervisors in a peer capacity, published a peer reviewed paper on the study's findings and employed reflexivity measures (see reflective statement in Appendix 4 on page 330). In addition, Chapter 4 identifies limitations relating to researcher positionality and trustworthiness, together with limitations resulting from unpredictable conditions within the Housebuilder organisation.

In terms of the sample, the study's findings may be considered limited by some researchers as a result of the sample size and make-up. The generalisability of the study is limited as the findings relate to one organisation; however, it is argued in Section 4.4.1 that the aim of the thesis was for the Researcher to develop a deep and holistic understanding of the Housebuilder organisation necessary to theorise about that specific case. The Researcher sought reduce the impact of this limitation by exploring and comparing three cases within one case. Through this approach, the thesis provides more indepth context about the conditions in which the Housebuilder organisation operates, meaning the reader can see where similarities and nuances exist between housebuilder organisations. In this study, the Researcher ascertained that the case Housebuilder organisation shared a number of structural similarities with other large UK volume housebuilders. For example, the Housebuilder organisation is a PLC, operates across numerous regional offices, uses the skills of numerous teams to purchase land, design new homes and build them (see Section 5.2), and satisfies statutory regulations at specific points in the housebuilding process. However, the Housebuilder organisation has its own working practices and standard operating procedures, making it similar to, but unique from its competitors..

The sampling strategy also changed as the fieldwork progressed, thus deviating from the original 12 participants. However, this was the outcome of changes to circumstances at short notice, and being pragmatic, as participants were ill, or not

available in the agreed location, as their diaries changed last minute. Likewise, the Researcher took conscious steps to interview individuals in other teams to try to better understand the operational context beyond the study routine. These changes were made once out of the field in the breaks between each study region's visit.

10.6 Further research

This study highlights an important but often hidden part of housebuilder behaviour: the simultaneous but constantly changing relationships individuals, within a single organisation, have with other individuals across hundreds of organisations. There are several ways to continue exploring build quality-related multi-level learning in housebuilders.

Firstly, at the single housebuilder level, there is scope to analyse the second wave of data collected as part of this study and gain a longitudinal insight into multi-level learning across the case Housebuilder organisation.

Secondly, research is needed to extend the focus on build quality standards across complex inter-organisational relationships. The social networks that operate as part of the housebuilding process over time in large volume housebuilders warrant further investigation to better understand the way these relationships work with regard to collectively improving build quality standards. An important area of focus is around Consultant and Trade organisations together with the Housebuilder, as these are complex interactions over the duration of a project. The relationships between Consultant organisations and Trade organisations were not the main study focus here, but offer a vital insight into complex inter-organisational learning over time and space.

Thirdly, research is needed to investigate how the current structural conflict in housebuilder organisations between short-term financial goals and longer-term learning goals could be resolved. For example, are there other ways for housebuilder organisations to report to their shareholders and UK Government? Could the annual reporting period be extended further to encompass longer-term targets, rather than the housebuilder having to show an increase in both housing numbers and profit annually? And if so, what would these changes mean for build quality-related learning? As part of this, research into Soft Landings for housing is desperately needed to establish how the principles could be applied to new build volume housing.

Lastly, the scope should extend further to better understand multi-level learning in housebuilding in general. Does multi-level learning occur in the same way across all private housebuilders? Are smaller housebuilders with only one regional office prey to the same problems, when *institutionalising* new quality standards, as large UK volume housebuilders? Similarly, does multi-level learning occur the same way in Housing Associations? Hopkin *et al.*'s (2016) research explores defects and learning from an organisational learning perspective but not looking at learning from a 4I or 5I framework perspective. This could also be extended to explore housebuilding in other countries to better understand how various cultural and environmental contexts play a role in improving build quality standards through multi-level learning.

10.7 Concluding remarks

In summary, multi-level learning to improve the build quality standards of new UK homes is a complex and untidy phenomenon, which takes place in an adhoc way despite bureaucratic organisational hierarchies. The key take-aways from this study are that: firstly, the *communication* of a routine from the organisational level through *institutionalising* creates multiple, unique and disordered *communities of learning* between small groups of individuals from within and across organisations. The energy and direction for routine-related learning comes from the *institutionalising* process at the organisational level. Secondly, each *community of learning* establishes its own learning cycle, where reciprocal learning sub-processes play out over time in an undetermined spiral, and both learning cycle speed and duration are unpredictable. However, these learning spirals are severely affected by the perpetual conflict between a housebuilder's fixed short-term financial reporting cycles and elastic longer-term housing project cycles. Lastly, trust between each community of learning dictates whether the *institutionalising* process is an ordered success or a chaotic failure. High levels of trust between *communities of learning* result in successful *institutionalising*, as trust fuels inter-community communication. This in turn facilitates learning sub-processes that transfer routine-related learning uniformly across an organisation. At the same time, feed-forward learning sub-processes transfer routine-related learning between multiple communities of learning back to the organisational level. Conversely, low levels of inter-community trust

maintain silos of chaotic learning spirals, despite organisational level *institutionalising* efforts.

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APPENDICES

Appendix 1. Illustrative quotes: Chapter 6 - Communication

Aggregate Dimension: Communication		
Second-order themes	First-order concepts	Representative Quotes
Changing lines of communication	Communication of conflicting goals	<p>"Something has got to give. And generally, the one that gives is quality...And you don't want it to and you try desperately not to." Region 1: Participant A</p> <p>"The first bit is always, I'm too busy for that, do we have to do it?, 'Sorry we have to' ...Sometimes there are maybe details that are part of our policy and process that we might not necessarily agree with. For 20 years [Site Managers] have done it one way and now they're being told to do it another way and why do we have to change?" Region 1: Participant B</p> <p>"This site is supposed to be in line with the [QA Handbook] but I do lots that the [QA Handbook] has got to catch up with." Region 2: Participant G</p> <p>"I hate this thing, yeah? [Pointing to the cavity where the external door opening is] and I have said to [the Quality Team], we shouldn't have that, and they say to me, you have to have that because of cold bridging. Well, I've never read of a case of anybody dying of frostbite or cold by the front door." Region 2: Participant G</p> <p>"The Project Teams in theory have the same goals, so myself and the Site Managers, our bonuses are based on our plot production programme." Region 3: Participant Q</p> <p>"There are certain things in the QA Handbook that our Region has taken the view that are rubbish and we are not going to do them." Region 3: Participant M</p> <p>"I think they [Site Managers] probably hate [the Site-wide Quality Control Inspections] to be honest with you because all the Site Manager wants to do is build and get units complete... and all these things get stuck in his way particularly when they come down from [Head Office]. I think they [Site Managers] feel there is a bit of a, oh, what do they want? Why are they getting involved? sort of thing. But [this Site's Site Manager] for example, he was a bit hesitant first of all, Oh, another bloody thing from [Head Office] wasting our time, we just want to build houses, this is going to hold us up. Once he gets into it and looks at it, it's like, Oh, actually I see what they are trying to do here." Region 3: Participant K</p> <p>"The site was pretty expensive... our MD thought... let's get on with it. And I think it was build build build, we've got units to get out. So, I think stuff like the [Site-wide Quality Control Inspection] and the [QA Handbook] were almost put to one side." Region 3: Participant K</p> <p>"A lot of the [Trades]... have come back and asked questions [about the QA Handbook] ... stuff we have never really done before and we didn't really do on Phase 1. They are asking questions because there is a cost to it... The estimate has probably been done on basic specification and of course the [QA Handbook] sort of ups the specification slightly, or the amount of materials, and there is a price difference in that. There's always that conversation." Region 3: Participant K</p> <p>"I wouldn't say even now that senior management believe that having continuous inspection at each stage is going to deliver a quality result. There is a residual and current opinion that it's not very productive for the Site Manager. They have got so many other things to do... and would suggest that it's not considered a fundamental part of their job...the biggest challenge is senior management engagement." Head Office: Participant W</p> <p>"Everybody's got used to doing things their own way and they've got their own systems that work for them so trying to get people to work in one way is very challenging." Head Office: Participant V</p> <p>"At the end of the day, the thing you are going to get paid your bonus on is the thing that's going to drive your behaviour." Head Office: Participant U</p> <p>"A lot of the reason why things happen or don't happen is because of the inbuilt assumptions people have about the way or what things [the Housebuilder organisation] values and doesn't value." Head Office: Participant U</p>
	Communication which bypassed Regional Superiors	<p>"I used to use [this Quality Team member] as my font of all knowledge. If I had a problem that I couldn't work out or didn't know what to do with, I would see [them]. [They] would always have the time." Region 1: Participant A</p> <p>"I'm fairly laid back so I don't get wound up...[so when the Quality Team] comes round... I will just walk around with them and go, 'yep, okay, yep okay'. Whereas I know there are a lot of other Site Managers that will be in their face effing and blinding telling them to get lost but, you know, they are there to do a job... We are all there to do a job but it just feels as though it's a witch hunt sometimes rather than an exercise in quality and helping things." Region 1: Participant A</p>

		<p>"I have tried explaining things to [the Quality Team]...I have explained lots of bits to them that don't work and they don't change it, so after a while I just, I do a lot on site myself to give the person a better house. That's what I do." Region 2: Participant G</p> <p>"[During the training] ... she went, 'you will have all of this information prior to [starting on site] and...I said, 'yeah, with these drawings being [with you] prior to [starting on site], what makes [the ones you are describing] so special? Because we are supposed to have everything, but we have nothing. So why does [your] drawing take precedence above everything else?' And she went, 'you should be getting everything.' But then I said, 'can I just pull you down from your ivory tower, we get nothing, so what's to say that this is any different?'" Region 2: Participant J</p> <p>Researcher: "If you did come across something [that didn't seem to work on site], what would you do?"</p> <p>Region 2: Participant F "I would go back to [a particular individual within the Quality Team]. I know [them] well enough to ask [them]. As I know [them], I feel confident in speaking to [them]."</p> <p>Researcher: "Do you think the situation is similar for the members of your team?"</p> <p>Region 2: Participant F "Yes, they can always go back to [our Team Director], and in fact the right route is probably to go through [our Team Director] and do that."</p> <p>"I'm not a hundred percent sure what the [Site-wide Quality Control Inspection feedback] procedure is but I've got quite a good relationship with [two members of the Quality Team]. What I will probably do is a response back to [them] when I get the chance... [They] just phoned me up and asked me a few questions." Region 3: Participant K</p> <p>"The first Site-wide Quality Control Inspection that came out, everyone treated like a slugging match. People who received them took the wrong end of the stick." Region 3: Participant R</p> <p>"Changes were introduced and people given training and then that was it – that was project closed, it's done, we've done it. As opposed to actually listening to stakeholders and all the barriers they are facing...and slightly adapting or changing [processes]." Head Office: Participant V</p> <p>"When you go on training and it all feels fantastic at the time and then come away and go back to business as usual and it's really hard to convert what you've learnt into changing the way you behave." Head Office: Participant V</p> <p>"You cannot make exceptions and compromise on something on one side and not do the same somewhere else on one Region and not another. So everybody has to be on the same level plane... some people are happy with that and some people are more sensitive. Sometimes never mind how you break the bad news, it's bad news and they don't like getting bad news. But it's got to be done somehow!" Head Office: Participant T</p>
<p>Siloed inter-group communication</p>	<p>Communication through project stages</p>	<p>"Obviously, the Site Manager, it would be their responsibility to kind of enforce standards of work basically." Region 1: Participant D</p> <p>"There's been discussions in the [Regional] office about insulating cavities... we do a drilling pattern and blow [the insulation in] but you can't have that below a cavity tray, so it came up initially on this site, and we... had a look at the [QA Handbook] and they were asking them to blow insulation in below the cavity tray and the DPC, and [the Site Team] said, 'Well, they don't do that because they won't do it below scaffolding and it would need a return visit'. So we lay rigid insulation [instead]... On a new groundworks order I'm trying to place, even though the detail doesn't specify rigid insulation in the cavity, I know it's going to be needed so I'm requesting it... I've picked that up... You just pass it on, even though it's informal." Region 1: Participant D</p> <p>"I don't think [the Development Team] think they need to provide us with all the information to get going on things...Sometimes you'll get 70 or 80% or 90%." Region 2: Participant F</p> <p>"[The Consultants] do all these drawings but when you go to build it, it doesn't work. You [in the Build Team] have to make it work." Region 2: Participant H</p> <p>"In Commercial [Team], it's out of your hands because you're only as good as the information you are fed. So, if you're fed a bunch of crap information from Technical [Team] then you place a really crap order but equally Technical [Team] is only as good as the information they have been given by Development [Team]." Region 2: Participant J</p> <p>"For a proper Land [Team]- Tech [Team] handover... it doesn't in my view get treated seriously enough from the [Development] side." Region 2: Participant F</p> <p>"It's not that [the QA Handbook] is not fundamentally part of the technical discipline...it's</p>

		<p>there for a reference. It's not to be ignored, it's there as a reference." Region 2: Participant I</p> <p>"[The design process at the] Development [Team level] is like applied mathematics, you can have 2 + 2 but it can equal 5 [in reality]. Commercial, Technical, Build [Teams] – [the design process is] quite a precise science, a bit like pure mathematics, there is only one answer." Region 3: Participant R</p> <p>"We should get involved a little more at the planning stage but generally the planning permission will come through and then there is a Development [Team] to Technical [Team] handover. We hear all about it and then we get on with it." Region 3: Participant M</p> <p>"We're not that good at doing the handovers...There should be a planning one [with the Development Team]; that very rarely happens and then we should do a handover to Commercial and then we should do a handover to Build. But they very rarely happen." Region 3: Participant M</p> <p>"We've got a General Construction Specification so the Architects need to be picking up on that and yeah they will make references to the [QA Handbook]...it's more best practice for various aspects of Build [Team]... They have got one on site and I flick through it if there's an issue but it's definitely more of a Site [Team] thing than a Technical [Team] thing." Region 3: Participant M</p> <p>"We relied very heavily on [the Customer Care Final Inspection] to pick up snags...That has been immensely damaging because...it absolved the Site Manager of responsibility of quality because all they had to do was get it past the Customer Care people and that's what they did." Head Office: Participant W</p> <p>"It's sort of like a pass the parcel down through the chain...people making decisions upstream or downstream, which have a knock-on effect, which then either cause a delay in time or an increase in cost, which we only feel the pain of later on down the line." Head Office: Participant U</p> <p>"Over 80% of [staff] felt [in a recent survey] that they didn't have a good enough understanding of how other [teams] and disciplines operate, and they didn't feel that those other [teams] and disciplines understand their wants and needs as [Teams]." Head Office: Participant U</p> <p>"Looking at design versus as built argument – often it falls apart because what is drawn [by Consultants] cannot be put together on site. We don't test the detail. The test is if you can build it as per the drawing and achieve the standard in the [QA Handbook] then that's what you call a good detail. If [Trade individuals] can't, why can't they?" Head Office: Participant S</p>
	<p>Communication through hierarchical layers</p>	<p>"I don't want to take all of my problems to [my immediate Regional Superior]. He may as well do my job. So, you pick and choose where you ask him to give us a bit of help." Region 1: Participant B</p> <p>"Somebody talks to somebody and it goes on their list of things to do. Eventually it will get done." Region 1: Participant D</p> <p>"I mean there is definitely an internal learning process I would say - individually." Region 1: Participant D</p> <p>"One of the things about [this Housebuilder organisation] is that a lot of things fall on deaf ears. So, despite the fact that you know something is wrong, you equally know that if you raise it, nothing gets done about it. So, there's better things to waste your time on!" Region 2: Participant J</p> <p>"I think it's an easier job to say, 'actually I have cocked that up', rather than hide it and get caught out two months later. Again, I learned that through hard experience." Region 2: Participant F</p> <p>"What is a defect and what is not in terms of the Team, it really is understanding through experience, and there is often a lot of conversation between the [Team members]." Region 3: Participant X</p> <p>"If there has been a big cock-up on a site, anyone at [Head Office] is the last person they [Regional Superiors] will tell. They entirely keep that to themselves." Head Office: Participant U</p> <p>"Whilst [individuals] have a lot of ideas at shop floor level...they don't know where to channel that information." Head Office: Participant U</p>
	<p>Communication between competing regions</p>	<p>"We don't talk... it's very difficult when you've got the different Regions which don't generally like to talk to each other anyway." Region 1: Participant A</p> <p>"I think that the sharing is done at a much higher level. There is not a lot of sharing done at lower levels." Region 2: Participant F</p> <p>"We did have the job at [Site X], the [Region 1 Technical] Team were doing a similar situation, similar design. I did speak to them about it but then our heating strategy</p>

changed so it kind of was, not pointless, but not as crucial... we were using different [Consultants] and... we were going to get them all together in the same room to make sure we did it the same way but they chose gas heating and we chose electric heating which changed the whole detailing. So we decided to let it go." Region 2: Participant F
"You see stuff on [the Housebuilder organisation's intranet]... But that's really the frilly end of things, like the awards... or charity work... it would be interesting... to go to other sites just to see because we sort of are in a bubble on our own development." Region 3: Participant L

"[A colleague] is doing a lot of Graduate stuff with a lot of Graduates across the company...they do Graduate events where they go, it's almost like the Apprentice...then they will go on a three-month rotation in each department." Region 3: Participant N

"I couldn't even tell you [my Regional counterparts'] names, nothing, no...When you work here, this is the business. We don't see that there are other regions exactly like this. This is the business as far as we are concerned, and we only need to know the people that are in here." Region 3: Participant M

"I think previously, from the top, the message was that we accept that Regions want to do their own thing... Now the message is more, for us to be a truly successful resilient business, we have to have more consistency, share best practice and learn from each other... So that message is feeding down now... Without the tone from the top being incredibly strong, and it generally hasn't been, it's just too much effort for everybody to try and tackle." Head Office: Participant V

"If [a Region] wants to put forward a suggestion of a better process, they can't force it on any other Region... they have no way of co-ordinating with other Regions because they don't meet... they would need someone in the centre to understand the issue, co-ordinate everything, come up with an answer that everyone goes along with, and then trot along to IT, who have their own agenda who then say, 'Nah, don't fancy doing that', and then they won't. I speak from bitter experience on this... Every single Region has been hung out to dry by engaging with investigations and working at proposals... and then nothing happens... [The Regions] have all taken the view that it's not worth the effort of putting the time in because it never ends well." Head Office: Participant W

"The three [study] Regions are very different in the way they react and deal with [Site-wide Quality Control Inspections]... You have one Region that you know will react and jump and try to do something straight away. There is another Region that although sometimes there is a goodwill, under the pressures of production... the easier route is to ignore it, or they seem willing for a change on the [inspection] day for improvement, and there is the other Region... you know they do a lot... but they don't want to tell the others what they are doing... Unless you prod them a lot, they will not communicate what they have done or how they have done it." Head Office: Participant T

"[The Quality Team has] talked about [the insulation]...we [the housebuilder] are going to move to [a specific] insulation below the thresholds and below the gas membranes because probably I'd say about 75% of our houses probably haven't got [insulation there] at all, maybe more than that. That's just guessing." Head Office: Participant Y

"It's very, very heavily ingrained in the MDs...there's a point where competition is helpful to spur on performance but there's a point where the balance tips and it becomes more of a hindrance, and I think that we've tipped over. We are too competitive because that just totally stops any collaboration... [The Regions] are pitted against one another. That comes through because we have league tables." Head Office: Participant U

"In some cases it's just down to people having to take personal responsibility for [learning], [individuals] could just pick up the phone, but it's just not part of our DNA, or part of the culture." Head Office: Participant U

"Information is equally not shared because people are fearful of being judged, or sort of airing their dirty laundry." Head Office: Participant U

"60mm rigid insulation used. The detail built leaves a significant uninsulated void at the perimeter of the building. For [the apartment block], the detail must be amended to reflect the [Housebuilder organisation's] standard detail and the injected insulation below the tray can be substituted with [this named insulation product]." Organisation's Documentation (Site-wide Quality Control Inspections in Region 1)

"Cavities below DPC had not been insulated, but have been recently and will continue to be on all future plots." Organisation's Documentation (Site-wide Quality Control Inspections in Region 2)

"It was identified that full-fill mineral fibre is being installed below the threshold. Please provide confirmation that this type of material and insulation provides the designed thermal performance and that it is acceptable to use mineral fibre below ground." Organisation's Documentation (Site-wide Quality Control Inspections in Region 3)

	<p>Site communication versus office communication</p>	<p>"[At year-end] I tend to dot in [to a site], try and look at any key issues with [the Site Manager] or anything where they need support with, phone calls, chasing people and then onto the next one. When it is a little bit quieter and normal, I will normally try and spend at least half a day on the site to get some quality, because I am not getting anything by spending six hours of the day on the road between sites...I probably do about 3,500 miles in a month but that time in the car goes really quick because all of that time I am on the phone...my office is my mobile phone." Region 1: Participant B</p> <p>"We don't have anything to hide but it's like we have deadlines...like today Plot X is meant to have the granite [worktop] installed but that's not happening until next week now. The granite was not up to standard, so they won't cut it and send...or so [the Supplier] tells us. But we don't put that down, there's nothing on [the tablet form] to say, four day delay on granite installed due to substandard granite." Region 2: Participant O</p> <p>"I just tell the guys on Site that the Architect's going to draw it." Region 2: Participant G</p> <p>"I took 550 photographs [of an apartment block], I sent it all to the Build Director and he went, 'what the f--- is this?' And I went, 'somebody told me this was finished', ... That's what I found. I've given the Build and Site Manager two weeks to sort it out." Region 2: Participant H</p> <p>"You can instantly see if [Site Teams] are not doing stuff...it's [the tablet] an essential way of checking quality." Head Office: Participant V</p>
<p>Communication and interpretation</p>	<p>Developing a shared interpretation</p>	<p>"The [Trade organisation] boss knows that the pipe has to be 50 mm above worktop, but Adam who works on site doesn't know that. He then puts it at 100mm. [The Quality Team] comes in and goes, 'oh - that's not [our] standard!'" Region 1: Participant A</p> <p>"[Talking about Site Managers] - you are there to deliver units for [the Housebuilder organisation]. That is your core purpose of being there. The details and the technicalities that come along with it, 'Can you please read those 5,000 drawings and make sure it happens. But it isn't the same as the last 10 jobs you've done, it's a bespoke project, the [Building] Regulations have changed'... every job seems to be a learning curve and it's very onerous." Region 1: Participant C</p> <p>"The good thing about the [QA Handbook] is that it is very visual isn't it, so whilst you might not have English as your first language, you've got eyes!" Region 2: Participant H</p> <p>"I don't think [the Commercial Team] spend enough time talking about [the QA Handbook and maintaining quality standards] at the [meeting before new a Trade organisation starts on site]... you might say to [a Trade Superior], 'We need to have an on-site Foreman, a representative from your company who you can go and speak to'. 'Oh, yeah yeah, okay right'. Because you do this meeting with... the [Trade organisation] Directors, and they nod their heads like puppies, 'Yeah we will do that'... They're never on site. They never tell the guy on site this is what they need to be doing. So, it doesn't happen. And they will go, 'I didn't know anything about that'... It's important to set it all out from day one, take notes and getting them to sign up to it." Region 2: Participant H</p> <p>"I went into one of the sites... and the painter wasn't using the little spacers and the Site Manager didn't know about that, so I sent on the quality manual section for that to the site manager... he wasn't aware of that particular point. So he hadn't taken it to bed at night." Region 2: Participant F</p> <p>"The [Bricklayers] will come in this [Site] office and ask... 'how can I get the drawing up?' To me, that should all be done before they even start the job and they should be fully familiar with what they've got to do...they are the experts...We're not the physical builder are we?...I think you need [to communicate requirements to] the Foreman who's going to run the job because...a [Trade organisation] boss might not relay it to his Foreman...The Bricklayer should absolutely 100 percent know what he's bought into and know all of the details and relay that to his workforce before he even starts the job." Region 3: Participant L</p> <p>"The bit we are struggling with right now is to make sure that the Site Teams are aware of the requirements and when they tick [the form] and say that's 'satisfactory', that they actually understand what satisfactory means...questions from sites suggests that they are not really au fait with the requirements, albeit they have been there for years." Head Office: Participant W</p> <p>"To have a Technical Team not understanding if you keep key [QA Handbook] elements and criteria, that was a bit concerning...[now it's] not a hundred per cent but at least...they are a lot more aware of the risks of making a decision without necessarily understanding a decision for changing." Head Office: Participant T</p> <p>"Suddenly people can relate to the [QA Handbook] as it's a pictorial version of... the most key elements of our specification...and that makes it easier for them." Head Office: Participant T</p> <p>"We do more training than originally expected. I'm not sure if this is due to the reluctance to read the [QA Handbook] on the part of Site Managers. I feel we may have some Site</p>

	<p><i>Individual interpretation of formal practices</i></p>	<p><i>Managers that do not know what other trades should be doing." Head Office: Participant S</i></p> <p><i>"It can get a little bit, not heated, but people can get a little bit agitated...You can have a different [Customer Care Team Member] that will judge two things, the same thing two different ways. So how much detail they will look at it in; all will have a minimum standard, but some could look at it and go, okay that's acceptable and another one might go, no and make a comment on it." Region 1: Participant B</i></p> <p><i>"A lot of things [in the QA Handbook] are cast in stone. A lot of things are fairly prescriptive but there is still interpretation in there so it depends on the [Site] Manager, it depends on the Trade [individuals] that are there." Region 1: Participant B</i></p> <p><i>"[The QA Handbook] covers as much as [the Quality Team] can think of. It doesn't really apply too much here – it's a generic book... but every site is different." Region 1: Participant A</i></p> <p><i>"Yes it is difficult because... you don't want to wind [the Customer Care Manager] up too much because even though [that person] is still hard work we've got to have [them] onside to a certain extent, so you don't want to rock the boat too much. But ... you can't bow down to [them] all the time. Something has to give. Otherwise we are struggling all the time, aren't we?" Region 2: Participant AE</i></p> <p><i>"If [the defect rectification works require] a man for a day or a bit, you're ok [i.e. the plot passes the Customer Care Final Inspection]. If it's anything more than that, or anything major... it's a fail.... when you're doing [the Customer Care Final Inspections] regular, regular, regular, the guys on Site need to know what route you do and your system of looking...[the Assistant Site Manager] knows what route I do, when I give him a list he knows [I] go that way, and I know he does that. After a while [the Assistant Site Manager] knows what my standard is." Region 2: Participant AA</i></p> <p><i>"When you've got a lot of bespoke designs it becomes very difficult and there is a lot of stuff in the [QA Handbook], 90% of it is relevant but there is still 10% that isn't and there's rules or there isn't a way of doing things – you really have to find it out for yourself." Region 3: Participant K</i></p> <p><i>"I think, unfortunately both Sites [you saw] today, the [QA Handbook], it's, I won't say it is thrown in a corner and ignored because I'm sure that has happened on some sites but I think on these two jobs potentially, it's not as important, important is not the right word, it's not as relevant but there is stuff in it that is completely relevant." Region 3: Participant K</i></p> <p><i>"I think [the Quality Team] have been a pretty clever. [They have] written [the QA Handbook]... quite open as opposed to being quite specific." Region 3: Participant K</i></p> <p><i>"[The Customer Care Final Inspection] wasn't codified... so [the Customer Care Managers] are a little team God, they just turned up and said, 'now I condemn this', or 'no I pass that'. So the Site Manager hadn't got a clue what standard they were building to. It depended on the individual and how they felt on the day." Head Office: Participant W</i></p> <p><i>"I think what is quite important is demonstrating knowledge, experience and being able to communicate in people's languages. And it's very different, the code of conduct, between when I speak with the Bricklayers. I use a different language to the language I might use in the [Regional] Office." Head Office: Participant T</i></p>
	<p><i>Turnover and continuity of interpretations</i></p>	<p><i>"Sometimes you really have to sit on [Trade individuals] to make sure they don't piss about." Region 1: Participant AD</i></p> <p><i>"By securing that loop of information and knowledge background at the beginning again and it's a continual learning curve because you have got a change of staff." Region 1: Participant C</i></p> <p><i>"Implementation [of the QA Handbook] and making sure it stays there because they all slip back to, as [the Site Manager says] says, 60% animal, 40% child. That's what you're dealing with... I'm a school teacher." Region 2: Participant O</i></p> <p><i>"You take them back to the QA Handbook... 'Mr Site Manager, this is what you're handing over to us, this is the quality you are giving. Put the shoe on the other foot, if this was your house, would you accept that?' 'Well, no.' 'Well, I rest my case. You wouldn't accept it, I wouldn't accept it and the customer won't accept it'." Region 2: Participant H</i></p> <p><i>"Our Region has been [poor on quality] for years... we just can't keep up with all the other Regions... A lot of the Site Managers, they don't stay with us because if you worked in [Region 1], you sit down for a meeting... get introduced to everybody, they are all 15 years, 10 years, 11 years, 12 years... a lot of experienced men here. And then you sit down with all of our guys here... and it's a year, six months, two years... There's no one there any more than three years." Region 2: Participant H</i></p> <p><i>"I feel like a Head Teacher with a school full of children." Region 3: Participant L</i></p> <p><i>"We don't have much of a turnover of staff... we outperform all other Regions hands</i></p>

		<p>down." Region 3: Participant M</p> <p>"I don't think it's the Technical side of things or even the Commercial side of things that has the problem, it's really to do with [Trade individuals] and the Site Teams understanding the new ways of doing things and ... trying to make them understand why we want them to do things in a certain way." Region 3: Participant K</p> <p>"There [are no organisational processes in Region 2], the [new individual] has got no idea where their function stands, what happened in the past. They are just chucked in the deep end and they sink mostly." Head Office: Participant W</p> <p>"If you've got a high turnover of staff, if we are getting snags electronically recorded then the next person that comes in can actually see where all the [Trade individuals] are rather than the bloke that has walked off site with his notebook in his back pocket and you have just lost all data. So, your [Trade individuals] then say, 'oh we were never told about that mate, everything is fine please pay us'. It's just a pure practical thing. You've got a continuity of site information which just helps everybody." Head Office: Participant W</p> <p>"We have had Middle Management [in Region 2] just going round undermining [the quality management routine] and just telling Site Managers, don't bother. It [the new quality management routine will] go away." Head Office: Participant W</p> <p>"There are still are elements that no matter how many times and how well and simply you have explained something [in the Site-wide Quality Control Inspection], it still happens 'the good old way'. Especially when speed and pace has to pick up." Head Office: Participant T</p> <p>"[Region 2 has] had three different, or four different MDs in the last three or four years. So they have had quite a lot of leadership changes. They have had a huge amount of staff turnover so that's very unhelpful for retaining knowledge and capacity." Head Office: Participant U</p>
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Appendix 2. Illustrative quotes: Chapter 7 - Time

Aggregate Dimension: Time		
Second-order themes	First-order concepts	Representative Quotes
Multi-level short-term financial goals vs. long-term learning goals	Financial deadlines encouraged team level improvisation	<p>"The problem is, we were under pressure for year-end as you're aware. To progress forward, [the Architect] will tell you, I do speak to him regularly, which I shouldn't, and [the Architect] gets pissed off with me. But I do ring people when I want an answer there and then, rather than two or three days' time because I need to carry on and get things done. Obviously [the Technical Manager] is aware of the conversation." Region 1: Participant AF</p> <p>"You run into problems [on site] as you go along... the meeting we had earlier, [the on-site power generation centre] was due to be in and up and running by now but the order didn't get signed off for six months, so we have lost that time. You will never get that back. Because they don't extend the programme." Region 1: Participant A</p> <p>"We can't build what we're building; never mind twice as much. That's a massive problem." Region 1: Participant C</p> <p>"Every Region had a Quality Manager, then about three, four years ago...[the organisation] decided to get rid of the Quality Managers because they were paying salaries when they were already paying salaries to the Site Managers to do their job... and it's down to the Site Team to do their own quality checks... The quality got bad and our [NHBC] star rating dropped down. So somebody decided, whoops, this is not working and then they put together this new [QA Handbook]." Region 2: Participant H</p> <p>"[The Quality Team] gets a bit upset sometimes because I should be out on site looking at quality, quality, quality but when it comes to the half year-end and the year-end...I spent eight weeks on one site and I had to... meet all of the customers and do all of the demonstrations, handovers, and [post-move in] courtesy visits because the [Regional] MD phoned up [and asked me to]." Region 2: Participant H</p> <p>"Our programmes are quite friendly with regard to the time they give you but they don't move the end date and if you don't start on time then you go from 26 [weeks], down to 24 to 22 and 20." Region 2: Participant G</p> <p>"[The Housebuilder organisation is] a PLC company, so everything is based around the shareholders. So if you don't make your numbers of the targets and the profit, your share price goes down and they go mad. So the first site [we visited]... should not have had people moving into it when it did but they had to get it in for year-end. So they got the figures and they got the numbers and they got the profit. But now they are paying tenfold to make it right." Region 2: Participant J</p> <p>"Anything I see which I don't think is right I would talk to the Site Manager but whether they put that right, act on my instruction is probably another matter. Sometimes I would get overruled by Build Managers because they need to get things finished. And year-end and half year-end impinges, just; I think all standards go out of the window." Region 2: Participant F</p> <p>Region 2: Participant AB "You can't start plastering cos [as the Trades are building out of sequence] you have to drill through [plaster]board [to inject the missing cavity insulation]."</p> <p>Region 2: Participant Z "I'd better cancel [the installer from the insulation company] then, hadn't I?"</p> <p>Then whispers to the Researcher, "Are you still recording?"</p> <p>Researcher: Nods</p> <p>Region 2: Participant Z "Yeah, I'll cancel it."</p> <p>"The [NHBC Final Inspection] is the most important bit, isn't it? I don't care what they say about [Customer Care Final Inspection], at the end of the day, it's the [NHBC Final Inspection] overall... That will be the [Customer Care Final Inspection], one day and [NHBC CML Inspection] the next, so it's all done... I'll just do it the way I'm doing it." Region 2: Participant AE</p> <p>"The only time I don't like [showing a customer around] is if I'm not happy with the house, which can happen. Especially at year-end. I had to do one and I couldn't stop it because we were running out of time but you have to take a few deep breaths and talk through the issues that are still outstanding and just hope that they are happy with my charm!... What I really want to do is walk someone into a house that I'm proud of and pleased with." Region 3: Participant L</p> <p>"I didn't get one day [between the NHBC's final inspection and the Customer Care Final</p>

		<p><i>Inspection], let alone three weeks [the time allocated in the construction programme]."</i> Region 3: Participant L</p> <p><i>"I'm sure there isn't a Site Manager in the land who doesn't want to do the job properly, you know, but the resources are limited and time as well, isn't it? And I know it sounds like an excuse and nobody likes to hear excuses but it's a fact."</i> Region 3: Participant L</p> <p><i>"Nothing affects the build programme! There's a date that they start and date that they finish and what we do around it makes no difference at all."</i> Region 3: Participant M</p> <p><i>"[2015 financial year-end] was the most rushed it has been for as long as [the current regional MD] has been in charge... There were some plots that were very close to the line but... I have heard from other regions... Customers moving in and there is no cooker. Legal completion taking place when the house isn't complete. Whereas we get there but we had a few issues where cleaners didn't get in... we probably had half a dozen houses that were a day or two too soon. but... one region, they had 31 financial completions after 5:30 PM on [the last Friday of the month]. We had one."</i> Region 3: Participant X</p> <p><i>"It's programme first, health and safety, then you might look at quality if you've got time."</i> Head Office: Participant W</p> <p><i>"We leave things, let's say a bit of a foundation is left out but we just say, 'oh we've done 90% of the foundation, yes we will just say that we've done that, move on, keep going through'. So to the outside reader of that report, it looks like everything is fine and then you come close to half year or year-end... on-site they've got to do a lot of catching up of old foundations, snags and things which they either can't do, which is usually what happens, or they do really badly because they are just rushing through it because they are out of sequence and that's actually where the real big cost comes."</i> Head Office: Participant W</p> <p><i>"Everybody here loves firefighting – problem solvers... The fact they caused the problem in the first place isn't kind of recognised; they put it out. Quietly getting on with it is not a trait that will get you very far [here]... It's a cultural thing... if you are going to get to the nub of quality... we encourage and reward reactive firefighting rather than proactive efficiency improvement."</i> Head Office: Participant W</p> <p><i>"[The Housebuilder organisation] has tended to have quite an entrepreneurial sort of culture where compliance hasn't necessarily been at the forefront of how things are done."</i> Head Office: Participant V</p> <p><i>"This is where it's very easy not to look in every detail and the full depth the effect that a change will have on all the elements of your construction. You need time to do that... there could be some saving on changing...but what also you need to consider is programme implications, fees, other risks of elements, delivery, material availability. All this. It's not strictly down to money...especially if you've already started. This is where the problem implications play a very fundamental role and this is where you guys, the Build Team, or your Executive, look at that change...and say, 'No, I don't want that change now because that is going to have an effect on my programme and my [Trade Organisations]'."</i> Head Office: Participant T</p>
	<p>No time to change team working practices</p>	<p><i>"Once the guys get into the habit, they know what they've got to complete in [the Construction Stage Completion booklet]... It's really time-consuming. There is a fair bit that is ticking boxes to say you have done something."</i> Region 1: Participant B</p> <p><i>"[The Construction Stage Completion booklet] is not mega onerous but it is the sort of thing that when you are coming to year-end and busy times it gets put to one side."</i> Region 1: Participant B</p> <p><i>"The [Construction Stage Completion booklet] takes about an hour to fill out. On the last apartment block we did, it was a hundred and...So it worked out that we spent 13 days filling these out. So, [the Housebuilder organisation] is paying for my time for 13 days to fill these out... But you go to the [Regional] office and these are in a back room somewhere. And you think, why have I gone to all of that effort to fill that out when it's discarded on the floor?"</i> Region 1: Participant A</p> <p><i>"I know a guy who is so busy he hasn't had a chance to stop and read procedures."</i> Region 1: Participant C</p> <p><i>"[A member of the Quality Team] tells us where we're going wrong but they do know their stuff to be fair... they're striving to make the [Housebuilder organisation] correct and comply, making sure we do our job right. Generally, we are but you do miss things, which they point out."</i> Region 1: Participant AF</p> <p><i>"Just leave [the Construction Stage Completion Form]; I'll sort it out...(sounding a little stressed) right, put a note on there. We can sit down and do one of these [forms] next week. We've gotta do them, we've gotta do them and it's one of those things, that when you do them, it will be fine. It's just you've got to get a chance to do them."</i> Region 2: Participant O</p> <p><i>"You do see repeat mistakes a lot on sites... I think it's the result of trying to do things too quickly."</i> Region 2: Participant F</p> <p><i>"Other things came up and took over and time overtook it. I didn't, and I did certain things</i></p>

		<p><i>[following the Site-wide Quality Control Inspection], but I didn't respond directly to [the Quality Team]. There were about five or six things that came out of that, that I organised on the drawings, for example wind posts. We had wind posts in the first phase, we had square wind posts for in the cavity and it was pointed out that they were going to stop the cavity being filled, so we said we would do L-shaped wind posts for the second phase, so we did that but I didn't go back to [the Quality Team] and tell them I had done that. I did that with the [Project] Design Team and just did it that way but there were a few things that came out of there and I was asked for information and after a couple of months... And no one chased me for it." Region 2: Participant F</i></p> <p><i>"I know the [Site-wide Quality Control Inspection] is a good thing but [the Quality Team] are finding a lot of issues with brickwork; even now – damp details not right, the insulation is not right, you know. And that's where we find we're all sort of floundering but equally we've got a programme that we need to get on with." Region 3: Participant L</i></p> <p><i>"I would get told off if we had an audit...we would get a gentle nudge...this one, [the Plot Passport], you certainly do get because you've got to deliver this at the end of the plot but the other one you don't get audited on it. So you could say it's human nature that it gets left behind. Until it comes onto someone's radar." Region 3: Participant L</i></p> <p><i>"We are going to be taking a photo of a defect, emailing it to a [Trade organisation] for him to deal with. Whereas in the normal world, a skilled Site Manager and his team will walk into something, see a defect and go and grab the relevant Trade individual and get it sorted out... If we take a photograph and send it to so-and-so, we haven't actually dealt with it have we?... It might sit in someone's email for three days... the art of defect rectification is getting it done there and then." Region 3: Participant L</i></p> <p><i>"There's more people stacking shelves in Sainsbury's local than there is running a building site, you know? We have limited resources to manage all those and to get all those [construction] details right is quite some ask." Region 3: Participant L</i></p> <p><i>"We are not very good on those two documents [Construction Stage Completion booklet and Plot Passport]...[compliance] would vary from site to site... just [because of] the individuals involved and because of the way in which we've performed, we were reluctant as a Region to embrace them." Region 3: Participant Q</i></p> <p><i>"I know what the [Quality Team] are trying to do, and they are trying to improve [quality] but it creates more work for everybody by doing it, you know. Site and them lot have got to do it, we've now got to meet, now we've got to read up on this, and re-look at that but I can see why they are doing it." Region 3: Participant M</i></p> <p><i>"We knew perfectly well that they weren't filling in the paperwork for the [Construction Stage Completion booklets]... [Site Teams] see it as admin rather than an intrinsic part of the job. But it was a slight surprise that they weren't doing it at all." Head Office: Participant W</i></p> <p><i>"Some feedback there around just having time to reflect and learn from what's going on and put in place improvements but they just don't have the time to do that so then they keep going round the hamster wheel." Head Office: Participant V</i></p> <p><i>"I think [Region 2] have struggled with [the tablets] and I think it's demonstrated other processes that should have been happening weren't happening...It has demonstrated that they were doing things beforehand that they now need to do because it shows up on the tablet if they haven't...[The tablet] is seen as creating extra work and it should have been just replacing work. So, instead of doing it one way, you do it another way but if you weren't originally doing it, then it's now extra work and its visible if you haven't done it." Head Office: Participant V</i></p> <p><i>"It tends to be very firefighting, dealing with the here and now and therefore not having, not taking time to reflect and to make improvements because they can't see where the time is coming from." Head Office: Participant V</i></p> <p><i>"Ok, there could be some saving on changing from [changing the roof design] but what also you need to consider is programme implications, fees, other risks of elements, delivery, material availability. All this. It's not strictly down to money - something is 10p cheaper than the other and therefore we'll take it, and especially if you've already started. This is where the problem implications play a very fundamental role and this is where you guys, the build team, or your executive, look at that [formal design change process] and say, 'no, I don't want that change now because that is going to have an effect on my programme and my trades'." Head Office: Participant T</i></p>
<p><i>Timing of episodic vs. systemic feedback</i></p>	<p><i>Timing of Project Team feedback</i></p>	<p><i>"[The Quality Team] came to me, 'you are using the wrong products', well, hold on a minute, [the trades] have been told to use this product and now it's wrong – so what do we use? 'Oh, we need to work that out'. So we need to get on with it still. I've still got bricklayers, I've still got to get people started on stuff but they haven't finalised the details yet, and it's like how long do we wait? So in the end you tell the groundworkers to crack on because it's not failed before. It's already been done on 70 houses." Region 1: Participant A</i></p>

		<p>"You've still got the pressure of getting the units out... you can't get an answer to anything but you try and do things to move the job on... We had an issue here with the roof... it wouldn't stick. So, [Quality Team] what do we do?' 'Oh, well, I don't know. I've never heard of it before'. So, we are left to sort it out for ourselves... we've asked the question and none of you know the answer." Region 1: Participant A</p> <p>"[The Site-wide Quality Control Inspection] is a worthwhile exercise but I think [the Quality Team] leave it a bit late to do it. They wait until the show home was built, complete and finished but nobody's checked it all the way through.... I'm thinking we should do [the inspection] way before that." Region 2: Participant H</p> <p>"If you are building a wall. You still need bricks and you still need mortar. The process is still the same but it's how you go about it because knowledge is power and if you haven't got any information and the knowledge about what is you are building, you can't build it and quite often it's drip fed to you so, imagine somebody asked you to do a puzzle but they didn't give you the corners to start with, so you have to try and start in the middle!" Region 2: Participant J</p> <p>"At [my last employer - a smaller organisation], they would spend the time, they wouldn't start until they had all the [design] information... it was a well oiled machine. Whereas [at this organisation], it is just like any other big beast in the development world – nothing is ever planned out in time." Region 2: Participant J</p> <p>"In theory what we are supposed to do is to go through all the details and to check them but in practice it's not an easy task...I think it is good to have a third party do that because you tend to get a bit protective of your schemes." Region 2: Participant F</p> <p>"[The MD] will go around and say, 'You should be doing that – it's in the QA Handbook'. I don't think at grassroots and at Technical Manager level are looking at that document and using it as maybe it should be... I think the more the likes of the Directors and Build Managers enforce it, the better it will be." Region 2: Participant F</p> <p>"I thought [the Site-wide Quality Control Inspection] was really worthwhile but just too late...we'd built a block of flats, 10 or 15 houses, so maybe do your first house?... I would do it earlier." Region 2: Participant I</p> <p>"[I would] have the same sort of audit [referring to the Site-wide Quality Control Inspection] on the working drawings before you've even started... I think it is good to have a third party do that because you tend to get a bit protective of your schemes... you do check them and you do as much as you can... Almost always you get to a point where you've got a deadline." Region 2: Participant I</p> <p>"Until this team was formed, there was a strong culture of people doing what they've always done without necessarily reading specifications and drawings and understanding them. Raising awareness of the fact that there aren't two projects that are similar, there are always differences, there are always changes, there are always variations. Make sure you understand your own project and explaining why some things have changed from the way we used to do things five years ago, that has started slowly, slowly dripping through now and we do see some of these common issues or common problems going away. But it's a slow process and a painful process." Head Office: Participant T</p> <p>"I think generally raising awareness – it is our presence mainly on site and the inspections and the repeat visits and talking about how and what we are changing... training has had a little bit to do with it." Head Office: Participant T</p>
	<p>Timing of inter-organisational feedback and feed-forward</p>	<p>"We should have said, if we do the change it's going to take us three weeks to come back with this...but that didn't happen. It was let's just get on with it, get it done." Region 1: Participant Ex 1</p> <p>"We need to include the [Trades] a lot more on the decisions that we are making...half the time we don't involve them enough. Like we have had an issue here with the roofing... we've been talking about for ages, how we do it, with the Architect. The Roofer comes out, we have a meeting with him here, 'Why are you doing it like that? That's crap, it's never going to work. It's going to cause problems for you in the future'... We've got these people that have got all of this knowledge but we don't use them." Region 1: Participant A</p> <p>"[One of our Carpenters is] not against [the QA Handbook]. He will deliver what we want. Whether he agrees with it all or not. I think he thinks we go over the top in some respects, and he's left scratching his head when he sees all these quality things come up. He will tell you things like 'we don't get our drawings right in the first place. We are trying to run before we can walk'... he'll be designing for us on site as he goes. [There's one site] where he has had to put so much effort in because basically what we gave him wasn't adequate." Region 1: Participant AG</p> <p>"Handymen, finishers, people to go in and effectively wipe their bottoms and wipe their noses and then complacency sets in, oh yeah, I can't be bothered doing that probably because someone is going to come in behind me. But if you turn round and go, no, no, you will come back. You will put that right, slowly the mindset becomes, I've got to get that</p>

		<p>right and I haven't got to go back, and that's where it changes." Region 2: Participant O</p> <p>"Right guys, we cracked it that's what we need to do...and then next month, it's all gone back to square one again. The [trades] just don't keep doing it." Region 2: Participant H</p> <p>"Every couple of months we do it, to refresh their memory because we always get new guys on site don't you? You do one with one team and then in three weeks' time they are all gone and a new team's on site. Some can't speak English – they don't usually do this and no one's shown them how to do this, so it's nice to sit down with them and have a chat." Region 2: Participant H</p> <p>"All the inspections are now on the tablet along with photographs and then when you do it, you just press the button and you send that straight to...all of [the organisation] and straight to the [Trade organisation]. So, it makes [the trade] look bad doesn't it? So, when [the Trade organisation] get all this bloody hell on-site, they speak to their supervisor, 'I don't want to see this any more'. Yes, [the tablet] is working. It just takes a bit of time." Region 2: Participant H</p> <p>"I had a deadline... and there were some drawings that came out on Friday that I had not seen. So, I had the option of whether to either tell [the Technical Consultant] not to put that drawing in the tender pack or put it in the pack and deal with it as you go." Region 2: Participant I</p> <p>"Site Managers and the [Trade organisations] are given the opportunity to do the best they can. So it's not just get it done mentality it is, you know, get it done when it is due to be done and you know, if there are issues or Trades or Suppliers that have an impact on that, it's dealt with straight away. It's not allowed to build up and programmes become a problem and rush units to get them finished. We work hard every week of the year to get it done." Region 3: Participant Q</p> <p>"In theory [Trade organisations] should all be fully aware of all the construction details, what's expected of them...in practice it's not, that certainly [pointing at the QA Handbook] is taking a long time to filter through." Region 3: Participant L</p> <p>"Procurement of materials and subcontractors was delayed...so we have not actually, we built the frame and it stood for about five weeks because we haven't procured the lightweight steel frame [Trade organisation] and that's what I am paying for now basically because we put that, if we got the frame [Trade organisation] on board at the right time we would probably be painting on the top floor at the moment. But that pain is now mine." Region 3: Participant L</p> <p>"We can't have [Trade individuals] coming in from outside with all different standards and then not putting them through a filter. At the moment, they just go out on site and do whatever they have done in the past, and we sort of hope that they will pick it up whilst the build is going on. Well that's very expensive and it's too late in the day. We need to sort them out before they even get there." Head Office: Participant W</p> <p>"If you've got high seasonality the chances are you are going to make a lot of mistakes because it basically says you are inefficient for a long time and then you are, by being slow and ponderous, and you are unbelievably inefficient by being really quick and missing out lots of issues. So it's just a bad way of working. So our quality issues are in part to do with the way we deliver the units for the year." Head Office: Participant W</p>
<p>Project-to-project multi-level, multi-disciplinary learning</p>	<p>Informal Project-to-Project Team learning</p>	<p>"Each [apartment] block is designed with a different product, done in a different way. It's not like one iron out all your problems and then that's it, you go over there and we are using a totally different one." Region 1: Participant B</p> <p>"As a [Housebuilder organisation] we seem to make the same [mistakes]... We don't seem to be learning... It takes a long time for things to evolve." Region 1: Participant A</p> <p>"Sometimes you're looking at stuff and its very open conversations that you can have as to how you would put a detail together. Does it practically work? And the Site Managers go, 'it did work a couple of times', right get a couple of site guys in, 'we're doing this type of scheme' and they will sit down for half an hour, 'go through your mind of what went wrong on the last job?' We've had a couple of guys do that." Region 1: Participant C</p> <p>"It's not a bad thing. It's not negative, it's just the way that the [Technical Team] tends to be cradle to grave. You touch everything [every stage in a housing project's life cycle]... so all the issues come to you, so you tend to get more embroiled in it and therefore, you've touched it and if it goes wrong, 'Why has it gone wrong? You did all that', 'Yes well, I was doing it because they didn't have time to do it all'... It's one of those... It's a hub of, a lot of stuff happens there, and all of the problems permeate back why haven't we got it right. It's a good game." Region 1: Participant C</p> <p>"You have got so many variables, every one of them will throw up another detail that you haven't thought of... in the original thought process and it's impossible to capture every one of them from day one, so... the design process is going to be fluid... It is starting to be recognised by the [Housebuilder organisation] that ... we need to adopt different procedures around delivering [design]. I think both programming and... how we go about</p>

	<p>developing the design of [bespoke] projects." Region 1: Participant E</p> <p>"We vary the housetypes on each development. So you may start off with a standard house type... [but] to meet planning conditions... you end up with a bespoke property and then that leads to, you might call it a standard [housetype], but it's not a standard, it's a non-standard." Region 1: Participant E</p> <p>"We go the extra mile to do these bespoke units. But because we do bespoke units we get it wrong! A lot of the time!" Region 2: Participant J</p> <p>"Quite often what happens is [the Region] will buy a site and then they look at the numbers for the year-end and go, 'right we need this many units in so we will start on that one now', without anything in place and it's just a repeated circle, that happens consistently year after year after year." Region 2: Participant J</p> <p>"We've ironed out all the issues now, we will be noting them down in the minutes and then we will be using the document that we had for phase 1A and replicating it for phase 1B." Region 2: Participant J</p> <p>"Sometimes you might end up with another 150 [construction] details that are bespoke and aren't in our standard portfolio... It causes problems as you are reinventing all the time." Region 2: Participant I</p> <p>"You are building new housetypes all the time, it's a learning curve on that house... When you build a housetype the first time, no matter how well it's designed, you will always find little teething problems or perhaps stuff you would do a different way. Then you update the drawing and the second time you build it, you incorporate that revision and then so you're always going to have little enhancements or adaptations or revisions to a housetype the first time you build it." Region 2: Participant I</p> <p>"We have gone through the three showhouses in particular and there's been, you know, quite a bit of sorting things out as we go." Region 3: Participant Q</p> <p>"It's another one of those where you've got to keep revisiting [the QA Handbook]... You can't just assume... So we were [following it] on the first phase and then we've gone to start another phase and it's been forgotten about. So we have had to pick it up again and that happens with a lot of things." Region 3: Participant L</p> <p>"I just don't like making the same mistakes over and over. So I would remember it and I would, you know, instigate it to manage it out." Region 3: Participant L</p> <p>"We don't necessarily sit back at the end of a job and reflect on what we could have improved, we've done it during the job and we will move on from that point to the next job." Region 3: Participant M</p> <p>"[Project X] has got its own house types, [Project Y] will have its own house types. Even though it will be called [Housetype 1], the [Housetype 1 at Project X] is probably 730 ft., the [same housetype at Project Y] is probably 850 ft. They have all been changed and tweaked because that's what has sold in that market. So [our Region] has got their own house types, [the Housebuilder organisation] has got their own house types, we have got certain house types that we have changed because of their location." Region 3: Participant M</p> <p>"We do tend to have little sit downs and usually when the next Site has started, and they will say right, do you remember what happened on the last one? Remember what happened on the last one? But there is nothing formal." Region 3: Participant K</p> <p>"There's never any formal sort of thing at the end. It always seems to carry over onto the next job and if you got the same consultants then you have that conversation, and say, well we realised we did that last time, we will do it slightly differently." Region 3: Participant K</p> <p>"If you want to build non-standard – it's the first time we've drawn it, it's the first time we've procured it, and it's the first time we've built it. Do you really think all three of those are going to be perfect? There are humans involved in all three of those stages unfortunately, and lots of them." Head Office: Participant S</p> <p>"You go to every site and you repeat exactly the same thing again and again and nothing happens." Head Office: Participant T</p> <p>"The ability to learn or the opportunity to get lessons learnt if you are building something different every single time is vastly reduced because you are so bespoke in your design." Head Office: Participant U</p>
No formal review of past project practices	<p>"The last job I did, the idea was, because it went really, really well, it sailed through. At the end of that, we all said, 'yeah, let's have a sit down before the pre-design meetings for this, and everything else, what went well and what didn't work?'... [We didn't have one probably due to] a lack of co-ordination and no one has the will." Region 1: Participant A</p> <p>"At the end of every job [we should] sit down and say, 'Right, what has worked, what hasn't worked?'... that's maybe something [the Quality Team] could do. So at the end of the job, you can get the Site Manager, the [Commercial Team] and maybe a few of the [Trade organisations] involved and have a sit down for half a day." Region 1: Participant A</p> <p>"You'd never get anyone to attend [a post-project review]... everybody's just onto the next</p>

project, get the next site up and running, get that all in place. There's no time to look backwards [pause] but in some ways there should be... I mean there is definitely an internal learning process I would say - individually." Region 1: Participant D

"I think one of the biggest things any company needs to do, is focus on a post-project review... you've got a list of Type A and Type B issues ... Type A being ones that you know are going to crop up again, and Type B are things particularly specific to that project, or that design. And it worked well when you have got all parties who are prepared to come to the table and review it with you.... it works even better if you can get it set up in the first place... we used to carry that lessons learnt forward into the next development so when you had a subcontract meeting you could prepare pre-start with all the consultants... it would take at least a morning... you would run through the scheme in detail; what you are building, how you are building it, what materials you are using, identifying some of the key areas where you think you're going to have problems and then you would bring in your lessons learned from the last project.... you are not making it a witch hunt... you are asking for [everybody's] feedback... and their experience. And people buy into it." Region 1: Participant E

"I think there is a glaring omission in terms of the way we shut down sites. In that we just say, 'right, we are off now' and there is not really a closedown meeting to see what went wrong. I think that would be worthwhile." Region 2: Participant F

"At the end, the end of the job, they just seem to fizzle out really. Technical [Team] end up holding the baby normally with a bit of Customer Care [Team] because when the Site Manager is off the Site and all other [Trade organisations] have gone it often gets dumped on the Customer Care [Team] to finish off a few bits or tidy a few bits up, which is a bit naughty but it always seems to be the way it goes." Region 3: Participant K

"It sounds silly but we are so busy, it's another thing we would have to sit down and go through and sort of disseminate but if it saves the company money and makes our life easier then it's probably something we should really do." Region 3: Participant K

"As a business 90% of the management information and activity is forward-looking... There's very little historic effort to look at what's happened...I have been around lots and lots of businesses...I have never experienced something that is so unconcerned with what's just happened, and so concerned with looking forward." Head Office: Participant W

"We have an appalling attitude to data... business information is not respected... it was all being trumped by individuals saying their opinion and then [individuals] just following what they were being told. There was no, 'let's look at the evidence and then come to a conclusion'." Head Office: Participant W

"I think there is plenty of consultation that happens but it does make it quite hard work at times because it is quite a slow process just getting the time in people's diaries and getting consensus." Head Office: Participant V

"What we don't have, which we should, is a project deconstruction meeting, where design teams and technical managers etc. everyone together, go through what went well and what didn't. And a four or five item action plan comes out of it... You need everyone there to get a balanced view of what went well. These meetings used to happen, but they were sporadic and never been policy. People move on to the next project. It's tough to allocate time for them. They need to become company policy otherwise they won't happen." Head Office: Participant S

"We don't have any formal ways of capturing things. So when something goes wrong... We are very good at problem-solving, we are very good at fixing the problem, what we are not so good at doing is then saying, okay why did that happen in the first place and how do we stop it happening again? There are examples of where we do go through that sort of questioning and reflective process." Head Office: Participant U

"There are local examples scattered around where [project teams] just, by second nature they go through that process but what we don't do is capture it... information just stays very locally within that particular project team and there is no sort of mechanism for sharing that more widely... So if any of those people then left, we wouldn't have a memory of what happened and why or how we fixed it." Head Office: Participant U

Appendix 3. Illustrative quotes: Chapter 8 - Trust

Aggregate Dimension: Trust		
Second-order themes	First-order concepts	Representative Quotes
Trust between levels	Within team trust	<p>"There are a lot of build delays... at the moment we have had probably four months of particularly bad issues with the kitchen supplier. They've had a big internal problem... they are way behind on manufacturing, way behind on deliveries... but we suffer the knock-on effect where we have houses pretty much finished and we are waiting for a kitchen." Region 1: Participant B</p> <p>"My team generally are fairly close knit as well because a lot of them have been with the company for a long time and known each other for quite a long time, so I know they phone each other and ask questions, particularly if they're using something they haven't before but they know so-and-so is using, so there's quite a lot of communication in that way." Region 1: Participant B</p> <p>"If I'm doing something wrong, don't let me do it, scream and shout at me, otherwise I won't learn." Region 2: Participant Z</p> <p>"He's a good boss. One of the first things he said to me when I came here, he said, I am not here to put you under pressure, I am here to help you. So, whatever you need help with, don't hesitate to call." Region 2: Participant Z</p> <p>"We all have our own styles don't we and we all have to deliver the end goal which is new homes for people to live in that are the quality we want." Region 3: Participant L</p> <p>"If we are behind, [the programme] doesn't change, we have to catch it up and eventually we'll get there." Region 3: Participant L</p>
	Selective reporting from lower to higher levels	<p>"So [the computer screen] says 'brickwork structure to plate', well I haven't got any brickwork but the timber frame is up and it's up to plate, so I am going to declare [Construction Stage] 'three', because I don't like red [which is the colour the text goes when progress is reported as behind programme] but next week will be more difficult because next week is 'four' which is roof complete... We are not far away but... So I will fill this in and it will go back to the office." Region 1: Participant A</p> <p>"[Site Teams] are afraid of [the tablet] because if they do an inspection and they put too much stuff on it and it goes straight to everybody... it makes the Site Manager look bad... So they might go, 'yes'... And you think, 'bloody hell guys, what's all this?' 'Oh, do we put all that down?' 'Yes, you have to put all that down and you have to take the photographs." Region 2: Participant H</p> <p>"People are afraid to make mistakes in case they pressed the wrong button [on the tablet] and send it off to somebody. They have got to be confident. It's not new, a lot of companies are using [the tablet]." Region 2: Participant H</p> <p>"I write [the defects] all down and take some photos myself and I just send it off [to the Site Team members]. I go, 'You [to Site Team member]. I have done your inspection, and this is what I found from my inspection'." Region 2: Participant H</p> <p>Region 2: Participant AB "Have you ever seen a site that's doing it? They're not doing it at [Site X] and they're not doing it here. We'll get there, if you get into a routine, getting these forms done, but the trouble is, that these forms go back, and everyone [in the regional office] can look at where we are..."</p> <p>Region 2: Participant Z "Which is dangerous."</p> <p>Region 2: Participant AB "[the regional office] hasn't got a clue where we are because no forms are going back in."</p> <p>"There isn't a very strong culture of transparency so anything that allows you to see exactly what people are doing at any level of the organisation is resisted." Head Office: Participant V</p>
	Trust in superiors	<p>"It's like big brother with this. It's not only us that see it." Region 2: Participant AB</p> <p>"[The Regional MD] is very precious and protective of us." Region 3: Participant L</p> <p>"It's a thoroughly good place to work from [the MD] downwards... When you have people like that at the helm you know you are heading in the right direction. And we outperform all other regions hands down. So that just goes to prove that we are doing something right." Region 3: Participant M</p> <p>"When [Region 3 MD was an Executive in the same Region] they were very very, really really good - on top of everything, covered every base, you know? People want to work for</p>

		<p>them, you know? They sort of drag you forward which is why they are the MD now; they're excellent." Region 3: Participant K</p> <p>"[The Regional MD] sets high standards and... he had a very close contact with the site guys." Region 3: Participant Q</p> <p>"I think it takes time; you can't change a culture straight away. It takes time and it takes a little bit of discreet perseverance, let's say. So they start getting used to you, to outsiders coming into the region and then it becomes easier, more acceptable and that it is okay, let's relax. It's fine, there's no problem with being found out if something doesn't happen the way it should happen." Head Office: Participant T</p>
Trust and Affect	Emotional response to organisational level interference	<p>"Sometimes you feel that when [the Quality Team] turns up to do [the Site-wide Quality Control Inspection], that things don't turn out as they should do, or something is picked up that is not quite right, instead of it being, 'all right, we need to do this and this', it's more often the case that a report gets sent by [the Quality Team] to everybody...and all of a sudden you are getting emails from [regional directors] saying, 'What the 'effing hell is going on here? Why have you done this?'" Region 1: Participant A</p> <p>"They are always out to look for the negative rather than the positive. That's not meaning I'm asking them to go around saying everything is, 'ooh yes', their job is to look for the bad stuff but it's also there to say, 'yeah', take the good stuff that we are doing as well and then try and implement that on other sites... quite a bit of the stuff that I have done on previous sites is actually in the [QA Handbook]... [there's] no names or anything but I know from the picture that is my fan on my fourth floor." Region 1: Participant A</p> <p>"We're all blinkered. We're all in our own little worlds and we don't care about anyone else's but we are not going to start a barney." Region 2: Participant Z</p> <p>"We build houses hopefully to a good quality. A few [defects on] items with the NHBC[']s inspections] but not necessarily the way the [Housebuilder organisation] wants them built." Region 3: Participant Q</p> <p>"[The Site-wide Quality Control Inspection] feels like an autopsy on what you are doing." Region 3: Participant L</p> <p>"Why break it when there's nothing to fix? Because it works here, we've got the highest score." Region 3: Participant X</p> <p>"We can't police and we can't take responsibility. We are there to advise and to help and give guidance. So there is a cut-off point where the regions and the teams in the regions have to take responsibility for their decisions for doing something, or not doing something." Head Office: Participant T</p> <p>"It is a Region [Region 3] where the communications are a little bit difficult, as they don't want to... they try to keep what they do within themselves. So sometimes you break through, you have a meeting and everything goes fine and then you see again that the doors close shut and you have to repeat the procedure again." Head Office: Participant T</p> <p>"[A Region 3 Executive had] a pop at me on email... and [they] did apologise in the following email...It wasn't anything serious. It was more like, you know, 'why are you coming to site, telling us we're doing things wrong when we are doing very well.' I think [they] take it to heart...I think [they're] very proud of what [they're] doing in [their region]...and I take my hat off to [them]; [they're] doing a good job." Head Office: Participant Y</p>
	Fear of blame	<p>"It's not always as simple as it's the Site Manager's fault." Region 1: Participant A</p> <p>"People revert to silos and then they just wait and blame." Region 1: Participant C</p> <p>"There's a lot of firing that goes on. Because historically that's all we've had. We haven't had the information to prove it one way or the other. So rather than as you would usually do... look to see what's going on... tracking the problem down – it may manifest itself on site but actually it wasn't invented there, that's just where it turns up, let's really run this to ground. That doesn't go on at all... Everybody in the business has no accountability... So it does become a difficult atmosphere of just blaming individuals and passing the blame on to other people; pretty unhealthy really." Head Office: Participant W</p> <p>"We fire a lot of people because we say, it didn't work because you must have been a bad person. We have got a region here which has turned over staff massively with very damaging results and not all the people that are brought in are poor. In fact, I would say very few of them are." Head Office: Participant W</p> <p>"There isn't a huge amount of management accountability and kind of buck stops with me within the organisation. So people can wriggle out of doing things!" Head Office: Participant V</p>
Inter-organisational trust	Expectations of inter-organisational performance	<p>"A boiler will be installed by a gas safe registered engineer and we expect that he knows everything he should do. Very few Site Managers will probably be able to go to him and say, you are doing that wrong because that's not their skill." Region 1: Participant B</p> <p>"I don't think [Trades Superiors] go through every single drawing. I think there's just too many to go through. They make assumptions based on their experience and they generally</p>

	<p>tend to get it right. There's always things that come up but you can never tighten everything up at tender stage and things always change as you build." Region 1: Participant D</p> <p>"[Information sent to Trade organisations is] stuff you would expect any competent Tradesman to do anyway really." Region 1: Participant D</p> <p>"Bring the Consultant Team in, don't just give me the drawings, present the drawings, and we will look at the drawings as a team. Now we are pulling it apart because you haven't looked at the landscape drawing, you haven't looked at the M&E [Mechanical and Electrical] drawing, you haven't looked at the constraints. And it does... 10 times out of 10 you will walk away from that with a list of stuff to sort out. And that I have found useful but there is stuff like that that needs to happen." Region 1: Participant C</p> <p>"You end up just writing more procedures, or a bit of text within a brief... that you then give out to the [Technical Consultants]... you put these briefs together to try and fill the holes, the gaps you've identified to make sure there isn't a gap again. But half don't read it. There's a whole world of pain trying to get the right information on the drawings on to site and build it the right way." Region 1: Participant C</p> <p>"That's stuff you've got to just pull out of people... You'll speak to a lot of people, the guy in the trench doing it, and say, 'Why don't you do that detail there?', 'I've never done that detail that way. It'll never work.', 'well no one has ever told me that it doesn't work', and I'm 10 steps removed from that guy; never mind my Consultant who's never going to speak to the guy on Site." Region 1: Participant C</p> <p>"Because we use [a framework] of appointed Consultants, the anticipation is that they are fully au fait with the policies and procedures that [we] require. They've got the [QA Handbook] and they've got [our] standard details. So, you should be getting a Consultant who knows the fundamental principles and designs that [we] need to build." Region 1: Participant E</p> <p>"The quality here is far better than the last site and that shows in the NHBC feedback we get... Because here the Site Manager insists that the Trades go back to make good the work they have got wrong." Region 2: Participant O</p> <p>"The QA Handbook is certainly a fantastic guideline on what's expected." Region 2: Participant O</p> <p>"You need to speak to your groundworker because it's his responsibility to finish it to an acceptable standard, check the quality of it, hand it over to you, and you sign it off, job done. So make them responsible for it. And make them do their own quality checks because I can't be on every single site to check the quality." Region 2: Participant H</p> <p>"It's probably [been built] as per the drawing, the drawing is not always right, is it? It might be as per the drawing, but common sense should prevail... But a lot of these guys [in the Trades] aren't sensible and they will just do it as per the drawing. They can't be bothered to stop what they are doing and lose money over sorting something out. So, they will just fit it and you go back and see it and you go, 'I am not accepting what you are just fitting here', and so an argument starts, 'it's as per drawing. Have you read the drawing? What does that show there? Well, that's exactly what I've done.' And you can't defend it can you? You might say, 'you knew [the drawing] was wrong', 'no I didn't, it's on your drawing'. So, we've got to be careful, haven't we?" Region 2: Participant H</p> <p>"Supplier input is [now] better. Five years ago it was just a nightmare; it was just non-existent. So, the job has evolved quite a bit. Although it is still difficult to pull everyone together it's just different. But I think people are demanding, Sites are demanding and Architects and [the Housebuilder organisation] are demanding more of the design. So maybe six or seven years ago you could do a set of house type drawings and then you would go and procure the lintels. Whereas I think now what we are trying to do is procure the lintels at the same time as that drawing is being done." Region 2: Participant F</p> <p>"We've got our QA Handbook, so if a property reaches that quality, that benchmark then there should be no defects but inevitably houses are made by people and things go wrong." Region 3: Participant X</p> <p>"As a [Housebuilder organisation] we have essentially been relying on [Trade organisations] to manage their own quality and that has fallen down for industry reasons and our own inspection regime hasn't taken out the slack and provided a safety net for that." Head Office: Participant W</p>
<p>Inability to monitor inter-organisational practices</p>	<p>"You put a lot of faith in the [Trade individuals] that you've got on Site... I know probably a bit more than the basics but... I don't confess to be an Electrician or a Plumber. So when I say to the guys, 'is that boiler plumbed in correctly?' And he says to me, 'yes', then I will go 'fine'." Region 1: Participant A</p> <p>"We are obviously assuming that everything is to a reasonable standard once we hand it over [to a customer]." Region 1: Participant D</p> <p>"There's a common experience where we seem surprised that the information to come out</p>

		<p>is either incomplete or late. And we shouldn't be surprised if we were dictating the tempo in which it is being released to the quality that we expect. It raises the question of checkers. You know, who is managing? Whose checking before it is released and is there some kind of control mechanism that should be there that isn't there?" Region 1: Participant AC</p> <p>"[Technical Consultants]... prioritise things in a professional way...but every action causes a reaction with a commercial impact or a time impact or a programme impact or a sequence impact and these guys if they are not aware of that, they don't understand the consequences and we are the ones that pick up the pieces...[Our] design team is made up of [Technical Consultants] and [Trades], as a team...it's not 'you pass to you', and then 'you pass to me'. It's an absolute relationship...so that we do it right first time, not second or third time when we are discovering things down the line." Region 1: Participant AC</p> <p>"On a design team, you've got four Consultants... all working on it in the background in this digital environment. All of a sudden when the package is due to be issued, they all co-ordinate and go, 'there you go, there's your 3000 drawings [Technical Team]'. I've now got to look at 3000 drawings now in 24 hours and then issue it to the Commercial Team because they want to start." Region 1: Participant C</p> <p>"If you are saying to a Consultant, all of your information should be detailed and complete at that stage, you are forcing them to do 1,000,001 other things in that process as well. You can't expect them to deliver everything on an urgent basis. There has to be some admission that you are not going to get that percentage of information by that date, so you need a mechanism to break it down into bite size chunks for them." Region 1: Participant E</p> <p>"And I think they should sign, start getting the [Trade organisation] more involved in quality. They are the ones that are doing the work, they are the experts. They should be doing the work and their Supervisors should be checking it and then handing it over to us as a finished product for us to do our inspection but they just leave it and our Site Manager can't enforce it and then the Site Manager ends up spending half of his day, maybe the whole of his day snagging all of the [Trade organisation's] work." Region 2: Participant H</p> <p>"When I send out the [QA Handbook and other documentation]... and only when I've got all of that will I raise the order for [the Trade organisation's work]. It's the only levy you've got really... No two ways about it. Some of the [Trade organisations] take the absolute piss." Region 2: Participant J</p> <p>"Our role really is project management... we project manage the Consultant Team because we haven't got the capacity." Region 3: Participant P</p> <p>"Drawings are being issued with construction issue status when the information on the drawing is not fully coordinated with the design team and suppliers... If the [region] decides to build from [these drawings] that is their choice but they need to understand the risk... There is probably a little bit of 'protecting the team' going on which [Head Office Executives] understand but this is now backfiring through the number of [premature] revisions which are unacceptably high." Organisation's Documentation</p>
<p>Intra- vs. inter-organisational trust over time</p>	<p>Development of respect and friendship between individuals</p>	<p>"The Region will do one or two or three a year... a big Site Managers' meeting, so 20 [Site Managers]. I'll occasionally just get my five and we'll meet in a site office and we'll just chew the cud over problems and issues." Region 1: Participant B</p> <p>"I'll chat to [a specific Site Manager]... I think he's the only one really... We don't have a Site Managers' meeting... [The previous company] I worked for... we used to do it once a month; we'd all get together in a hotel... there would be 15 to 20 Site Managers round the table... it was very good. It was one of the first questions I asked when I came here, and they said, 'no, we don't do it'... [At those meetings] we got to know everybody from that era, we've stayed friends and we now... once a year we get together and will go for a drink and go for dinner." Region 3: Participant L</p> <p>"I've been in [other regional offices] and just feel like everyone in [this regional office] has respect for each other's job but equally there's that element of banter and stuff that make it quite a pleasant environment. The Technical banter us for... all the land guys are perceived as going out for lunches all the time; wining, dining clients and all that! We just banter the Technical team with them struggling to build a wall or whatever! So then there's equally respect for what they do and with us as well." Region 3: Participant N</p> <p>"Usually the Site Managers and the Technical Managers end up staying the same, we tend to keep them together because you've built a relationship." Region 3: Participant K</p>
	<p>Development of inter-organisational working relationships</p>	<p>"I like to be everyone's mate but at the end of the day, I've got a job to do." Region 1: Participant AD</p> <p>"All you are trying to do is improve, or add someone else to the list to try and make your life easier, from a selfish basis, from somebody that you know that you have a good rapport with, who you know is going to deliver a good job, then it makes your life a hell of a lot easier than if you start from scratch with somebody that you don't even know." Region 1: Participant E</p> <p>"It's educating the [Trade individuals] the reasons why we do these things." Region 3:</p>

	<p><i>Participant K</i></p> <p><i>"You've got to be fair, firm and friendly and try and work together to get the best out of it."</i></p> <p><i>Region 2: Participant H</i></p> <p><i>"I think that with a set of designers who you are paying you can be quite..., I can personally work with that quite well and to get them to do things. I find it harder to integrate the supply chain information."</i> Region 2: Participant F</p> <p><i>"I know the Commercial Team were a bit hesitant first of all because of the price difference – [this roofing company] are a lot more expensive than like a single ply or a, just getting the Roofer to go out and get some off-the-shelf product but [the roofing company representative] who is our [roofing company] contact is actually really good and he comes to site a lot and stays in contact and we are quite impressed to be honest with you."</i> Region 3: Participant K</p> <p><i>"We don't have to tell Architects how to design for us; through repeated use they know what we want. They know pet hates and standards. We don't need to re-tender or keep training them. Yes, we make mistakes but hopefully we learn from them."</i> Head Office: Participant S</p>
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Appendix 4. Reflective statement

Before starting this thesis, I qualified as an architect in 2009. My area of interest was, and still is, building performance evaluation and post-occupancy evaluation; in other words, investigating ways to make buildings perform better when they are in use. As mentioned in Chapter 1, this thesis started out on a remarkably different trajectory, and one that sought to develop academic insight into new housing performance, rather than learning within and beyond a Housebuilder organisation. However, looking back at this now, I think the two things are intrinsically linked, with housebuilder learning indirectly determining new home performance. However, changing the focus of my thesis did present one challenge; I'm an Architect with a background and understanding of architecture, as opposed to a Management School Graduate with a background in organisational learning and behaviour. At this point my Architecture School Supervisor, Fionn, wisely suggested asking a Management School academic, Dermot, to be my second Supervisor, and it all changed from there.

Through Dermot's involvement with my thesis, I became familiar with Feldman (2000) and Feldman and Pentland's (2003; 2005) concept of organisational routines and then organisational learning theories, which extended into multi-level learning frameworks. Consequently, the focus of my thesis shifted from housing, housebuilding and subjects I was familiar with to new theoretical realms I definitely was not.

The study was originally conceived, designed and carried out as a two-wave longitudinal study. I spent six weeks in the field, two years apart (2015-16 and 2017-18). So, for 12 weeks over two different winters, I moved from site cabin to site cabin, regional office to regional office, talking to over 150 people and following build quality experts around as they looked at many construction details on freezing cold housing sites. So, despite not knowing much at the start about multi-level learning and organisational routines, I knew a lot about the environment I was immersed in and understood the language participants used to describe their working lives. So not only have I learnt a good deal about organisational learning theories, I have also learnt a fair amount about participant observation methods which I had not used before.

My understanding has changed in several ways following this research, and stemmed from going into the field twice. Therefore, I was able to improve the way I

captured and collated my primary data, get to know participants and understand the language of the Housebuilder.

During the first wave of fieldwork, I used my tablet to handwrite fieldnotes. However, as my writing was messy, I needed to re-write or type everything before it was legible to code. This was time consuming. I was also very cold when out on site and having to hold a tablet in one hand and write with a stylus in the other meant my hands froze, making my writing even messier. So, over time, I made typed notes on my phone. This required only one hand to hold the phone, and one thumb to type. Typing directly in this way also meant I did not need to retype anything, just import it straight into NVivo, which was far less time consuming.

At the beginning of Wave 1, I recorded everything possible on audio and wrote few notes when conducting ethnographic interviews. I then relied on the audio for my notes as I typed up the transcript. I soon realised that this was an inefficient way to work. I had collected a huge amount of audio data and listening back to it to sift out build quality and learning related discussions was exceptionally time consuming. When I went back for Wave 2, I used my dictaphone more sparingly, and wrote more fieldnotes on my phone. I tried to capture the essence of what participants said in written text, when participants said it. Working in this way meant at the end of each day when I wrote my journal, I was also quickly able to build up a better summary spreadsheet during the fieldwork period.

My fieldnotes became more concise in wave 2, as I had more practice at writing them. I added time stamps, and tried to capture more of the atmosphere of what was going on. I also took photos within my fieldnotes in OneNote and annotated them with a few words to jog my memory, as to what was going on at that point in time.

Reflecting on how I, as a Researcher, influenced my research, my gender was particularly relevant. The majority of the participants I interviewed or shadowed were white males in their 40s. I am a white female in my 30s. I think being female in a male-dominated environment, particularly on site, influenced the behaviour of those around me. Meetings held on site often comprised only men, and in those instances I'm fairly sure their language was tempered on my account. During Wave 2, at a Design Team Meeting, a Participant forgot I was in the room and used some choice words to describe someone else. After he received stern looks from others around the

table, the Participant felt the need to apologise to me about their swearing. I reassured them that I was not offended and to carry on as normal; however, the conversations became more measured after that.

I also think being pregnant changed how participants treated me. I was pregnant during Wave 1 but not during Wave 2. As most participants were in their 40s or older, they had families, and I think because I was pregnant, ethnographic interviews with participants often moved to talk about their children. This led to Participant and Researcher commonalities being found at another level, and helped to put the Participant at ease with my presence. During Wave 2, the participants I spoke to again remembered that I had been pregnant and asked after my daughter. This rekindled the Wave 1 family conversations we had, and the reminiscing helped to put the participant at ease again.

My architectural background sometimes changed the way participants spoke to me. Participants knew I was a Researcher from the University of Sheffield, but I did not automatically disclose my background to them; however, if they asked, I told them. I found this approach resulted in participants giving me a layman's explanation of their role, what they did and their understanding of the Housebuilder organisation, which was really useful. Once they found out I was an Architect, their language became more technical and construction-based.

However, the Housebuilder organisation had its own language, which took a while to learn and I became more familiar with over time. There were many acronyms and processes that had the same name but were executed differently in each Region. Conversely, each Region carried out the same activity but called it by different names. During Wave 1, a lot of my time was spent trying to understand the organisation's nuances as well as detecting things participants said about learning the *quality management routine*. The study scope seemed broader as I was not absolutely sure what I was looking for. By the time I undertook Wave 2 fieldwork, I had a much clearer understanding of the Housebuilder organisation, the people in it, and what I was studying. Consequently, conversations with participants were more focused on what had changed in the last two years, and were conducted using the Housebuilder organisation's language or terminology. This meant, the participant observation process became far easier.

The time I had to complete this ambitious thesis was limited and I needed all that time to try to understand what was happening within a single six-week period. One disappointment I have is not being able to use both waves of data, mainly because so many participants invested their time and energy in talking to me during both waves of fieldwork, and I've only managed to explore part of this. However, I hope that my thesis offers more than the contributions outlined. Personally, there are many parts that I identify with and relate to, particularly around the challenges of Consultant organisations learning from Trade organisations and vice versa, especially when time and money are all the outside world is focused on. However, there were findings that surprised me; I was not expecting trust to play such an influential role in multi-level learning. I think this gives the Housebuilder organisation a different perspective with which to view how their organisation learns.

Appendix 5. Coded interview transcript

S1: Researcher
S2: Participant

Partial interview transcript

S1: Are there set [quality] reporting forms that you need to do? What are they?

S2: It's the [Plot Passport] forms. That is the main one. So, we will fill that and record...

S1: And that is per plot isn't it? Every plot has got one?

S2: Yes, every plot.

S1: You fill those in and obviously, you have got the [Plot Passport] and then there is the other one, [the Construction Stage Completion booklet]? How often, do you use those as should be done? Or are they more tick box? Or do you spend a lot of time and effort going through them?

S2: We do use them. We will record but they are not tick box exercises. I don't use them as a tick box. We don't have them; I mean they are not live, and they are not sort of... but we will make sure that they are filled in.

S1: Do you have any on the go at the minute?

S2: Yeah

[Participant goes to get one]

S2: This is [Plot] XX. This obviously we have just sort of started it, so it's not filled in but it's ready to go. So, [Construction Stage]... So, [Construction Stage] V, because we obviously had our year-end so everything was finished all at once and that's our next sort of house. It is being built now, so [Construction Stage] V which is the roof, which we are almost at, so that will then come into play.

S1: Because the [Construction Stages] have their own report don't they as well? But do you fill those in religiously or not? [Because the document being discussed above is the [Plot Passport], not [the Construction Stage Completion booklet]]

S2: Yes. Not really, I wouldn't say religiously, no. But I would get told off if we had an audit, you know, they would, we would a gentle nudge let's say, yeah but it's something we are now establishing our new team, we can get those standard procedures... Because this is important and with the other form as well.

S1: I think I've only been to one site where I have seen [the Construction Stage Completion booklet] actually completed but I have seen [Plot Passports].

S2: But these have to be complete for legal completion [the Plot Passport].

S1: Yeah, but the bit that goes behind this again that it is one of [the Housebuilder organisation's] official procedures isn't it? Formal procedures. Whether or not it's taken, not seriously, but whether it's done as thoroughly as was initially envisaged when it was set up.

S2: We don't get... well I certainly haven't been... This one [the Plot Passport] you certainly do get because you got to deliver this at the end of the plot, but the other one you don't get audited on it. So, you could

Coding Density	2.2.2: Timing of inter-organisational feedback and feed-forward
	2.1.1: Financial deadlines encouraged team level improvisation
	1.3.2: Individual interpretation of formal practices
	2.1.2: No time to change team working practices

say it's human nature that it gets left behind. Until it comes onto someone's radar.

- S1: But if that was the case would you have to go back and retrospectively fill them [the Construction Stage Completion booklets] all out? Or do you sort of just take them as you go along?
- S2: I think you just... I don't think you... It would be an effort to start them now.
- S1: But everything on this [the Plot Passport], you guys fill out from the [the Construction Stage Completion booklet].
- S2: Yes, that gets... The only trouble is that I can't show you a filled in one because once the house is legally complete, they go off... They get signed by [the Build Manager] and then they go off to Head Office. So that's the [Customer Care Final Inspections] isn't it?
- S1: And normally there is a sheet of paper attached to the [Plot Passport] that's there, depending on what...
- S2: Well, they are supposed to use that [participant taps at the relevant section of the [Plot Passport]]. But probably the sheet of paper you've seen is a photocopy of that. So, we have to email that sheet as we are coming up to [Customer Care Final Inspection] point. You know the procedure presumably?
- S1: It seems to vary from Region to Region, so it's quite nice to hear what you guys do in this Region.
- S2: Well, to trigger their [Customer Care Manager] visit... because they need to come invited, that is the trigger basically. So, if they see that. We scan that, [relevant section of [Plot Passport]], email it across. So, if there are six of these, we have to scan six sheets. That seems to be the way I've been told to trigger off a [Customer Care Final Inspection].
- S1: And so, you will send that up [with the Site's Customer Care Manager]?
- S2: [Participant gives Manager's name].
- S1: Because [they're] the [person] for this site? And then [the Customer Care Manager] will come round and arrange with you when they are going to get it done?
- S2: Yeah
- S1: So, in terms of timescales, do you [do the NHBC Final Inspection] first?
- S2: Yes
- S1: And then you [do the Customer Care Final Inspection] afterwards?
- S2: Yes
- S1: So how long is then normally between [NHBC Final Inspection] and [Customer Care Final Inspection]?
- S2: Days, a week at the max. In theory, if we've got the time, we are supposed to [do the NHBC Final Inspection] which is [Construction Stage] XII – it's three weeks to legal completion – that is to get all of the snagging, [Customer Care Final Inspection], get everything buttoned up.
- S1: So how will it work? So, one week you will [do the NHBC Final Inspection], the next week you will [do the Customer Care Final Inspection], the week after that you will put right [defects] and the week after

- that the Customer will move in?
- S2: Yes... In theory...
- S1: But is there a bit of a difference between theory and practice?
- S2: Absolutely, yes... Well, some of these I didn't get one day, let alone three weeks. That was because we condensed everything.
- S1: Is that because of year-end?
- S2: Yes
- S1: But on a normal, when it's not year-end, how does it normally play out? Is it normally a bit better?
- S2: Well, on the programme here, look it's showing...
- S1: Is that actually what happened?
- S2: Yeah... No, this is what's happening. What happened there is we... No, last year's is not on here [Participant looking at their programme]. Well, basically, everything got condensed into one week.
- S1: What? So [NHBC Final Inspection], [the Customer Care Final Inspection] and Customer move in?
- S2: The whole lot... Well, say, two actually. But believe it, even considering we did so much, the [Customer Care Final Inspections] were good, you know? They didn't come out bad. The art is just to catch everything as you are building the house, not leave it all to, you know...? So, in theory three weeks, in practice, well, no... the trouble is, this Site is, it's not a 'one [plot] a week Site', it's three or four a week once we start [NHBC Final Inspections], yeah? So, on here look, [Participant rustles through their programme], this is our... So, we've got three plots there, that's [NHBC Final Inspection], [NHBC Final Inspection], the [NHBC Final Inspection for] 4 plots... [NHBC Final Inspection] for [Plots] X, X, X... So, we've got to get in a real rhythm once we get our first ones. We got to make sure... And obviously that's part of my job... to make sure that we're pushing now aren't we?
- S1: [Researcher looking again at the programme] So, how come it's 2 [plots being completed] a week, rather than 1 a week which is what you normally have? What's driven this?
- S2: Because they are trying to get that [Apartment block X] squeezed into [calendar month for Housebuilder organisation's upcoming half year-end].
- S1: So, the programme has been changed then to fit that in. How much notice have you had of that? Or did you anticipate it?
- S2: I was told before because we had a lot of issues building the [previously mentioned apartment block], it's a [concrete frame], yeah? So, obviously procurement of materials and subcontractors was delayed etc. so we have not actually... We built the frame and it stood for about five weeks because we haven't procured the lightweight steel frame [Trade organisation] and that's what I am paying for now basically, because we put that... If we got him on board at the right time we would probably be painting on the top floor at the moment. But that pain is now mine.

Appendix 6. Analysis development

Firstly, three examples from the fieldwork were mapped out iteratively using Mind Maps to understand individual and collective actions at multiple levels. Data came from interview, observation and documented sources, all compiled to explain circumstances around quality routine-related events. From this it was possible to explore the associated implications for learning.

Figure 51 shows the Mind Map of the first example, where the Project Team changed the roof insulation to save time; however, the Team experienced a number of adverse consequences as a result, which impacted on subsequent quality standards. During a *Site-wide Quality Control Inspection*, these actions and consequences were discussed verbally between inspection participants, and participants reflected on their experiences differently.

The examples were then re-arranged around a learning model based on Kim's (1993) interpretation of March & Olsen's (1975) model. Additional levels were added, as actions, responses and beliefs were different at each level of the Housebuilder organisation. Figure 52 is the development of the first example, where the roof insulation was changed. Over time, the model evolved to incorporate Crossan *et al.*'s (1999) terminology. Figure 53 maps out the first example and shows how it relates to the aggregate dimension of *time*. This loose model was subsequently refined following each example, thus identifying each of the five levels of analysis and how each level has its own learning cycle. Figure 54 shows the final model.

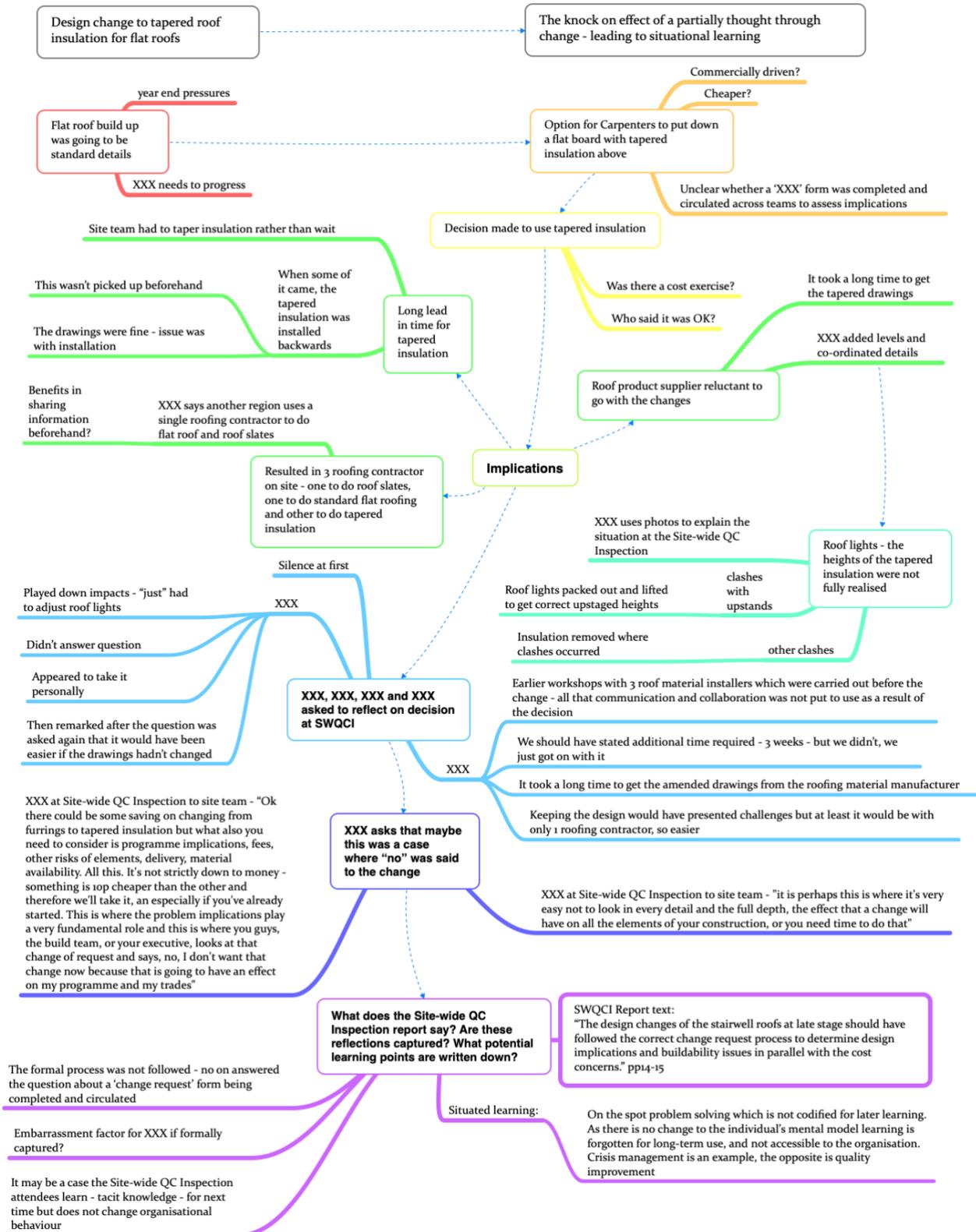


Figure 51: Mind map of Example 1 actions, consequences and reflections during a Site-wide Quality Control Inspection (described in Section 7.2)

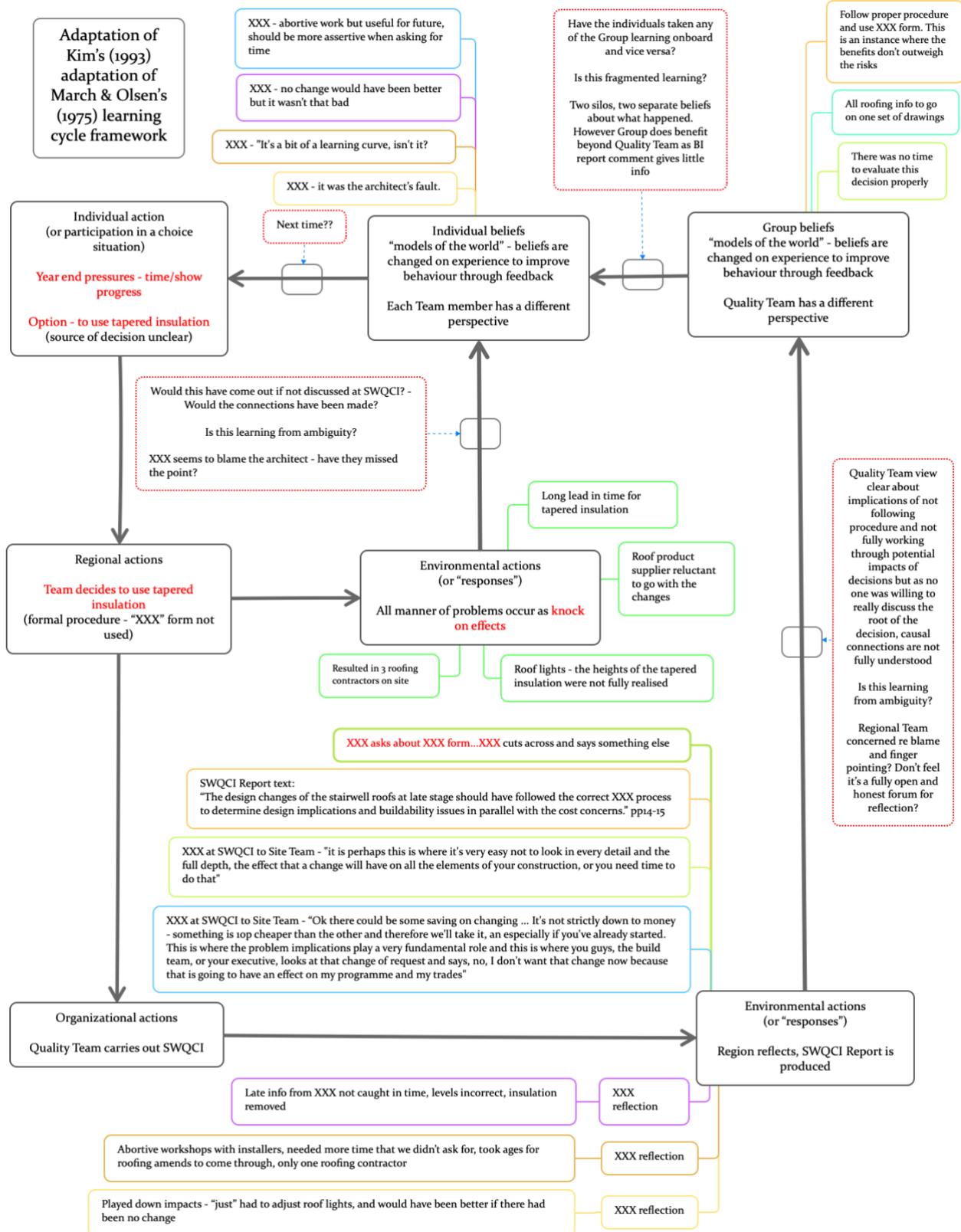


Figure 52: Development of Mind Map of Example 1 actions and consequences against Kim (1993) and March and Olsen's (1975) models

Here, a Regional level has been added to differentiate multi-level actions, responses and beliefs

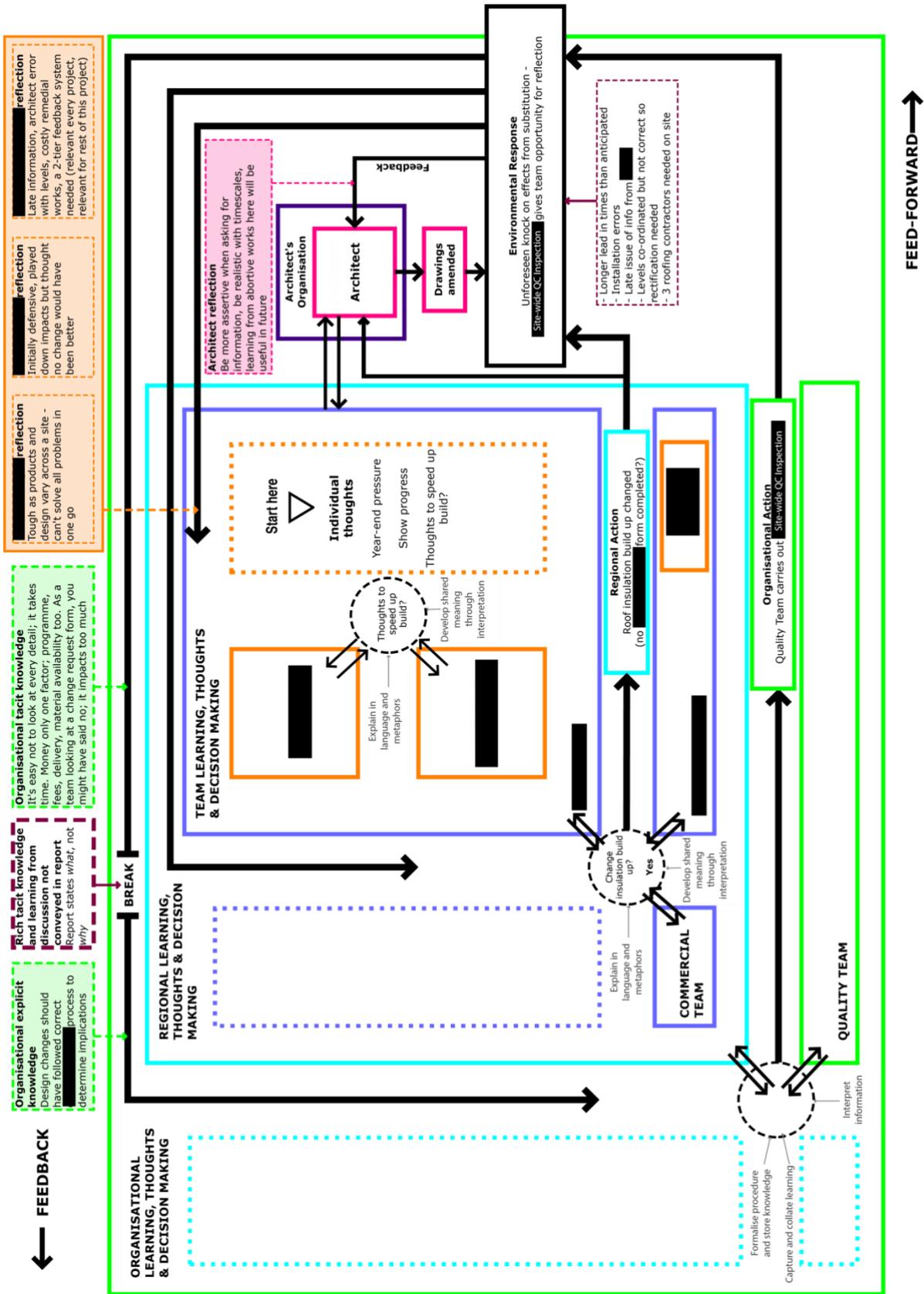


Figure 53: Analysis of example 1 and learning model

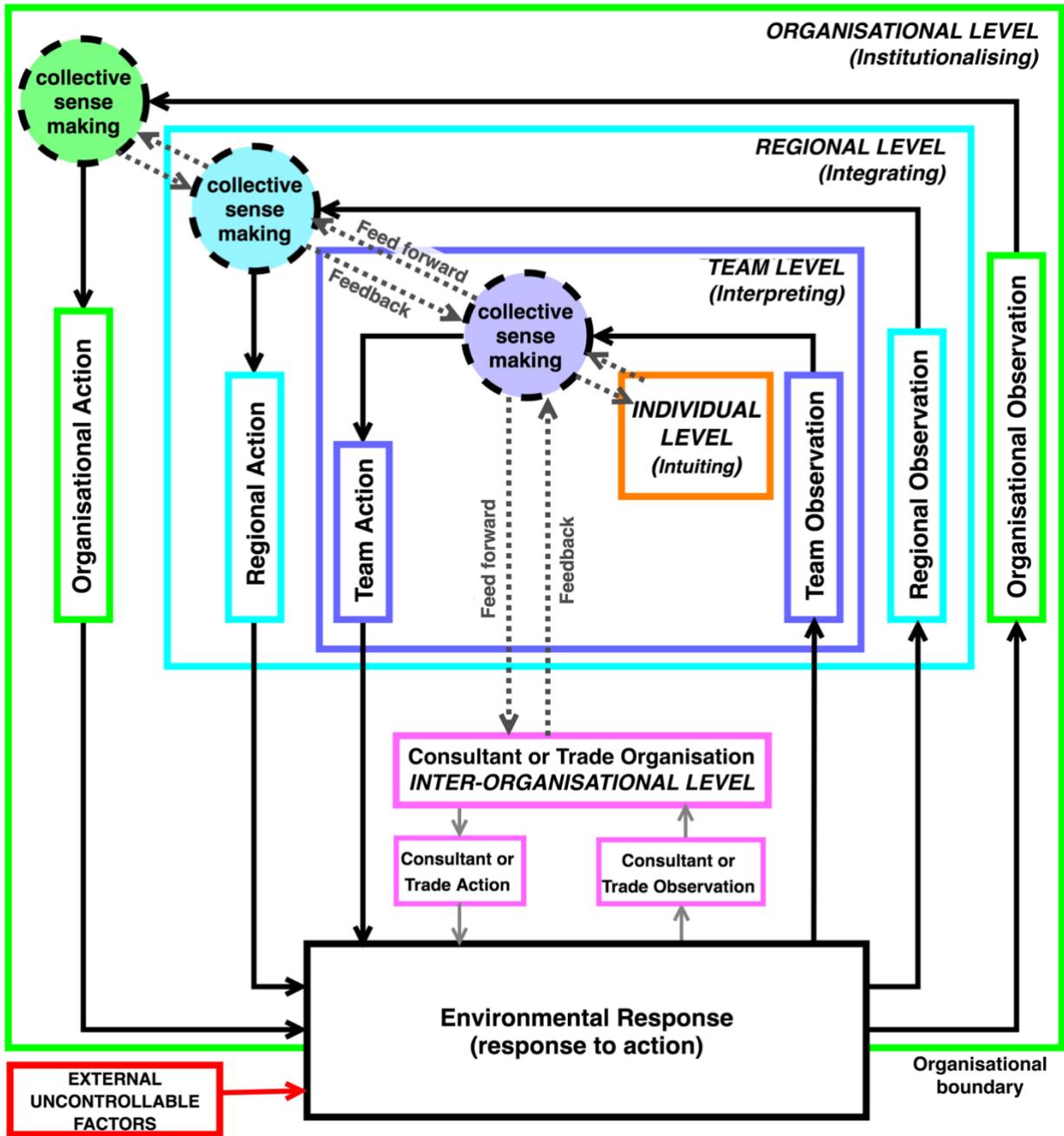


Figure 54: Learning model developed abductively from the learning literature and study data

Appendix 7. Interview information sheet for participants

IMPROVING PERFORMANCE IN NEW UK HOMES:

The longitudinal change of organisational routines across associated networks in relation to learning

CASE STUDY INTERVIEWS: INFORMATION SHEET

30 October 2015

You are being invited to take part in a research project. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of the study?

I am a postgraduate researcher from the University of Sheffield conducting research as part of my PhD studies. My research looks at how repetitive organisational routines are carried out by a number of people over time to achieve a specific aim or outcome. At [REDACTED], I will be looking at formal and informal feedback and learning routines in relation to Benchmark Inspections across three regional offices. This complements [REDACTED]'s current organisational learning research, which aims to develop innovation, knowledge fostering and idea sharing. These interviews are envisaged to take place on two occasions approximately a year apart at some point in early 2016, and early 2017.

Why have I been invited to participate?

You have been invited to participate as you work for [REDACTED] or a project team organisation working for [REDACTED]. I would like to discuss how Benchmark Inspections and associated activities are currently being carried out and your views of this. Participants are selected to give a range of perspectives about the Benchmark Inspections, based on their role within the organisation and involvement level in terms of carrying them out.

Do I have to take part?

No, participation is entirely voluntary. If you do decide to take part you will be asked to sign a consent form. You are free to withdraw at any time and without giving a reason.

What will happen during the session?

You will be interviewed by me at a time and location convenient to you, on two occasions, at least a year apart. Each interview will last between 45 and 60 minutes. You will be asked questions about your views in relation to Benchmark Inspections, subsequent feedback and the learning outcomes.

What are the possible disadvantages and risks of taking part?

The only disadvantage of taking part in this study is the time taken to carry out the interview.

What are the possible benefits of taking part?

By taking part in this research you will learn how feedback from the Benchmark Inspections is generated, collated, transferred and implemented across the organisation. In addition, study findings may be applicable to other aspects of the organisation, or go beyond [REDACTED]. Observing feedback and learning practices in action adds valuable insights into organisational changes and will be taken into account for this research. You will be fully informed of the study outcomes.

What if something goes wrong?

If you have any concerns about the way in which the study has been conducted, in the first instance please contact me to discuss them. Alternatively, please contact my Supervisor, Fionn Stevenson. Contact information is provided at the end of this sheet. Or, if this is unsatisfactory, you should contact the Registrar and Secretary Department at The University of Sheffield on registrar@sheffield.ac.uk.

Will what I say or do in this study be kept confidential?

All information divulged by you will be kept strictly confidential. However, whilst every effort will be taken to ensure your anonymity, it may not be possible to guarantee. This may be particularly relevant in relation to colleagues or fellow project team members. Therefore, subject to your agreement, the intention is to use your responses in contexts where anonymity can be maintained. On the occasions where this is not possible, quotes will be attributed to you by a generic description of your role, not name. For example, as a "development team member" etc.

To ensure your opinions are accurately captured, the discussion will be digitally recorded. The audio recordings of your interview will be used only for analysis and for illustration in conference presentations and lectures. No other use will be made of them without your written permission, and no one outside the study will be allowed access to the original recordings. Data generated by the study will be retained in accordance with The University of Sheffield's policy on Academic Integrity and kept securely in paper or electronic form for a period of six years after the completion of a research project.

What should I do if I want to take part?

If you would like to participate in the interview, please sign the enclosed Consent Form. The form will be kept as part of the data generated by the study.

What will happen to the results of the research study?

The results of the interviews will form part of my study fieldwork. The findings will be available to you for your approval prior to publication. Following your approval, the research will be published and extracts may also be published as papers in reputable Academic Journals or at conferences in future. You are very welcome to receive details of the academic publications or presentations. Please contact me on the details below.

Who has reviewed the study?

This research has been approved by the University Research Ethics Committee, The University of Sheffield.

Contact for Further Information

Please contact Kate Morland, PhD Researcher on 07916 282839 or kvmorland1@sheffield.ac.uk or Professor Fionn Stevenson, Head of Sheffield School of Architecture on f.stevenson@sheffield.ac.uk Sheffield School of Architecture, The University of Sheffield, The Arts Tower, Western Bank, Sheffield, S10 2TN.

Thank you for taking the time to read this information sheet.

Appendix 8. Participant observation information sheet for participants

IMPROVING PERFORMANCE IN NEW UK HOMES:

The longitudinal change of organisational routines across associated networks in relation to learning

CASE STUDY OBSERVATION: INFORMATION SHEET

03 October 2015

You are being invited to take part in a research project. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of the study?

I am a postgraduate researcher from the University of Sheffield conducting research as part of my PhD studies. My research looks at how repetitive organisational routines are carried out by a number of people over time to achieve a specific aim or outcome. At [REDACTED], I will be looking at formal and informal feedback and learning routines in relation to Benchmark Inspections across three regional offices. This complements [REDACTED]'s current organisational learning research, which aims to develop innovation, knowledge fostering and idea sharing.

This fieldwork is anticipated to span from November 2015 to spring 2017. It involves observing a number of [REDACTED] staff and associated project team members across the three divisions for six weeks (two weeks in each division) on two occasions at least a year apart.

Why have I been invited to participate?

You have been invited to participate in this study for one of two reasons: either you work for [REDACTED] and have been identified as a key participant in relation to the Benchmark Inspections (i.e. I would like to shadow you and observe how the Benchmark Inspections are carried out from your perspective on a day-to-day basis); or you are working on a project with a [REDACTED] employee who is being shadowed (i.e. attending a meeting that they are or conversing with them about a project in relation to a Benchmark Inspection).

Do I have to take part?

No, participation is entirely voluntary. If you do decide to take part you will be asked to sign a consent form. You are free to withdraw at any time and without giving a reason.

What will happen during the observation periods?

If you are a [REDACTED] employee and have agreed to participate, I will be shadowing you for up to five working days, on two occasions at least a year apart. I will sit in your office or at a desk nearby and observe you carrying out your daily work activities, who you speak to and interactions between people in meetings you attend etc., both in a formal and informal capacity. My focus will be around (but not limited to) feedback and learning in relation to the Benchmark Inspections. I may also ask you, other staff or project team members questions about activities being performed. I will also be studying documentation relevant to the Benchmark Inspections, both current and historic. This will be treated in accordance with the conditions agreed with [REDACTED]. Depending on the circumstances, I may take part in activities relating to the Benchmark Inspections to better understand the processes involved. Please inform me at the earliest opportunity of any permissions or training required to ensure the relevant health and safety standards are met.

If you are working alongside a key participant, then you will see me shadowing them. I may attend meetings you do, or talk to you informally about the activities you are undertaking in relation to Benchmark Inspections.

You should have been made aware of me and my research prior to each visit, and asked to sign a consent form to participate in the study. If you wish to be excluded, you will not be mentioned in the research.

What are the possible disadvantages and risks of taking part?

It is hoped the only disadvantage of taking part in this study is the time taken to answer informal questions. The intention is to be as unobtrusive to daily working practices as possible.

Will what I say or do in this study be kept confidential?

All information divulged by you will be kept strictly confidential. However, whilst every effort will be taken to ensure your anonymity, it may not be possible to guarantee. This may be particularly relevant in relation to colleagues or fellow project team members. Therefore, subject to your agreement, the intention is to use your responses in contexts where anonymity can be maintained. On the occasions where this is not possible, quotes will be attributed to you by a generic description of your role, not name. For example, as a "development team member" etc.

To ensure your opinions are accurately captured, the discussion will be digitally recorded. The audio recordings of your interview will be used only for analysis and for illustration in conference presentations and lectures. No other use will be made of them without your written permission, and no one outside the study will be allowed access to the original recordings. Data generated by the study will be retained in accordance with The University of Sheffield's policy on Academic Integrity and kept securely in paper or electronic form for a period of six years after the completion of a research project.

What should I do if I want to take part?

If you would like to participate in the interview, please sign the enclosed Consent Form. The form will be kept as part of the data generated by the study.

What will happen to the results of the research study?

The results of the interviews will form part of my study fieldwork. The findings will be available to you for your approval prior to publication. Following your approval, the research will be published and extracts may also be published as papers in reputable Academic Journals or at conferences in future. You are very welcome to receive details of the academic publications or presentations. Please contact me on the details below.

Who has reviewed the study?

This research has been approved by the University Research Ethics Committee, The University of Sheffield.

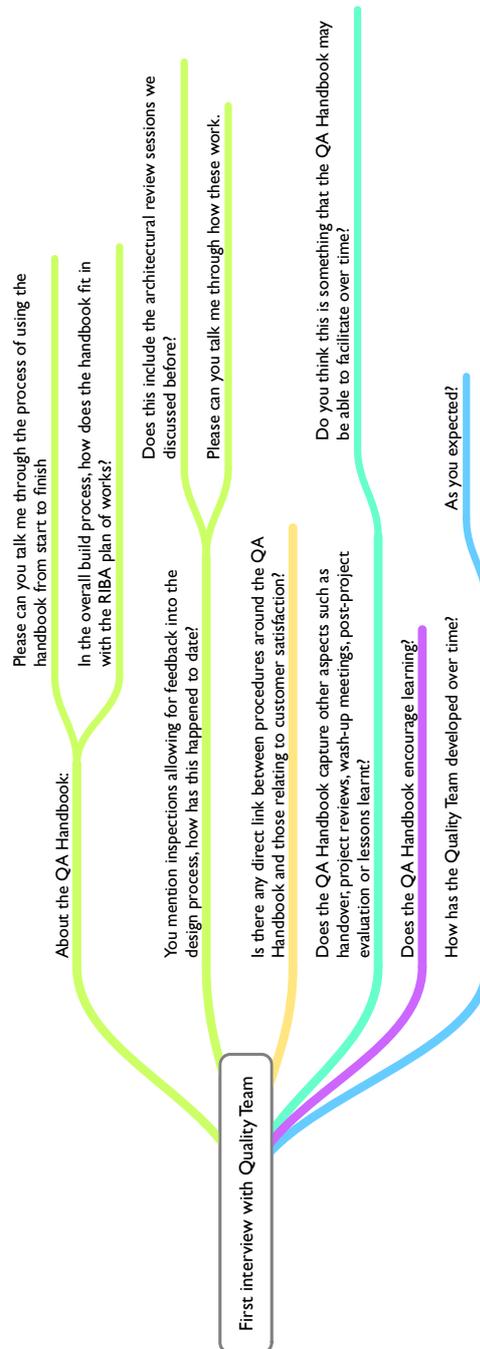
Contact for Further Information

Please contact Kate Morland, PhD Researcher on 07916 282839 or kvmorland1@sheffield.ac.uk or Professor Fionn Stevenson, Head of Sheffield School of Architecture on f.stevenson@sheffield.ac.uk Sheffield School of Architecture, The University of Sheffield, The Arts Tower, Western Bank, Sheffield, S10 2TN.

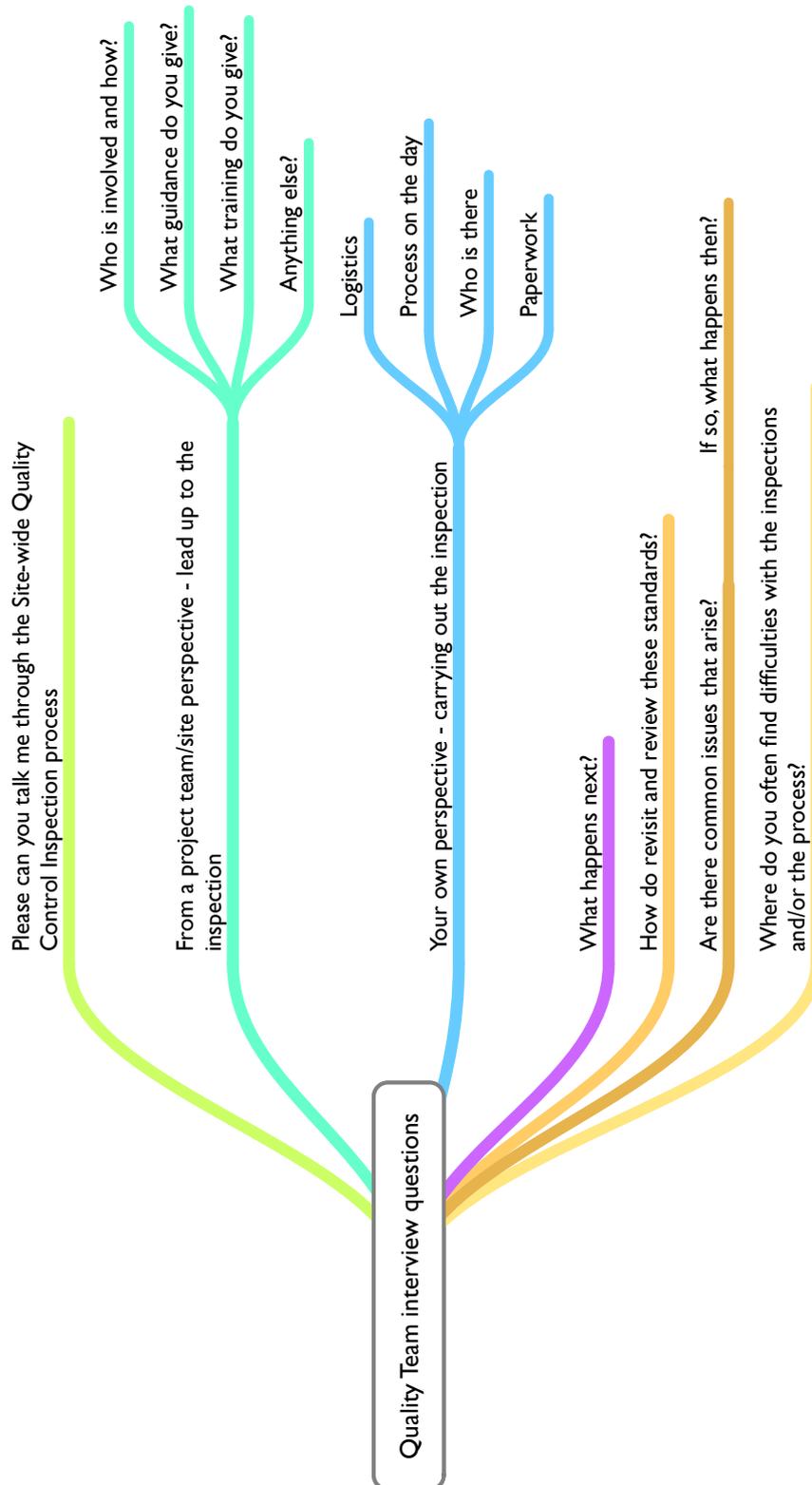
Thank you for taking the time to read this information sheet.

Appendix 9. Quality Team Interview questions

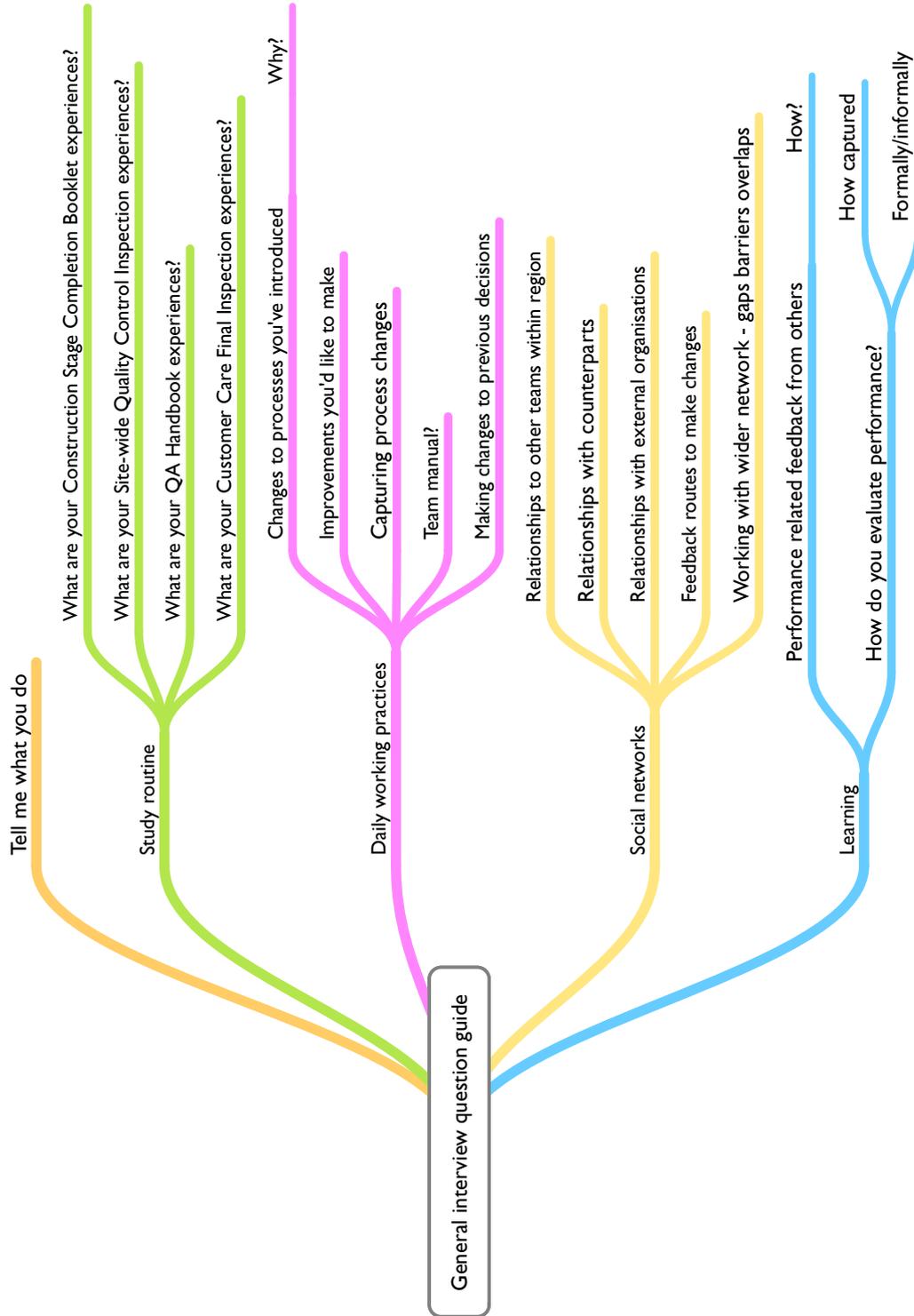
Questions from first interview with Quality Team to understand what the *quality management routine* was and how it worked as part of the housebuilder's standard processes.



Quality Team interview questions from the beginning of the fieldwork period about Site-wide Quality Control inspections



Appendix 10. General participant observation interview questions



Appendix 11. Fieldnotes from Thursday, 21 January 2016

Today is I suppose my first 'real' day on this site. How my time has been spent in this region is different than the others. I have spent more time in the office but used the time to trawl [the housebuilder's intra-net] and get the vibe across the office.

I get the feeling Participant X doesn't quite know what to do with me. This is compounded by the layout of the site office. But at least its only 2 days! And I think I need to leave reasonably early tomorrow. There's a meeting today that I'm sitting in.

Site walk-around

Went to Plot 7 with Participant X to let in Magic Man [fixes scratches]. Had wander round. Then to Block I with a Tiler [Trade individual who fits bathroom tiles]. Discussing what to do re. returning round nib. Realised shower tray not sized as per dwgs. Participant X to clarify tray stuff. Subbie [individual from Trade organisation] asking questions which is good.

Then off to look at other flats. We spotted bottle of wee. Participant X made a note and will bring it up at his subbies' meeting tomorrow. We talked about UFH [under-floor heating] as it's retrospectively fitted too. We walked all 4 floors. Some Subbies' arguing as Chippy's [the Carpenter's] chop saw in way in communal areas.

Also went round to see groundworks for apartment block at foundation level. Chatted to Participant X about how you can't micro manage all labourers on site but work with their gaffers [bosses]. Met up with Participant Y in Block I. They went on their own way half way through. Participant Y thought wee was the Plasterers. We also looked at the shower wall in the units on the floor above. This was shorter - well the wall wasn't in, but the floor was cut for the wall and was a lot shorter.

Returned to site office

Back to the site office for a brew. Participant Y and Participant Z talking to [a Head Office Health and Safety member of staff] about accident forms.

Participant X catching up with Participant Y and Participant Z.

NHBC Inspector coming, screed make-up.

Now having bit of quiet time sitting in chair next to Participant X's desk. Am trying not to talk to him as he looks busy.

Looked at flat dwgs re shower trays. Participant X has seen the 900x800mm shower tray on manufacturers website and was questioning why 800x800mm was seen on site. Participant Y to check specification and call Commercial Team member to resolve. The issues was only sorted because a Subbie asked questions. Otherwise would this have been picked up?? Participant X said you get some Subbies who don't ask questions and just do what they think is right. At least this one showed some 'nouse'.

There's lots of activity on site. Which is good and Participant X keeps referring to. What I did notice was a thing mentioned at the Site-wide Quality Control Inspection has not been adhered to - fb13.5 block inserts on doors - no wrap around of aluminium channels

Lunch

Just nipped out for lunch. Participant Y tried shower tray guy - assume the Plumber? - and got no answer.

Participant X is a very mild-mannered [in their role]. He talks often about challenges with the role. How busy it is, how he's had to stop sport to work on the site - except for football.

We chatted about Participant Y saying they moved here after year-end, as someone with more energy was needed. [The previous person] who was here, and here for the Site-wide Quality Control Inspection has been moved to another site. Participant X is very happy with Participant Y

Participant Z is studying at the Site Manager academy. I also need to get Participant X 's take on quality processes and what they thought of the Site-wide Quality Control Inspection.

Meeting

Attendees - Lift engineers x 2 from the HA [Housing Association], HA individual, Technical and Commercial Team members for the site

[Lift manufacturer] men x 2 arrive later

Relevant meeting points

- Contract and spec [design specification] don't tally up. A lot of things are not relevant or outdated. Generic lift specification.

- Disagreements already. Saying meeting spec except where technology outdated...yes...
- HA don't want to keep coming back to [this lift organisation] to get support.
- Worried about being maintained by other people.
- It's a [specific lift organisation name] lift – maintenance by others is not allowed
- HA have in writing that they don't need diagnostic tool for lift. All open protocol. In every controller. Will get statement to them...brief written as client worried not able to maintain without going back to [this lift organisation].
- Door panels - what is robust - cat 0, 1, 2 etc. Cat 2 is prison standard.
- Opening statement that [this lift organisation's product] meets spec but number of stats doesn't meet that.
- Same re flooring - rubber matting specified. Wood laminate finish put forward by [this lift organisation]...won't last 5 mins
- [Lift organisation] – to go through the spec and colour up and comment pdf to highlight differences - identify where don't comply. How quickly can you get it back - by end of Monday.
- To meet spec you would need to hand make lift - yes.
- Lift engineer works with other housing associations and they use their spec as they've been stung in the past by this.

Meeting 2

Curtain walling people meeting

Attendees: Participant X, Participant Y, 4 x individuals from Trade organisations, Technical and Commercial Team members for the site

- Going smoothly but lacks some weekly co-ordination rather than management Chinese whispers currently going on
- Missed a couple of louvres. Some costs swallowed by Contractor. Now looking at dwgs [technical drawings]
- Why no definitive quote - rushed. Package procured too late.

- Identifying who is doing what.
- Design calcs [calculations] for porches - get a price for going forward.

I have a question - SWQCI highlighted testing. NHBC getting hot on testing – will ask Participant about this tomorrow.

- Participant X to instigate a coordination meeting – Brickie [Bricklayers], Roofer, Window and curtain walling.
- His detail - really damp and insulation - Participant X and Tech Team member to coordinate curtain wall supplier detail with standard detail.

Back up to site cabin

Tech Team member and Participant Y checking details. Participant X emailing or typing.

All quiet on the home front, so I'll write up my immediate reflections from the two meetings.

Reflection from meetings

[Lift organisation] ignored spec and put forward the best suiting generic equivalent. Technical guy very reluctant to go through and highlight differences but agreed to in the end. HA lift engineer is old school and the same age as the spec. Disagreement started pretty soon after meeting started.

Second meeting

The curtain walling guy knows his stuff. He's in for the long haul so happy to drop price and absorb bits he's missed in his tender. He's asked for coordination meetings with relevant trades - let's see if Participant X does it! He doesn't need to be there just the trades but he needs to instigate them.

Back to what's going on in the site office

Tech Team member and Participant Y chatting about details. I'm just going to stay here and listen rather than clutter up the room.

Spoke to Participant Z re academy. He mentioned them bringing a new process in to record what they do for their own purposes.

AOVS – Sparky’s [Electrician] now wiring for actuators but supplier’s not supplying glass. Yesterday said they could but now told can’t. But have for other site in the city.

Trying to look for details now.

Now rereading email - it may not be the case but wiring needs to be right as being done now. Participant Y, Tech and Commercial Team members are on the case.

Appendix 12. Journal entry from Thursday, 21 January 2016

Journal entries were written in the evening after the day's events

Today was my first real day on site. Yesterday I attended meetings on site. Today Participant X took me on his rounds. I met the Magic Man and then we went to meet a Tiler who was questioning the extent of tiling in a shower enclosure-the wall was built to the right length but the tray on site was the wrong size in relation to the drawing. This showed a Sub-contractor (Subbie) who thinks things through and asks. Participant X says this is not always the case.

The afternoon comprised two meetings: a lift contractor and HA [Housing Association] representatives, the second a curtain-wall Subbie. The first was adjourned when the lift contractor agreed to read the Client's specification and point out where their proposal differed - something they seemed extremely reluctant to do. The technical guy from the lift contractor kept name dropping but fair play to him-he knew his stuff. Then the two lift guys had a lift appreciation chat at the end-it got a little too Games Workshop geeky for comfort.

The second meeting had a very switched-on Subbie talking about curtain walling and how they were going to approach it plus what was included in their tender and what wasn't. What was interesting here was the Subbie asking Participant X for a weekly coordination meeting between them, the Bricklayer, the Roofer and the Windows Installer. Participant X seemed reluctant to organise this as he didn't want to have to attend, but the Subbie said he didn't need to, just instigate it. The Subbie would chair. This suggests a desire to improve communication and coordination on site. It also suggests the Subbie needs Participant X's authority to make the meetings work.

Reflecting on the week so far, it's been good, although a little more stiff than previous site days. The Review Meetings show that previous actions are closed out, then finances are gone through, then programme, then quality as a final thought. The MD's [Managing Director] attitude towards the organisation's quality procedures is one of tolerating but not embracing. If this is being projected down from the head honcho, you can understand the animosity towards it. Although in his credit, the MD acknowledged the process was essential-as things he'd seen in other regions were shocking.

Going through another Site-wide Quality Control report gave the Project Team a chance to reflect and while they often said "we will do it like this from now on" there were instances where they said, "well, if we did it again, this would have

happened.” or “it should have been done like this.” For example, the corner posts in the bay windows or UFH system. It will be interesting to see how the two Technical Team members choose to respond to the report. This may link to something Fionn said-that the inspection template is a diagnostic rather than interrogative tool. Going through the Site-wide Quality Control Inspection reports-the why question is investigated verbally but probably not captured in the formal response back to group. Again, this influences the informal learning process. However, given the inspections are thought to be a necessary and useful ball ache, they are a ball ache none the less. So, suggesting additional feedback to the Quality Team about capturing the ‘why’ may not be a welcome recommendation. This is reinforced by one Quality Team member’s toolbox talk which covers what problems and poor examples they see, not why it happens.

Leading on from this, I have also seen work that has not been changed following the Site-wide Quality Control Inspection. The Quality Team member conducting the inspection talked about how the metal studs should be returned up against the timber infill for bracing. This is not being done-although saying that, I couldn’t find the detail in the QA Handbook nor could I find explicit reference in the inspection report. Therefore, if it is not formally requested, it won’t get done.

Before we left, there was a query about glass louvres. The Commercial Team member came up to help resolve the matter. It’s another thing that has been sprung on him since he took over this job. I think this highlights (and across all three regions) the importance of continuity or the formalisation of certain tasks before someone leaves-as the Commercial Team member has had some nasty surprises with this scheme. Also, nasties have been buried which are only just surfacing. With all of the housebuilder’s formal procedures in place, how could this happen? This is something to explore with Head Office staff in a few weeks’ time.

It’s my last day in this region tomorrow. I need to ask Participant X about the QA Handbook and Site-wide Quality Control plus emphasis on inspections after the final build stages. It would also be good to talk to someone in the Sales Team and Participant Y.