Sensemaking and Diversity in High Reliability Teams

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The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

The role of sensemaking processes is evident in studies that show how High-Reliability Organisations (HROs) avoid disasters in complex situations. Sensemaking is the process through which people construct meanings and bring order to unexpected or puzzling events. The petrochemical industry, in general, provides an HRO context. It involves dangerous and complex work yet has fewer than its fair share of accidents. In Saudi Arabia, the petrochemical industry is a multinational industry that operates with and by many joint-venture partners and is reported to have a highly diverse workforce composition.

Theories of HROs provide useful guiding principles and concepts that describe and explain how the process of sensemaking can be facilitated in HROs, yet, less acknowledgement has been given to the group diversity within High-Reliability Teams (HRTs) that may yield very different effects on the sensemaking process. To this concern, this research is an attempt to better understand the influence of diversity on reliability-seeking sensemaking processes (RSSPs) and the interplay between diversity, leadership behaviour, and organisational culture on generating this influence.

Using a qualitative methodology and a grounded theory-building approach (Strauss and Corbin, 1990; 1994), this research explored perspectives of 17 teams (57 technicians) with both high and low-diversity levels regarding their on-ground work experiences. The data revealed several practices (referred to as reliability-seeking sensemaking processes, RSSPs) that characterise sensemaking processes and which allowed the team to act reliably during unexpected and risky situations. These RSSPs were mainly manifested through the in-group: 1) exchange and generation of alternative perspectives; 2) emphasis on details; 3) showing high team orientation; and 4) collective and careful enactment of team contributions.

To relate these findings with group diversity, seven key factors were found to relate the in-group's dissimilarities with the level/quality of RSSPs, that are: group identification processes (first pathway); and the process of divergent perspectives generation (through cognitive elaboration – second pathway); individual preconceived views (e.g. diversity mindset); leadership behaviour; collective motives to engage; relational quality; and information processing capacity. Examining the role of these factors revealed that the effects of

diversity on the collective RSSPs were not due to in-team differences per se, but instead the way in which differences were perceived, processed, and integrated. Results of this study also revealed that leadership behaviour (e.g. fairness, on-ground support, showing trust, and conflict resolution) was a determinant for the diversity-RSSPs outcomes. These results provided important insights into the importance of diversity management on HROs to harvest its beneficial effects on RSSPs.

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Introduction

1.1 Overview

Today’s highly dynamic and tightly coupled work environments signify organisations need to improve their abilities to anticipate and contain unexpected events. When organisational members experience ambiguous and puzzling events, they strive to understand what is happening by extracting and interpreting cues from their surroundings to create a cognitive structure that allows people to act with more concentration (Maitlis, 2005; Weick, 1983; 1995; Weick, Sutcliffe, and Obstfeld, 2005).

Sensemaking—the process through which people construct meanings and bring order into unexpected or puzzling events (Maitlis and Christianson, 2014). The process of sensemaking is triggered when organisational members experience ambiguous and puzzling events (Weick, 1995). Through extracting and interpreting cues from the environment, sensemaking allows individuals to make sense of what is happening by creating a cognitive structure that brings order to and facilitates concentrated reactions (Maitlis and Christianson, 2014). Sensemaking is among the most important topics in organisational studies considering its key role in several organisational processes such as change, decision-making, innovation and creativity, and organisational learning (Maitlis and Christianson, 2014).

The role of sensemaking is evident in the studies that show how High-Reliability Organisations (HROs) can stay away from disasters while working in hard and complex situations. The term High-Reliability Organisations (HROs) is used to refer to "organizations that operate continuously under trying conditions and have fewer than their fair share of major incidents" (Weick and Sutcliffe, 2007, p.1). Such organisations manage "high performance in settings where the potential for error and disaster is overwhelming" (Weick and Sutcliffe, 2007, p.ix). They do this by operating according to principles such as preoccupation with failure, reluctance to simplify, and sensitivity to operations (Weick and Sutcliffe, 2007) that, as noted by Maitlis and Christianson (2014), “enable members to catch problems early, noticing and acting upon weak cues” (p.73). Such practices, as argued by Maitlis and Christianson (2014), contribute to the formation of an organisational culture that encourages sensemaking, which is significant

for HROs considering the frequent and potential impact of inconsistencies and uncertainties in their operations.

Petrochemical Industry, in general, provides a HRO context. It involves very complex conditions, and yet have less than their fair share of accidents (EMARS, 2012). Petrochemicals or petroleum distillates are chemical products (i.e. compounds and polymers) derived from petroleum (Chaudhuri, 2011). Examples of these products are synthetic fibres and rubbers, solvents, and plastics (Matar and Hatch, 2001). The main raw materials for petrochemical production are natural gas and crude oil (Matar and Hatch, 2001). For Saudi Arabia, petroleum-related industries are the lifeblood of the economy. By integrating its oil refinery projects with large petrochemicals plants (U.S. Department of Energy, 2014), Saudi Arabia maintains its leading position as the region’s largest petrochemical producer (BMI, 2016). After China and the US, Saudi Arabia is ranked the world’s third-largest producer of petrochemicals (BMI, 2016). Saudi Arabian petrochemical industry is a multinational industry that operates with and by many joint venture partners (BMI, 2016) and has a highly diverse workforce composition (McKinsey Global Institute, 2015; Ramady, 2010). Although the high possibility of accidents (EMARS, 2012), petrochemical industry in Saudi Arabia is still having a fewer than the fair share of major incidents and ranked as the top in the BMI's Middle East and Africa Petrochemicals Risk Index with a score of 76.1 (BMI, 2016).

1.2 Statement of Problem

The literature on High-Reliability Organisations (HROs) highlights the significant role that organisational culture and leadership behaviour play in encouraging and facilitating the process of sensemaking in HROs (Weick, 1995; Weick and Sutcliffe, 2007). As discussed by Weick and Sutcliffe (2007), HROs are organisations where informed culture is facilitated. An informed culture is "one in which those who manage and operate the system have current knowledge about the human, technical, organizational [sic], and environmental factors that determine the safety of the system as a whole” (Reason, 1998, p.294). In addition to the role of organisational culture in HROs performance, a great emphasis is also placed on the role of leaders as mindful organisers (Weick and Sutcliffe, 2007), sense breakers and sense givers (Mantere, Schildt, and Sillince, 2012; Pratt, 2000). While these studies represent employees or team members as a generic category, less acknowledgement has been given to the variation and differentiation within

High-Reliability Teams (HRTs) that may yield very different effects on the sensemaking process. For instance, and from a workgroup's perspective, team diversity can influence how individuals identify themselves and others within the team and thus increase the possibility of encountering conflict (Chatman et al., 1998; Jehn et al., 1999; Morrison and Milliken, 2000; Stevens et al., 2008; Westphal and Milton, 2000). In parallel to their potential effects on the sensemaking process, studies on diversity also identify the significant role that organisational culture and leadership behaviour play in evoking the effects of diversity (e.g. Chatman, 1998; Morrison and Milliken, 2000).

Although the research on team diversity shows inconsistent and mixed findings concerning the effects of diversity on team processes and functioning (Williams and O'Reilly, 1998; Mannix and Neale, 2005), there is an agreement that the influence of team diversity can be significant. Effects of diversity, which could be associated with organisational, team, task, and individual factors, can moderate teams' creativity (Chatman et al., 1998; Mannix and Neale, 2005), conflict (Chatman et al., 1998; Jehn et al., 1999; Morrison and Milliken, 2000; Stevens et al., 2008; Westphal and Milton, 2000), and productivity (Chatman et al., 1998; Jehn et al., 1999; Morrison and Milliken, 2000; Westphal and Milton, 2000). Diversity is also associated with team members' emotions (e.g. Westphal and Milton, 2000) and morale (e.g. Jehn et al., 1999; Stevens et al., 2008; Westphal and Milton, 2000).

Even though theories of HROs provide useful guiding principles and concepts that describe and explain how the process of sensemaking can be facilitated in HROs, some conceptual gaps remain. While these theories suggest that having an informed culture and mindful leadership behaviours are necessary for organisations to anticipate and contain unexpected events, they do not specify how this form of culture and behaviours will interact at the team-level within contexts of high diversity where demographical dissimilarity, variation of expertise, and different world views represent influencing factors for organisations' anticipation and containment capabilities.

A recent review by Maitlis and Christianson (2014) of the literature on sensemaking explicitly mentioned that social and cultural forces are among several forces that are quite overlooked, or certainly underplayed. Such factors, according to Maitlis and Christianson (2014), "shape what groups will notice, how they can act, with whom they interact, and the kinds of environments that can be collectively enacted" (p.98). Moreover, there have

been very few attempts to investigate the influence of team diversity on sensemaking, especially within the context of HROs. Yet, Jehn and Techakesari (2014) classified diversity as a problematic situation for HRTs, arguing that diversity in HRTs should influence the communication, information exchange and team conflict (Jehn and Techakesari, 2014).

1.3 Research Questions

To obtain a clearer picture of diversity's influence on the process of sensemaking in HRTs and the interplay between diversity, organisational culture, and leadership behaviour in HRTs' sensemaking, the research problem can be divided into two research questions. These are:

- How does team diversity influence the process of sensemaking in HRTs, if at all?
- What is the interplay between organisational culture, leadership behaviour, and diversity in influencing the process of sensemaking in diverse HRTs?

The first question will allow us to capture and conceptualize the effects of diversity in the context of HRTs. This will help us to understand diversity's influence on the process of sensemaking within the teams. In addition, it will help us to understand the underlying mechanisms through which diversity influences the sensemaking process. The second question of this study will allow us to provide a more comprehensive picture regarding the effects of diversity on sensemaking process by exploring the relationship between organisational culture and leadership behaviour and the appearance of diversity's effects on the processes of the participating HRTs.

1.4 Research Objectives

As previously discussed, the influence of diversity in HRTs' sensemaking is not well captured in research. Therefore, the overarching aim of this research is to narrow this research gap and conduct qualitative-inductive research to explore, understand, and describe how diversity in HRTs influences the reliability-oriented sensemaking processes and the interplay between organisational culture, leadership behaviour, and diversity in generating this influence. It will focus on the context of HROs, where the process of sensemaking is essential to anticipate and contain unexpected events. This study will hopefully contribute to knowledge by bridging the gap between the literature of team diversity, sensemaking, and HROs. It will also

serve as a guideline for organisations seeking high reliability to visualise the interplay of HRTs' diversity, organisational culture, and leadership behaviour and the impact on the sensemaking process.

1.6 Thesis Structure

This thesis has been divided into eleven chapters, with chapter 1 introducing this study, highlights its rationale, questions, and objectives. Chapters 2-4 offer a general and brief overview of sensemaking literature and other relevant literature – HROs, diversity, organisational culture, and leadership. Chapter 5 provides a contextual background for the study. Chapter 6 introduces and discusses the research methodology. The results of this study are presented and discussed in Chapter 7-10. Finally, Chapter 11 provides the conclusions reached by this study and outlines its contributions, implications, limitations, and future research directions.

Chapter 2
Literature Review

2.1 Introduction

Sensemaking is the process through which people construct meanings and bring order into unexpected or puzzling events (Maitlis and Christianson, 2014). Sensemaking is among the most important topics in organisational studies considering its key role in several organisational processes such as change, decision-making, innovation and creativity, and organisational learning (Maitlis and Christianson, 2014). The notion of sensemaking was introduced to organisational studies in the work of Weick (1969). Weick's (1995) book, Sensemaking in Organizations, is considered as one of the most significant developments in the study of sensemaking. The process of sensemaking is triggered when organisational members experience ambiguous and puzzling events. Through extracting and interpreting cues from the environment, sensemaking allows individuals to make sense of what is happening by creating a cognitive structure that brings order to and facilitates concentrated reactions. This chapter will introduce the notion of sensemaking and then describe its seven properties. The seven properties of sensemaking serve as a framework that explains what sensemaking is, how and where it can occur/fail (Weick, 1995). Examples of the practical implications of these seven characteristics on the process of sensemaking in diverse HRTs will be discussed in the following chapters.

2.2 Defining Sensemaking

The fragmented nature of the sensemaking literature poses definitional challenges. Maitlis and Christianson (2014, p.62) reviewed the literature on sensemaking in organisations and noted that sensemaking "is often invoked as a general notion, without an associated definition". They attributed such definitional challenges to the differences in the ontological assumptions regarding what sensemaking involves and where it takes places (Maitlis and Christianson, 2014). One of these different assumptions views sensemaking as a cognitive process that occurs in the individual's mind (Hill and Levenhagen, 1995; Starbuck and Milliken, 1998). For example, Starbuck and Milliken (1988, p.51) defined sensemaking as those processes that "involve placing stimuli into frameworks (or schemata) that make sense of

the stimuli". Similarly, Hill and Levenhagen (1995) viewed sensemaking as a process that requires individuals to "develop a 'vision' or mental model of how the environment works" (p.1057). On the other hand, sensemaking can be viewed as a social process that takes place between people (Balogun and Johnson, 2004; Gephart, 1993; Weick, 1995; 2005). Gephart (1993), for example, defined sensemaking as "the discursive process of constructing and interpreting the social world" (p.1485). Weick (1995) recognised the social basis of sensemaking and presented what is currently known as the seven properties of sensemaking. Weick (1995, p.17) argued that sensemaking is understood as "a process that is 1) grounded in identity construction, 2) retrospective, 3) enactive of sensible environments, 4) social, 5) ongoing, 6) focused on and by extracted cues, 7) driven by plausibility rather than accuracy". Weick et al. (2005, p.409) viewed the process of sensemaking as a process of organising and suggested that:

> sensemaking unfolds as a sequence in which people concerned with identity in the social context of other actors engage ongoing circumstances from which they extract cues and make plausible sense retrospectively, while enacting more or less order into those ongoing circumstances.

In an attempt to generate an integrated definition, Maitlis and Christianson (2014) discussed what they called the "recurrent themes across definitions of sensemaking" (p.66). They argued that sensemaking is understood as a process that is dynamic, triggered and shaped by cues, social, and associated with actions (Maitlis and Christianson, 2014). Maitlis and Christianson (2014, p.67) defined sensemaking as:

> a process, prompted by violated expectations, that involves attending to and bracketing cues in the environment, creating intersubjective meaning through cycles of interpretation and action, and thereby enacting a more ordered environment from which further cues can be drawn.

2.3 Properties of Sensemaking

The process of sensemaking has seven properties that, as Weick (1995, p.17) noted, "set sensemaking apart from other explanatory process such as understanding, interpretation, and attribution". These seven characteristics constitute the framework in which we can understand how sensemaking unfolds and how team diversity can be linked to the sensemaking process.

2.3.1 Grounded in identity construction

The basic assumption behind this property is that my definition of what is out there depends on who I am. According to Weick (1995), sensemaking is preoccupied with the formation and preservation of identity. This is also true for Erez and Earley (1993, p.26) who viewed the self as a "dynamic interpretive structure that mediates most significant intrapersonal and interpersonal processes". The work of Dutton and Dukerich (1991) explained the relationship between the self or identity and individual sensemaking in organisations and noted that the self-conception of individuals is influenced by the way others view their organisations. They argued that the organisational image influences how individuals identify themselves and how they approach issues (Dutton and Dukerich, 1991). Threats of negative images on self-representation can motivate individuals to change their perception of those images and redefine their identity (Weick, 1995). In his work on looking-glass self, Cooley (1902) identified that a self-idea has three principal elements: “the imagination of our appearance to the other person; the imagination of his judgment of that appearance; and some sort of self-feeling, such as pride or mortification” (p.153). He argued that it is not the imagination of our reflection itself that affects our identity, but “the imagined effect of this reflection upon another's mind” (Cooley, 1902, p.153). Weick (1995, p.22) explained how identity could influence the process of sensemaking:

> Depending on the ‘weight and character’ of that questioner, the imagined judgment of that person, and one's own resulting self-feeling, that small act of sensemaking . . . can affect individual interpretations and actions, which can then diffuse and have much larger organizational [sic] effects.

2.3.2 Retrospective

Weick (1969; 1995) classified the focus on retrospect as central and argued that it is the most distinguishing feature of the contemporary conceptualisation of sensemaking (Weick, 1995). To introduce the idea of retrospective sensemaking, Weick (1995) built his work on Schutz’s (1967) study of “meaningful lived experience”. The basic argument behind Schutz’s statement, as discussed by Weick (1995), is that “people can know what they are doing only after they have done it” (p.24). This means that people can understand what they are experiencing only after they have experienced it before. We can understand the retrospective generating of meanings by

thinking of the act of reflection as a light that shines backwards from a particular present (Weick, 1995). Such shine, according to Weick (1995), will give meaning to portions of lived experiences. The present state and feelings will affect backward attention (Schwartz, 1991). The role of attention in the meaning generation process was also stressed by Schutz (1967) who argued that "the meaning of a lived experience undergoes modifications depending on the particular kind of attention the Ego gives to that lived experience" (p.73).

Weick (1995) argued that reflecting on the past experience may result in effective future actions. Therefore, anything affects remembering will affect what is extracted from previous experience (Weick, 1995). In addition, and as is the case in team diversity, people may have different projects and goals that involve differing awareness, and thus reflection becomes overdetermined (Weick, 1995). In this case, clarity cannot be assured considering that the elapsed experience can be equivocal by making different, and probably contradicting, kinds of sense (Weick, 1995). In such scenarios, values, priorities, and preferences can help sensemakers to identify what is significant in elapsed experience and guide them in the meaning generating process.

Although reflecting on the past may be vulnerable to disruption and loss, as Weick (1995) noted, Starbuck and Milliken (1988) argued that retrospection "only makes the past clearer than the present or future; it cannot make the past transparent" (pp.39-40). Retrospection, therefore, fulfils an important goal of sensemaking by increasing the feeling of order, clarity, and rationality. As a result, Weick (1995) concluded that “present decisions can be made meaningful in a larger context than they usually are and more of the past and future can be brought to bear to inform them” (p.30).

2.3.3 Enactive of sensible environments

Nicholson (1995, p.155) described enactment as “an organism’s adjustment to its environment by directly acting upon the environment to change it". In organisational settings, Orton (2000) defined enactment as “the process in which organization [sic] members create a stream of events that they pay attention to” (p.231). Several studies argue that, in organisations, people are partially involved in creating new features for their environments (Orton, 2000; Weick, 1995; Weick et al., 2005). Therefore, and according to Weick (1995), “there is *not* some kind of monolithic, singular, fixed environment that exists detached from and external to these people” (p.31, italics in original). This role involves actions, which create materials, that form the environment

they have, including constraints and opportunities they face (Weick, 1988; 1995).

Weick argues that action is essential for sensemaking. He noticed that actions in organisations often create structures, opportunities, and constraints that did not exist before (Weick, 1988). Such actions, as discussed by Maitlis and Christianson (2014), enact the environment that people seek to understand. Enactment is a feature that distinguishes sensemaking from interpretation (Maitlis and Christianson, 2014). This led Maitlis (2005, p.21) to argue that sensemaking creates “rational accounts of the world that enable action”.

2.3.4 Social

When discussing sensemaking, it is important to remember that “human thinking and social functioning . . . [are] essential aspects of one another” (Resnick, Levine, and Teasley, 1991, p.3). Weick et al. (2005) argued that sensemaking occurs in the social world of others. In organisations, sensemaking occurs when individuals interact with each other to comprehend their environment and construct meanings that enable them to understand the world and react collectively (Maitlis, 2005). Sensemaking, as a social process, can occur in the imagined or physical presence of others (Weick, 1995). This same quality can be found in social physiology. As described by Allport (1985, p.3), social physiology is “an attempt to understand and explain how the thought, feeling, and behavior [sic] of individuals are influenced by the actual, imagined, or implied presence of others”. It is also posited and discussed in organisational studies; Burns and Stalker (1961, p.118) argued that “in working organizations [sic] decisions are made either in the presence of others or with knowledge that they will have to be implemented, or understood, or approved by others”. Sensemaking can take several forms of social influence other than shared meanings. As summarised by Weick (1995, p.42), “sensemaking is also social when . . . joint actions are coordinated by equivalent meanings . . ., distributed meanings . . ., overlapping views of ambiguous events . . ., or nondisclosive intimacy”.

2.3.5 Ongoing

An idea of Weick’s (1995) is that “people are always in the middle of things” (p.43). This idea led Weick (1995) to argue that the process of sensemaking does not have an absolute starting or stopping points. Instead, sensemaking is viewed as an ongoing activity that can be triggered in the middle of

situations when people encounter moments of interruption of continuous flows. These moments of interruption produce an emotional response that encourages people to extract cues from those moments (Berscheid, 1983; Mandler, 1984; Weick 1995). This is also highlighted by Burrell and Morgan (1979, p.237) who noted that “we always find ourselves in the middle of complex situations which we try to disentangle by making, then revising, provisional assumptions”. The ongoing nature of sensemaking means that it can be triggered on a continuous basis, and thus, people can consciously shape their understanding of and reaction towards their environment (Weick, 1995).

2.3.6 Focused on and by extracted cues

Sensemaking depends on how people notice, extract, and interpret cues (Weick, 1995). Cues allow people to make sense of what is occurring (Weick, 1995). An extracted cue, as argued by James (1950), can be considered as “an equivalent to the entire datum from which it comes”, and can suggest “a certain consequence more obviously than it was suggested by the total datum as it originally came” (p.340). It serves as a point of reference that guides feelings and directions in organisations (Smircich and Morgan, 1982). This point of reference constructs a cognitive structure that brings a presumed order and allows people to act with more concentration and thus creates a material order (Weick, 1983).

When discussing the role of extracted cues in sensemaking, it is important to remember the influence of context in cues extraction. Reviewing the problem sensing literature, in general, shows that “people attend to and encode salient material – events that are unpleasant, deviant, extreme, intense, unusual, sudden, brightly lit, colorful [sic], alone, or sharply drawn” (Kiesler and Sproull, 1982, p.556). Nevertheless, Weick (1995) argued that context affects what cues we extract and how those are interpreted. As discussed by Leiter (1980), meanings can be vague, equivocal, and multiple unless a context is supplied. For instance, social context can affect the saliency of cues in organisations by providing norms and expectations that boost/constrain noticing (Salancik and Pfeffer, 1978).

2.3.7 Driven by plausibility rather than accuracy

It is continuously argued in the studies of sensemaking that accuracy is good, but not essential (Weick, 1995). Isenberg (1986) emphasised the importance of plausible reasoning in his studies of managerial thinking. He argued that plausible reasoning goes beyond observation and creates

enough certainty by forming ideas that fit the facts (Isenberg, 1986). According to Weick (1995), sensemaking is about “plausibility, pragmatics, coherence, reasonableness, creation, invention, and instrumentality” (p.57). Although there are difficulties in achieving accurate perception, such perception can yield positive outcomes (Sutcliffe, 1994). For example, inaccurate perception, as noted by Sutcliffe (1994), can propel an individual to create plausible accounts that bring order to the world and encourage action. Sensemaking, as argued by Weick (1995), is about accounts that are embellished, elaborated, socially constructed and accepted. Therefore, obsession with accuracy in sensemaking seems unproductive considering the higher costs and potential dangers of close looks under the conditions of stress, risk, and limited resources, as Bruner (1973, p.30) argued, in addition to the existence of multiple meanings and identities that impose different interpretations (Weick, 1995). As mentioned in the introduction of this chapter, sensemaking seven properties serve as a framework that explains what sensemaking is, how and where it can occur/fail (Weick, 1995). They have practical implications on organisational sensemaking. For example, when social interactions are narrow as a result of team diversity, sensemaking processes may become threatened, and these threats can enlarge rapidly.

Although the notable influence of sensemaking perspectives, some scholarly critique has been directed to them (for a detailed discussion, see Sandberg and Tsoukas, 2015). Most of these critiques were around the focus on the retrospective sensemaking and the negligence of ‘prospective’ sensemaking (e.g. Gephart et al., 2010; MacKay, 2009; Stigliani and Ravasi, 2012). Gephart et al. (2010) argued that, in conversations, constructing images, meanings and structures that project future occurs only through prospective (i.e. future-oriented) sensemaking. Other critiques were directed towards the ambiguity of the concept of “sense” within sensemaking perspectives (e.g. Sandberg and Tsoukas, 2015), and the little acknowledgement of larger contexts in which sensemaking processes occur (e.g. Weick et al., 2005; Weber and Glynn, 2006 – for a notable exception, see Maitlis and Christianson, 2014).

2.4 Conclusion

The processes of sensemaking, therefore, start as a moment that challenges our expectation and end as a guide by which we identify ourselves and others, enact and interact with our environment. This chapter introduced the

notion of sensemaking and described its seven properties. These properties serve as a framework that explains what sensemaking is, how and where it can occur/fail (Weick, 1995). Although extensive work has been conducted on the process of sensemaking in organisations, it is still important to know how sensemaking is facilitated in organisations that work under intense time pressure and dynamic conditions. The role of sensemaking in such conditions is crucial where the ability to anticipate unexpected events is an important factor for organisations to survive. The work of researchers on High-Reliability Organisations (HROs) has tried to address this need by identifying the way in which organisations can enable and encourage sensemaking under trying conditions.

Chapter 3
High-Reliability Organisations (HROs) and Possible Relevant Factors

3.1 Introduction

This chapter provides a brief overview of the literature relevant to this study – i.e. HROs, organisational culture, and leadership. However, given the inductive nature of this research, this overview stays at a very general level. A more focused appraisal of the literature will occur in the theory development section following data collection and analysis.

The literature on sensemaking recognizes HROs as organisations that depend on and encourage sensemaking (Maitlis and Christianson, 2014). Several studies stressed the importance of sensemaking in HROs (Maitlis and Christianson, 2014; Weick and Sutcliffe, 2007) and attributed that to the “prevalence and potential impact of contradictions and ambiguities” in such organisations (Maitlis and Christianson, 2014, p.73). The basic assumption of HROs is that expectations, intentions, routines, and plans can lead organisations into catastrophes unless they have a mindful infrastructure that tracks small failures, resists oversimplification, remains sensitive to operations, maintains capabilities for resilience, and takes advantage of shifting locations of expertise (Weick and Sutcliffe, 2007). Such a mindful infrastructure enables organisations “to catch problems early, noticing and acting upon weak cues” (Maitlis and Christianson, 2014, p.73). Additionally, it helps them to formulate an organisational culture that encourages attentiveness and facilitates sensemaking (Maitlis and Christianson, 2014; Weick and Sutcliffe, 2007). Understanding the role that HROs practices play in facilitating HROs functioning, and more specifically, HRTs’ sensemaking will allow us to study the applicability of these practices and their interactivity with diversity in organisations.

3.2 HROs and HRTs

The term High-Reliability Organisations (HROs) is used to refer to "organizations [sic] that operate continuously under trying conditions and have fewer than their fair share of major incidents" (Weick and Sutcliffe, 2007, p.1). These organisations manage "high performance in settings where the potential for error and disaster is overwhelming" (Weick and

Sutcliffe, 2007, p.ix). HROs rely on mindfulness to reduce the unwanted outcomes of incidents and accelerate the process of recovery (Weick and Sutcliffe, 2007). They do this through their high-reliability teams (HRTs) who are the “on-the-ground response units in which members must react quickly to identify and resolve unpredictable and potentially disastrous events, such as drought, floods, earthquakes and bushfires” (Waller and Jehn, 2000, cited in Jehn and Techakesari, 2014, p.407). A lack of mindful infrastructure exacerbates the unwanted outcomes of unanticipated incidents and disrupts HRTs performance (Weick and Sutcliffe, 2007).

The distinctive feature of HROs relies on their mindfulness. HROs recognise how expectations, intentions, routines, and plans can influence their ability to anticipate and contain unexpected events (Weick and Sutcliffe, 2007). Weick and Sutcliffe (2007) observed that the best HROs recognise potential risks and appreciate the liabilities of overconfidence. They argued that such appreciation “takes the form of ongoing mindfulness embedded in practices that enact alertness, broaden attention, reduce distractions, and forestall misleading simplifications” (p.3).

3.3 HROs Principles

Weick and Sutcliffe (2007) identified five principles underlying the performance of HROs. These five principles are associated with organisations' preoccupation with failure, reluctance to simplify, sensitivity to operation, commitment to resilience, and deference to expertise. Weick and Sutcliffe (2007, p.9) noted that "the first three principles involve mainly an HRO’s capacity to anticipate unexpected problems, while the fourth and fifth have more to do with capacity to contain them".

3.3.1 Preoccupation with failure

HROs are sensitive to failure. They treat weak signals as symptoms of a potential disaster and believe that small separate errors can accumulate to become a catastrophe (Weick and Sutcliffe, 2007). Weick and Sutcliffe (2007, p.9) noted that HROs “are wary of the potential liabilities of success, including complacency, the temptation to reduce margins of safety, and the drift into automatic processing”. They do this by encouraging error reporting, learning from experiences, and articulating and discussing unwanted faults before they happen (Weick and Sutcliffe, 2007).

3.3.2 Reluctance to simplify

HROs avoid simplification. They believe that less simplification allows people to make sense of the whole picture. In HROs, recognising an event as something that happened previously is a cause of concern rather than a reason of reassurance (Weick and Sutcliffe, 2007). The concern is that people are inclined to construe events in line with their expectations and that artificial or surface similarities between experiences hide deeper differences that could be devastating (Weick and Sutcliffe, 2007). Therefore, Weick and Sutcliffe (2007) argued that people in HROs are careful in choosing what to simplify and detailed in discussing any potential faults for such simplification.

3.3.3 Sensitivity to operations

HROs are alert to the complex reality within any system (Weick and Sutcliffe, 2007). Being sensitive to operations involves monitoring interactions inside a complicated system and responding instantly to any unanticipated events (Perin, 2006). The difference between this principle and first two principles, as Weick and Sutcliffe (2007, p.59) noted, is that “sensitivity to operations is about the work itself, about seeing what we are actually doing regardless of what we were supposed to do based on intentions, designs, and plans”. This means that intentions, designs, and plans may threat the principle of sensitivity to operations (Weick and Sutcliffe, 2007). For example, Weick and Sutcliffe (2007) found that engineering culture, routines, and safety overestimation are threats to operations. They argued that engineering cultures, which stress designs and plans that put more value on quantitative, measure, and objective knowledge, threaten sensitivity by ignoring doubt, discovery, and interpretation that are the “hallmarks of sensitivity” (Weick and Sutcliffe, 2007, p.60). Routines can also endanger operations if they are not executed mindfully (Weick and Sutcliffe, 2007). Mindful execution of routines allows HRTs to update their routines to fit new conditions (Weick and Sutcliffe, 2007). In addition to engineering culture and routines, overestimation of reliability can also put operations at risk (Weick and Sutcliffe, 2007). The development of these threats is associated with the way in which HROs learn from their experiences (Weick and Sutcliffe, 2007). For example, when organisations continuously consider weak threatening signals as normal, this strengthens their beliefs that the existing system is highly reliable.

3.3.4 Commitment to resilience

Allenby and Fink (2005, p.1034) defined resilience as the “capability of a system to maintain its function and structure in the face of internal and external changes and to degrade gracefully when it must”. Being committed to resilience requires HROs to be mindful about faults that have happened and to try to mitigate their unwanted outcomes (Weick and Sutcliffe, 2007). It also requires a different mindset that expects surprises and thinks “mitigation rather than anticipation” (Weick and Sutcliffe, 2007, p.69). Wildavsky (1988) provided a precise description of the nature of commitment to resilience. He argued that the basic assumption behind the notion of resilience is that unexpected incidents are possible and unpredictable. To be capable of operating resiliently, as noted by Wildavsky (1988), is to learn from error rather than trying to avoid it and to react accordingly. Unlike anticipation, which stresses thinking before acting, commitment to resilience emphasises improvisation and actions as facilitators of thinking (Weick and Sutcliffe, 2007).

Weick and Sutcliffe (2007) specified three components of resilience. They argued that being resilient involves and organisational ability to a) absorb pressure and keep functioning during crises; b) carry or pull through unwanted events; and c) learn from previous experiences (Weick and Sutcliffe, 2007). This means that the ability of HROs to cope and respond depends on how people develop knowledge, provide feedback, improvise, learn, communicate, and recombine their varied perspectives and experiences (Weick and Sutcliffe, 2007).

3.3.5 Deference to expertise

HROs know that the authority hierarchy does not necessarily reflect the knowledge hierarchy (Weick and Sutcliffe, 2007). Therefore, they are careful to defer to expertise rather than rank. Weick and Sutcliffe (2007, p.77) described the culture that encourages the deference to the hierarchy as a culture that is “more informed by inputs that are colored [sic] by hierarchical dynamics such as uncertainty absorption and withholding bad news”. Unlike traditional organisations, where members demonstrate deference to the higher-ups, HROs show “the ability to alter these typical patterns of deference as the tempo of operations increases and unexpected problems arise” (Weick and Sutcliffe, 2007, p.74). Roberts et al. (1994) argued that the only person who can make quick decisions to alleviate and reduce the consequences of an unexpected event is the person who can immediately sense and has specific knowledge of such event. Deference to expertise

creates a culture that is mindful and informed by frontline knowledge and expertise (Weick and Sutcliffe, 2007). When an unexpected event unfolds, people who have specific knowledge contribute and manage their contributions to handle such an event (Weick and Sutcliffe, 2007). Such collective contributions represent expertise that resides in informal and ad hoc relationships, conversations, interactions, and networks (Weick and Sutcliffe, 2007).

Research in HROs offers many practices and processes that allow organisations to keep good safety records. However, there are several critiques of HRO perspectives. These critiques were around the small range of organisations in which HROs studies were conducted and the application of HROs principles in all organisational contexts (Lekka, 2011). Another issue in HROs studies is the abandonment of the organisational characteristics, properties, and underlying mechanisms that would enable all organisations to operate reliably (e.g. LaPorte 2006; Leveson et al., 2009; Waller and Roberts, 2003). As Boin and Schulman (2008, p.1054) concluded, it is still unknown “which subset of properties is necessary or sufficient to produce high reliability” and “which variables and in what degree might contribute to higher and lower reliability among a wider variety of organizations.”

This section provided an overview of how HROs can manage high performance in trying conditions. The literature on HROs stress that, in order to perform highly in trying conditions, organisations need to be preoccupied with failure, reluctant to simplify, sensitive to operations, committed to resilience, and deferential to expertise. These practices are expected to promote mindfulness, encourage attentiveness, and thus facilitate sensemaking. They allow organisations to create a form of mindful infrastructure that allows their members to anticipate and contain unexpected events. The literature on both sensemaking and HROs highlights several roles that organisational culture and leadership behaviour play in communicating and promoting such practices. Therefore, it is important to understand what organisational culture and leadership behaviour are, how they emerge, and how they can influence sensemaking in HRTs. The next two sections will introduce the notions of organisational culture and leadership behaviour and then highlight their potential role in HROs and sensemaking process.

3.4 Organisational Culture and HROs

Culture is something that surrounds us. It was described by Schein (2004) as a dynamic phenomenon that is created and consciously shaped by us to guide and constrain our behaviour. In an organisational context, culture is discussed as the thing that "holds your group together, [and] sets its prevailing tone" (Weick and Sutcliffe, 2007, p.109). The notion of organisational culture has been defined by Schein (1990, p.111) as:

> (a) a pattern of basic assumptions, (b) invented, discovered, or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is to be taught to new members as the (f) correct way to perceive, think, and feel in relation to those problems

Schein (1990) identified three levels at which organisational culture can be noticed: (a) observable artefacts, (b) values, and (c) basic underlying assumptions. Observable artefacts are defined by Schein (1990) as a notion that includes "everything from the physical layout, the dress code, the manner in which people address each other, the smell and feel of the place, its emotional intensity, and other phenomena, to the more permanent archival manifestations such as company records, products, statements of philosophy, and annual reports" (p.111). Values involve "norms, ideologies, charters, and philosophies" (Schein, 1990, p.112) while underlying assumptions are "the taken-for-granted, underlying, and usually unconscious assumptions that determine perceptions, thought processes, feelings, and behavior [sic]" (Schein, 1990, p.112). Underlying assumptions can start as values and then develop to become deeply held assumptions (Schein, 1990). Developing a consensus on critical underlying assumptions, as observed by Schein (1990) in a study of an organisation that requires hard work and rapid solutions, can allow people to work effectively in a highly complex and changing work environment.

Schein (1990) stated that one approach "to understanding the 'content' of a culture is to draw on anthropological typologies of universal issues faced by all societies" (p.112). He argued that deciphering the content of culture cannot be from its artefacts. Instead, Schein (1990) stressed that noting what he termed "espoused values" (p.112) is a roadmap for underlying assumptions. In his studies, Schein (1985; 1990) argued that any organisational culture has different answers to different dimensions

regarding a) its relationship to its environment; 2) the nature of human activity; 3) the nature of reality and truth; 4) the nature of time; 5) the nature of human nature; 6) the nature of human relationships; 7) homogeneity vs diversity. Understanding the underlying assumptions of organisational culture can explain any emergent phenomena inside organisations (Schein, 1990).

Schein (1990; 2004) argued that the culture is created as a result of 1) the formation of norms and the learning around critical incidents; and 2) the identification with leaders and founders. According to Schein (1990), norms and beliefs “arise around the way members respond to critical incidents” (p.115). Such norms develop to become beliefs or values and then deep assumptions (Schein, 1990). The second mechanism of culture creation is the identification with leaders and founders (Schein, 1990; 2004). The basic idea behind this mechanism is that “the modelling by leader figures . . . permits group members to identify with them and internalize their values and assumptions” (Schein, 1990, p.115). Schein (1990) argued that groups adopt their leaders own beliefs and then update their belief system based on their experience of what works for them as a whole.

3.4.1 Cultural Dimensions of HROs

Several studies attributed the higher performance of HROs to their principles such as preoccupation with failure, reluctance to simplify, and sensitivity to operations (Weick and Sutcliffe, 2007) that allow organisational members to “catch problems early, noticing and acting upon weak cues” (Maitlis and Christianson, 2014, p.73). These principles, as observed by Weick and Sutcliffe (2007), help organisations to "build their own locally rational practices" (p.10) that promote mindfulness, encourage attentiveness, and facilitate sensemaking.

Weick and Sutcliffe (2007) argued that organisational culture is the thing that “holds your group together, sets its prevailing tone, and may need to be changed if mindfulness is to be sustained” (p.109). They adopted that notion of “informed culture” by Reason (1998) in order to translate the general picture of culture into a more specific one that is focused on mindfulness. An informed culture, as defined by Reason (1998), is the culture "in which those who manage and operate the system have current knowledge about the human, technical, organizational [sic], and environmental factors that determine the safety of the system as a whole” (p.294). Reason (1998) noted that the informed culture requires four subcultures including a reporting culture, just culture, flexible culture, and learning culture and that

artefacts, values, and assumptions must be aligned around these subcultures.

3.4.1.1 Reporting Culture

The basic idea behind reporting culture is around “what gets reported when people make/experience errors” (Weick and Sutcliffe, 2007, p.125). Reporting culture in HROs is about “protection of people who report . . . [and] . . . what kinds of reports are trusted” (Weick and Sutcliffe, 2007, p.129). It helps people to anticipate, avoid, and mitigate the effects of unexpected events (Weick and Sutcliffe, 2007). Having a flawed reporting culture can affect the quality of information regarding events and result in a lack of mindfulness (Weick and Sutcliffe, 2007). These effects may extend further to impact all five principles of HROs. As Weick and Sutcliffe (2007, p.131) put it:

> [F]ailures are not made salient, [incidents] are simplistically labeled [sic] anomalies, procedures are not tight, recoveries from deteriorating conditions are missing, and there are no experts in the system to defer to.

3.4.1.2 Just Culture

Reason (1997, p.195) described the notion of just culture as “an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information—but in which they are clear about where the line must be drawn between acceptable and unacceptable behaviour". Just culture ensures that people are clear about “what constitutes the grounds of punishment” (Weick and Sutcliffe, 2007, p.132). It encourages admitting/reporting errors by resisting the tendency to blame individuals and considering the potential of learning. As observed by Weick and Sutcliffe (2007, p.132), “[p]ractices of blaming create an atmosphere that tends to stigmatize people and discourage them from speaking up”. Organisations can avoid such stigma by encouraging and rewarding individuals who “speak up on behalf of the system” (Weick and Sutcliffe, 2007, p.132).

3.4.1.3 Flexible Culture

A flexible culture involves “shifting from the conventional hierarchical mode to flatter professional structure, where control passes to task experts on the spot, and then reverts back to the traditional bureaucratic mode once the emergency has passed” (Reason, 1997, p.196). This form of culture adapts to situational demands and allows free flow of information by fostering individuals’ commitment to resilience and deference to expertise (Weick and

Sutcliffe, 2007). Flexible culture, as stressed by Reason (1997), depends significantly on respect for “the skills, experience and abilities of the workforce and, most particularly, the first-line supervisors” (p.196).

3.4.1.4 Learning Culture

Learning culture, as noted by Reason (1997), reflects “the willingness and the competence to draw the right conclusions . . . and the will to implement major reforms when their need is indicated” (p.196). The basic assumption behind the call for a learning culture, as argued by Weick and Sutcliffe (2007), is that “people can convert the lessons that they have learned into reconfigurations of assumptions, frameworks, and action” (p.126). Having an informed culture that fosters reporting, justice and flexibility will allow people to observe and learn from their best practices (Weick and Sutcliffe, 2007).

This section aimed to highlight the levels of culture, its underlying dimensions and explained how culture is formed. The second part of this section reviewed the overlap between organisational culture and HROs and introduced the notion of informed culture, which plays a significant role in facilitating HRTs functioning (Weick and Sutcliffe, 2007). HROs put a great emphasis on the organisational culture in encouraging sensemaking processes under intense time pressure and dynamic conditions (Weick and Sutcliffe, 2007). From an organisational culture perspective, developing a consensus on critical underlying assumptions is important for teams to work effectively in a highly complex and changing work environment (Schein, 1990). Therefore, it is important to know how HROs manage to create shared assumptions within and among their teams. Studies on organisational culture (e.g. Schein, 1990) identify leadership as a key component of shared assumptions development. The role of leadership behaviour is also apparent in the process of sensemaking (Gioia and Chittipeddi, 1991; Pratt, 2000). The literature on HROs and sensemaking highlight several roles of leadership in fostering HRTs’ abilities to make sense and anticipate unwanted events (Weick and Sutcliffe, 2007). The next section will introduce the notion of leadership and provide an overall review for the roles that leadership plays in the process of sensemaking from both sensemaking and HROs’ perspectives.

3.5 Leadership and Sensemaking

3.5.1 Defining Leadership

In addition to the emphasis on the role of organisational culture, literature on sensemaking and HROs also stresses the role that leadership plays in facilitating the process of sensemaking. The basic assumption behind most definitions of leadership, as noted by Yukl (2013, p.18), is that leadership "involves a process whereby intentional influence is exerted over other people to guide, structure, and facilitate activities and relationships in a group or organization [sic]". Yukl (2013) argued that leadership definitions differ in their assumptions about the source, purpose, manner, and outcome of leadership influence.

Leadership behaviour can appear in several forms and can, directly and indirectly, influence others (Yukl, 2013). It can appear in a form of specialised role that has a selected leader and other team members or followers (Yukl, 2013). Another form of leadership can appear as a shared influence process between team members (Yukl, 2013). For example, Schein (1990) considered the practices of dominant figures within the group as a form of leadership that "provide a visible and articulated model of how the group should be structured and how it should function" (p.115). This led Schein (2010) to provide a less-restrictive definition and describe leadership as "being influential in shaping the behavior [sic] and values of others" (p.3). Given that the focus of this research is on the influence of team diversity on the process of sensemaking and the interplay between organisational culture, leadership, and diversity in this process, this research will take into consideration all forms of leadership – behaviours and processes that are directly and indirectly influential in shaping others' behaviours and values and will refer to this as leadership behaviour.

3.5.2 Leadership in Sensemaking

The literature on sensemaking and HROs identify several roles of leadership behaviour in facilitating the process of sensemaking. From a sensemaking perspective, leadership behaviour can contribute directly to the process of sensemaking by occurring as a sensebreaking (Pratt, 2000) and sensegiving (Gioia and Chittipeddi, 1991). Sensebreaking, as defined by Pratt (2000, p.464), is "the destruction or breaking down of meaning". Pratt (2000) argued that the main purpose of sensebreaking is to "disrupt an individual's sense of self to create a meaning void that must be filled" (p.464). The process of sensebreaking is mostly identified as an act of leadership,

considering its influence on others' assumptions and actions (Mantere, et al., 2012; Pratt, 2000). Several studies proposed that the practices of sensebreaking can stimulate the process of sensemaking. For instance, and according to Maitlis and Christianson (2014), sensebreaking can encourage individuals to question their sense, to rethink their underlying assumptions, and to review their practices. Sensebreaking is often discussed as a prelude to the process of sensegiving (Pratt, 2000). As concluded by Mantere et al. (2012), sensebreaking destroys the organisational accounts that underlie a conventional interpretive scheme and increases recipient's receptiveness to the new accounts provided through the process of sensegiving. Sensegiving, on the other hand, has been defined by Gioia and Chittipeddi (1991, p.442) as "the process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organizational [sic] reality". Sensegiving occurs when predominant accounts are challenged through a variety of processes such as sensebreaking (Pratt, 2000) or conditions like threats, ambiguity and tension (Corley and Gioia, 2004; Maitlis and Lawrence, 2007). The role of sensegiving in facilitating the process of sensemaking can be significant. Several studies stressed the role of sensegiving in guiding, directing the process of sensemaking, and establishing the shared interpretive scheme (Gioia and Chittipeddi, 1991; Gioia and Thomas, 1996; Isabella, 1990; Ravasi and Schultz, 2006 – see Mantere et al., 2012 for a review). Additionally, and as argued by Gioia and Chittipeddi (1991, p.442), sensemaking and sensegiving can take place "in an iterative, sequential, and to some extent reciprocal fashion". In addition to the leadership role as sensebreakers and sensegivers, Rouleau and Balogun (2011) identified another role of leadership behaviour in "setting the scene" and creating a context for a conversation that facilitates the processes of sensemaking. In their study, Rouleau and Balogun (2011) stressed that understanding the socio-cultural context is essential for leaders to engage in their role effectively.

3.5.3 Leadership in HROs

The literature on HROs place emphasis on the role of the informed culture in promoting mindfulness, encouraging attentiveness and facilitating sensemaking (Weick and Sutcliffe, 2007 – see Section 3.3 and 3.4 for a review). This emphasis on culture is coupled with an equal emphasis on the role of leadership behaviour that can indirectly facilitate the process of sensemaking by creating an informed and mindful culture (Weick and Sutcliffe, 2007). The basic assumption behind HROs scholars' focus on

leadership behaviour in organisational culture is that leadership behaviour can communicate and model mindfulness for others, and thus can contribute to the formation of an informed culture (Weick and Sutcliffe, 2007). Therefore, leadership behaviour in HROs involves translating the principles of mindfulness into norms, values, and expectations that will allow organisations "to sustain mindful management of the unexpected" (Weick and Sutcliffe, 2007, p.138). Specifically, it involves revising and modifying practices, artefacts, values, and assumptions respectively to focus on reporting, justice, flexibility, and learning (Weick and Sutcliffe, 2007 – see Section 3.4.1 for a review). It is important to acknowledge that the view of leadership in HROs literature is quite general and needs to specify the types or characteristics of leadership behaviours that explains its relationship with reliability-seeking sensemaking processes.

3.6 Conclusion

The beginning of this chapter provided an overview of how HROs can manage high performance in trying conditions. The literature on HROs stress that, in order to perform highly in trying conditions, organisations need to be preoccupied with failure, reluctant to simplify, sensitive to operations, committed to resilience, and deferential to expertise. These practices are expected to promote mindfulness, encourage attentiveness, and thus facilitate sensemaking. They allow organisations to create a form of mindful infrastructure that allows their members to anticipate and contain unexpected events. The last two sections provided a general background on how organisational culture and leadership behaviour can influence sensemaking process in HROs and HRTs. Sensemaking perspectives stress the direct role of leadership behaviour in sensemaking and identifies the leader as sensebreaker and sensegiver. Understanding the socio-cultural context is critical for leaders to engage their role effectively (Rouleau and Balogun, 2011). This indicates a potential impact of different social and cultural factors on the leadership role in facilitating the process of sensemaking. In the HROs literature, great emphasis is given to the role of organisational culture in encouraging sensemaking processes under intense time pressure and dynamic conditions. The role of leadership behaviour, from the HROs' perspective, is specified as a facilitator of cultural change. These efforts are expected to allow organisations that seek reliability to improve their ability in anticipating and containing unexpected events. However, by considering sensemaking as an identity-centred social process,

the role of team members in authoring/constructing reality constitutes a key component of this process. Therefore, although organisational culture and leadership behaviour play a role in facilitating sensemaking process in teams working under trying conditions, we do not know how these elements (i.e. culture and leadership) interplay with team member diversity to influence the process of sensemaking.

Chapter 4
Diversity, Culture, Leadership and Sensemaking in HROs

4.1 Introduction

HROs rely on their HRTs to reduce the unwanted outcomes of incidents and accelerate the process of recovery (Weick and Sutcliffe, 2007). As discussed previously in Chapter 3, HRTs are the on-the-ground teams who work in highly dynamic environments and responsible for dealing with tightly-coupled systems and for proactively identifying and resolving any unanticipated incidents (Waller and Jehn, 2000, cited in Jehn and Techakesari, 2014). A recent article by Jehn and Techakesari (2014) identified several problematic situations that could impede HRTs functioning. These situations included diversity as an antecedent that "should influence the communication, information elaboration and how the conflict plays out" (Jehn and Techakesari, 2014, p.411). Diversity refers to the extent to which a workgroup is heterogeneous in terms of personal (e.g. age and race) and functional (e.g. work experience) attributes (Jehn et al., 1999). A diverse work team comprises individuals with different ways of thinking, expertise, disciplines and backgrounds (van Knippenberg and Schippers, 2007; Stevens et al., 2008).

Several studies reveal that successful integration of individuals' different skills and ideas enable workplace diversity to result in many positive outcomes. For example, a study found that diverse workgroups, comparing to similar ones, are often more creative, innovative, and productive (Earley and Mosakowski, 2000; Ely and Thomas, 2001; Watson et al., 1993). Even with these benefits, team diversity can result in unwanted outcomes. Studies find that diversity can slow down the decision-making process in teams considering the difficulties associated with reconciling different ideas and perspectives (Chatman et al., 1998; Jehn et al., 1999; Morrison and Milliken, 2000; Stevens et al., 2008; Westphal and Milton, 2000 – see Mannix and Neale, 2005 for a review).

Studies on diversity show that the influence of diversity may be contingent on several factors. These factors include organisational culture (e.g. Mannix and Neale, 2005; Stevens et al., 2008) and leadership behaviour (e.g. Morrison and Milliken, 2000; Mannix and Neale, 2005). This chapter will highlight the effects of diversity on team processes, discuss potential

implications of such effects for HROs, and review some of the studies that identify the interplay between organisational culture, leadership behaviour and diversity in influencing team processes. Given that this research is focused on sensemaking processes in HROs, the review will be limited to the effects of diversity that are most relevant to the process of sensemaking and will again be general and broad.

4.2 Categories of Diversity

Studies vary in categorising types of diversity (*see* van Knippenberg and Schippers, 2007 for a review). Some of these classifications suggested that in studying diversity's effects, it is important to consider both visible (e.g. demographic, education, and function background) and nonvisible differences such as personality, attitudes, and values (Harrison et al. 1998; Jehn et al. 1999). For instance, Jehn et al. (1999) classified diversity as informational, social category, and value diversity. Informational diversity refers to "differences in knowledge bases and perspectives that member bring to the group" (Jehn et al., 1999, p.743). Informational differences can appear as a result of differences among team members in education, experience, and expertise. Social category diversity, on the other hand, includes all explicit differences in social category membership such as gender, ethnicity, and race (Jackson, 1992; Pelled, 1996). Social category diversity provides a salient basis by which individuals can categorise themselves and others (Jehn et al., 1999). While social category diversity is associated with individual characteristics, value diversity is most often associated with workgroup tasks and goals. Value diversity, according to Jehn et al. (1999, p.745), "occurs when members of a workgroup differ in terms of what they think the group's real task, goal, target, and mission should be".

4.3 The Interplay: Organisational Culture and Diversity

The overarching aim of this chapter is to provide general background about the interplay between organisational culture, leadership behaviour and diversity in influencing the process of sensemaking in HRTs. Therefore, it is important to review the role that organisational culture plays in shaping the influence of diversity. The study of Chatman et al. (1998) suggested that organisational culture can evoke diversity's effects. Chatman et al. (1998) identified that organisational culture could affect communication, productivity, and conflict among dissimilar people. For instance, they

observed that the emphasis on collectivist organisational culture was associated with narrow types of interaction between dissimilar people, specifically, low face-to-face interactions (Chatman et al., 1998). Building on the literature on network research, Chatman et al. (1998) argued that such effects could negatively impact teams' problem-solving abilities. The role of organisational culture as a moderator of diversity's influence on team process was also evident in Stevens et al. (2008) study. As noted by Stevens et al. (2008), the ways in which organisations encourage and manage their diversity determine how diversity impact their team processes. For example, they found that an organisational focus on colourblindness – an approach which disregards cultural identities and focuses on the overarching organisational identity, was associated with increased frustration, dissatisfaction, and conflict among dissimilar people. In their study, Stevens et al. (2008) found that this approach was perceived by diverse people as an exclusionary practice. Such unwanted outcomes, as observed by Stevens et al. (2008), affected teams' cohesion and the acceptance/utilisation of different perspectives associated with members from different social categories. The study also highlighted other effects of diversity on the homogeneous majority, such as unity threats, diversity resistance, outgroups devaluation, and stereotypical judgements (Stevens et al., 2008). Interestingly, diversity was also found to influence diverse minorities' aspirations. Stevens et al. (2008) found that the way in which the majority perceive and react towards minorities, as a result of an organisational emphasis on multiculturalism, was proposed to negatively moderate minorities' attitudes and attraction towards organisational opportunities framed as supportive to multiculturalism.

The interaction between organisational culture and diversity can be reciprocal. A study conducted by Morrison and Milliken (2000) found that diversity or dissimilarity among people can affect the culture of an organisation. Specifically, they found that diversity can result in a phenomenon called 'organisational silence' – a collective phenomenon in organisations where rising information about potential problems by employees is something undiscussable (Morrison and Milliken, 2000). They argued that diverse employees often feel that they are "compelled to remain silent in the face of concerns of problems" (Morrison and Milliken, 2000, p.706). Morrison and Milliken (2000) attribute the emergence of such beliefs, which influence organisational culture, to the practices of leadership and the way in which leaders are perceived.

4.4 The Interplay: Leadership Behaviour and Diversity

Research has shown that diversity interacts with leadership behaviour (Ely, 1994; Morrison and Milliken, 2000). Morrison and Milliken's (2000) study of organisational silence also examined the conditions that contributed to this phenomenon. Their study proposed that demographic variance between those who are in positions of power and other organisational members will impact leaders' perception of different perspectives, and thus nurture the development of organisational silence (Morrison and Milliken, 2000). Specifically, they argued that diversity could increase mistrust and fear inside the mind of leaders and attributed this to the leaders' implicit beliefs and their fear of negative feedback (Morrison and Milliken, 2000).

In addition to the effects that diversity can have on leadership behaviour, the way in which leaders behave and appear can also influence diverse people actions. Cox (1994) argued that salient differences produce distrust and fear. This was evident in the study of Ely (1994), who found that dissimilar people's perceptions of themselves as different from those in leading positions affect their relationships. Building on this finding, Morrison and Milliken (2000) argued that leadership behaviour could interact with diversity allowing dissimilar people to feel that they are underrepresented, and that the organisation does not value their inputs. They concluded that such outcomes "may foster the belief that it is even more risky for them to honestly voice their opinions" (Morrison and Milliken, 2000, p.717). This in turn, will impact the amount, depth, and quality of information exchange within teams, and therefore, the quality of decision-making will be compromised.

Research findings also show that leadership behaviour can yield positive outcomes. Positive assumptions by those in leading roles concerning diversity were found to restrain the negative effects of diversity (Morrison and Milliken, 2000). Mannix and Neale (2005) also proposed a role of leadership in bridging diversity and building social ties through overarching goals at the task-, team- or organisational-level. An emphasis on the role of organisations and leadership in supporting minorities' representation, creating a culture of learning and openness was suggested to mitigate and reroute the negative implications of diversity on team processes (Mannix and Neale, 2005).

4.5 The Interplay: Leadership Behaviour and Organisational Culture

Studies on organisations reveal a clear interaction between organisational culture and leadership. Schein (2010) argued that what appears as a culture is a result of “what a founder or leader has imposed on a group that has worked out” (p.3). He called this mechanism the ‘identification with leaders and founders’ (Schein, 1990) and discussed it as the way through which leaders embed and transmit culture. The basic idea behind this mechanism is that “the modelling by leader figures . . . permits group members to identify with them and internalize their values and assumptions” (Schein, 1990, p.115). Schein (1990) argued that groups adopt their leaders own beliefs and then update their belief system based on their experience of what collectively fits them.

Despite the role that leadership behaviour plays in the formation, communicating, changing, and modifying the culture, studies also show that culture, at some point, can constrain this effect. According to Schein (2010), a group’s maturity stabilises and constrains its culture “even to the point of ultimately specifying what kind of leadership will be acceptable in the future” (p.3). Next section will introduce the potential effects of diversity on HRTs, and especially their sensemaking processes.

4.6 Potential Effects of Diversity on HRTs and Sensemaking Processes

Studies in organisational demography and intergroup relations identified several conditions in which group or team diversity can contribute to the development of problematic issues, and thus yield negative consequences (e.g. Chatman et al., 1998; Jehn et al., 1999; Mannix and Neale, 2005; Morrison and Milliken, 2000; Stevens et al., 2008; Westphal and Milton, 2000). As discussed in this chapter, workgroup diversity can influence teams’ creativity, conflict, and productivity. Studies also suggested an additional influence that diversity plays in emotions and morale. In the context of HROs, Jehn and Techakesari (2014) study is among few studies that consider the potential impact of diversity on HRTs. The study proposed that diversity in HRTs should influence the communication, information exchange and team conflict (Jehn and Techakesari, 2014). Therefore, even though studies of diversity in HROs are very limited, the literature on workgroup diversity, organisational demography, and intergroup relations

provide an indication of the potential influence of diversity on HRTs. This signifies the importance of understanding diversity's effects on collective RSSPs where HRTs must be able to catch problems early, noticing and acting upon weak cues in order to avoid catastrophic events.

The effects of diversity can impact teams' role structure and create role ambiguity and conflict (Benschop, 2001). In diverse workgroups, differences in attitudes towards hierarchy, styles of teamwork, and ways of voicing opinions can cause resistance, conflict, and misunderstanding among individuals (Benschop, 2001). Such effects can lead to dire consequences in situations that require quick decisions. As noted by Weick (1993) in his study of the Mann Gulch fire incident, loss of the team's role structure had a negative effect on the team's ability to think and react in an orderly way, resulting in an escalation of the incident.

The influence of diversity can also affect team interaction. According to Chatman et al. (1998), group dissimilarity can result in a narrow type of interaction. Specifically, they argued that diversity could reduce face-to-face interaction and increases other forms of interactions such as memos (Chatman et al., 1998). Such effects can be extremely dangerous within the context of HRTs, in which the teams' ability to make sense of problems and anticipate them effectively depends on the immediate exchange of information and the socially constructed understanding of meanings (Weick and Sutcliffe, 2007).

Diversity's influence can extend to produce frustration, conflict, and dissatisfaction among all organisational members, which consequently will affect the way in which people identify themselves (Stevens et al., 2008). Additionally, and as Steven et al. (2008) discussed, diversity can threaten majorities leading them to resist diversity, devalue, and stereotypically judge dissimilar people. In relation to sensemaking, Weick (1995) explained how identity could influence the process of sensemaking, arguing that individuals' interpretation and actions are associated with the way others judge and view them. He argued in his works on sensemaking that making sense of a situation is "dictated by the identity . . . [individuals] . . . adopt in dealing with it" (Weick, 1995, p.24).

4.7 Conclusion

This chapter provided a general overview of how organisational culture and leadership behaviour can influence the performance of HROs and,

specifically, the process of sensemaking. However, current literature on sensemaking and HROs do not explain how informed culture and leadership behaviour interplay with diversity in HROs. The current chapter (i.e. Chapter 4) reviewed the literature on workgroup diversity, organisational demography, and intergroup relations and found that diversity in teams may impede interaction, information exchange, creativity, and morale. It also examined the role that organisational culture and leadership approaches towards diversity play in determining the influence of diversity in teams. This review stresses the importance of this study by highlighting how catastrophic the effects of diversity in HROs can be and suggesting that the ability of HROs to encourage and facilitate sensemaking among teams depends, in addition to their current practices, on their way to approach and manage diversity.

It is important to acknowledge that the previous literature review aimed to provide a general overview as a platform to conduct an inductive exploration of the role of diversity, organisational culture, and leadership behaviours on the reliability-seeking sensemaking processes in HRTs rather than developing hypotheses or specific questions. A general overview of HROs literature emphasised on the practical significance of safety in HROs (Maitlis and Christianson, 2014; Weick and Sutcliffe, 2007). However, it is still unknown how does diversity affect reliability-seeking sensemaking processes and how does organisational culture and leadership fit in. Therefore, an inductive study is required in HRTs with varying levels of diversity to unpack this phenomenon.

Chapter 5
Contextual Background: Petrochemical Industry in Saudi Arabia

5.1 Overview

Petrochemical Industry, in general, provides a HRO context. It involves very complex conditions, and yet have less than their fair share of accidents (EMARS, 2012). In Saudi Arabia, petrochemical industry is a multinational industry that operates with and by many joint venture partners (BMI, 2016) and has a highly-diverse teams composition (McKinsey Global Institute, 2015; Ramady, 2010). Available studies in the petrochemical industry in the context of Saudi Arabia have empirically demonstrated that diversity can influence team processes. In one of these few studies, Alshahrani et al. (2015) found that cultural differences among team members in the Saudi petrochemical industry influenced the perceptions of safety behaviour. Such findings indicate a potential influence of diversity on sensemaking processes within HRTs, as noted by Jehn and Techakesari (2014). On the other hand, studies in the Saudi context do not provide an in-depth investigation of the underlying mechanisms of diversity effects (e.g. Alshahrani et al., 2015). This signifies the gap between diversity, sensemaking and HROs researches and stresses the importance of this study to address such gap and contribute to the literature on HROs, sensemaking, and diversity in teams.

5.2 Introduction to the Petrochemical Industry

Petrochemicals or petroleum distillates are chemical products (i.e. compounds and polymers) derived from petroleum (Chaudhuri, 2011). Examples of these products are synthetic fibres and rubbers, solvents, and plastics (Matar and Hatch, 2001). The main raw materials for petrochemical production are natural gas and crude oil (Matar and Hatch, 2001). However, other substances can be used to produce these chemicals such as oil shale, coal and tar sand (Matar and Hatch, 2001). The production of petrochemicals involves converting raw substances to desirable products (Chaudhuri, 2011). These products are produced, as noted by Chaudhuri (2011), in several forms such as feedstocks (first-generation

petrochemicals); intermediates (second-generation of petrochemicals); or finished products (third-generation petrochemicals).

A petrochemical plant consists of several processing units that are grouped and located suitably (Chaudhuri, 2011). It includes other facilities such as power plant, cooling tower, water conditioning plant, quality control centre, service centres (e.g. firefighting facilities, first aid, canteen), and other administrative offices (Chaudhuri, 2011).

5.3 Petrochemicals in Saudi Arabia

Petroleum-related industries are the lifeblood of the Saudi economy. By integrating its oil refinery projects with large petrochemicals plants (U.S. Department of Energy, 2014), Saudi Arabia maintains its leading position as the region's largest petrochemical producer (BMI, 2016). After China and the US, Saudi Arabia is ranked the world's third-largest producer of petrochemicals (BMI, 2016). The availability of cheaply extractable feedstock, governmental support, low energy and tax costs, and the strategic location make Saudi Arabian petrochemical industry one of the most attractive business environments in the Middle East and possibly the world (BMI, 2016).

In align with the National Industrial Clusters Development Programme, Saudi Arabia started to promote and support joint ventures (JVs) partnerships aiming to revive "its manufacturing sector and diversify its opportunities in other industries such as downstream industries" (BMI, 2016). For example, Saudi Basic Industries Corp (SABIC), the largest petrochemicals producer in the Middle East and the 11th globally, established many multinational joint ventures with companies such as Shell, Mitsubishi and ExxonMobil Chemicals to operate some of its 19 world-scale complexes in Saudi Arabia (BMI, 2016). SABIC operates with a workforce of 40,000 individuals from over than 50 countries (SABIC, 2016). Saudi petrochemical industry to relies heavily on expatriate labour due to the deficiencies in the educational system in Saudi Arabia, which prevents the supply of marketable skills (BMI, 2016). However, continuous government focus on job localisation in Saudi Arabia (i.e. Saudisation policy), together with its heavy investment in education projects (e.g. King Abdullah Scholarship Program) seem likely to affect the composition of companies' workforce dramatically (McKinsey Global Institute, 2015; Ramady, 2010).

5.4 HRTs in Saudi Petrochemical Industry

As discussed in Chapter 3, HRTs are “on-the-ground response units in which members must react quickly to identify and resolve unpredictable and potentially disastrous events, such as drought, floods, earthquakes and bushfires” (Waller and Jehn, 2000 cited in Jehn and Techakesari, 2014, p.407). Saudi Arabian petrochemical industry, which is a multinational industry that operates with and by many joint venture partners (BMI, 2016), has a highly diverse workforce composition. As discussed previously, this diversity can be attributed to the companies’ focus on functional experience and the shortage of local expertise (BMI, 2016). Furthermore, the government’s focusing on job localisation in Saudi Arabia accompanied with its investment in education projects seem to create a new form of diversity in teams at the operational level (Ramady, 2010). These results, in fact, may contribute to the development of new diversity effects in the Saudi petrochemical industry, such as those discussed by Stevens et al. (2008 – see Chapter 4 for a review) related to majority-minority representation.

The literature on HROs classifies HROs as organisations that work in very complex conditions and have less than their fair share of accidents (Weick and Sutcliffe, 2007). It is evident that the possibilities of accidents in petrochemical are high. Statistics in the EU Major Accident Reporting System (EMARS, 2012) indicate that the petrochemical industry is the second in the number of accidents. Although there is a high possibility of accidents in the petrochemical industry, petrochemical industry in Saudi Arabia is still having a fewer than the fair share of major incidents and ranked as the top in the BMI's Middle East and Africa Petrochemicals Risk Index with a score of 76.1 (BMI, 2016).

Therefore, I propose that organisations in Saudi petrochemical industry can be considered as HROs as they operate in very complex conditions that include, for example, extreme weather that can cause disruption to water and electricity supplies, and a high potentiality of terror attacks (BMI, 2016). I also assume that choosing Saudi Arabian petrochemical industry, which is a multinational industry that includes many forms of workforce diversity and operates in trying conditions, will allow us to explore, understand, and describe how diversity in HRTs influences the reliability-seeking sensemaking processes and the interplay between organisational culture, leadership behaviour, and diversity in generating this influence. It, therefore, will provide insightful findings to HROs, sensemaking, and diversity literature.

Chapter 6
Research Methodology

6.1 Introduction

In his works on organisational culture and leadership, Schein (1990) explicitly stated that deciphering what is really going on in a particular organisation needs to "start more inductively to find out which of these dimensions is the most pertinent on the basis of that organization's [sic] history" (p.112). Overall, this work adopted an inductive (i.e. bottom-up) approach. Considering the nature of phenomena (i.e. diversity and sensemaking), it followed an interpretivist research paradigm and used a qualitative research methodology. To gather in-depth data and to explore diversity's effects on HRTs' reliability-seeking processes and the role of leadership behaviour and organisational culture in influencing this relationship, this research was designed according to a multiple-case studies approach. Data was collected and analysed using interviews and in accordance with grounded theory building approach (Strauss and Corbin, 1994) and critical incident technique (Flanagan, 1954). With a research sample of 57 technicians from 17 teams, I looked for critical incidents, narratives and situations to understand diversity-sensemaking interaction and its underlying mechanisms and association with leadership behaviour and organisational culture.

6.2 Research Approach, Philosophy, and Method

6.2.1 Research approach

Choosing the research approach is the first step to answer any research question. Research approaches differ in terms of their philosophical and theoretical traditions and thus differ in their logics and methods of social inquiry (Blaikie, 2010). A deductive research approach, for example, aims to explain the association between concepts by presuming possible theories, testing them, and deducing conclusions (Blaikie, 2010). It, therefore, can be an appropriate research approach to answer 'why' questions (Blaikie, 2010). On the other hand, the inductive research approach is proposed to be a suitable approach to answer 'what' questions. It allows the exploration and description of a specific social phenomenon (Blaikie, 2010).

The approach of this research is guided by specific questions that stem from broader conceptual and practical concerns. As stated in the research introduction (*see* Chapter 1), the main objective of this research is clearly defined to explore the influence of diversity on HROs and understand the underlying mechanisms of such influence. Additionally, it is not aimed by this research to test hypothesis and produce generalisable assumptions, but rather to capture the influence of diversity in the particular HROs studied. Therefore, this research will focus on the inductive research approach. An inductive research approach starts with collecting data, providing descriptions, and then ends with relating these descriptions to the research questions (Blaikie, 2010). Therefore, it seems convincing that an inductive research approach will be suitable to fulfil the current research questions and purpose.

6.2.2 Research philosophy

Research philosophy or paradigm is a belief system that defines reality, its parts, and the association between this reality and its parts (Guba and Lincoln, 1994). It provides researchers with a criterion of what could be considered as reality (i.e. ontological question), and how to approach such reality (i.e. epistemological and methodological question). As Guba and Lincoln (1994, p.108) argued, research paradigms “must rely on *persuasiveness* and *utility* rather than proof in arguing their position” (italics in original).

The basic belief of positivist research philosophy is that reality has an objective and observable existence (Sayer, 2000). It proposes that social reality exists outside individuals as natural laws and mechanisms (Guba and Lincoln, 1994; Petty et al., 2012; Sayer, 2000). Furthermore, positivistic philosophy identifies the research and the reality as independent entities (observer-object) that do not influence each other (Bruce et al., 2008; Guba and Lincoln, 1994). On the other hand, interpretivist research philosophy accepts that reality is neither observable nor objective; but rather socially constructed meanings (Dyson and Brown, 2006). Interpretivist philosophy has a subjectivist assumption that reality can be known through the interpretation of social meanings and by the interaction between researches and respondents (Creswell, 2014; Guba and Lincoln, 1994).

Positivist research traditions have been classified as reductionist and deterministic (Creswell, 2014; Hesse, 1980). It seeks to explain causes that determine outcomes and reduce these causes into discrete sets (Creswell, 2014). In contrast, interpretivist tradition aims to understand and reconstruct

reality (Guba and Lincoln, 1994). It believes that reality is associated with human experience and interpretation, and thus varies (Creswell, 2014; Crotty, 1998). Therefore, it assumes that social phenomena are not like the natural sciences and should be investigated from the 'inside' (Blaikie, 2007).

In this research, I took an interpretivist worldview taking into consideration the evident role of individual identity and social perspectives in understanding the process of sensemaking (Ashforth and Schinoff 2016; Brown, 2015; Pratt, 2000; Weick, Sutcliffe, and Obstfeld, 2005) and the influence of diversity (Jehn et al., 1999).

6.2.3 Research method

The concept of sensemaking has always been associated with individual identity and social authoring of meanings. It has a descriptive nature that is always found to be related heavily to qualitative research methodologies (e.g. Weick, 1993; Weick and Sutcliffe, 2007). Qualitative methodologies adopt a flexible approach that takes into consideration the perspectives of social actors and focuses on social processes (Blaikie, 2010). This provides thick descriptions and allows the development of theories and concepts (Blaikie, 2010).

Dabbs (1982) stressed the importance of quality in studying the nature of things. The notion of quality, as Berg (2007) explained, refers "to the what, how, when, and where of a thing" (p.2). Therefore, and consistent with this research approach and philosophy, qualitative methods are found to be sufficient to answer the current research questions. Whereas Van Maanen (1979) identify the notion of qualitative methodology as an "umbrella term" (p.520) that includes a wide range of approaches, following section will describe the processes and the rationale of research design, specifying data collection and analysis procedures.

6.3 Research Strategy — Design and Setting of Study

6.3.1 Case study

This research will rely on conducting multiple-case studies. The case study method is defined by Hagan (2006, p.240) as "in-depth, qualitative studies of one or a few illustrative cases." Yin (2009, p.18) added the dimension of time and context by defining the notion of case study as "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". Creswell (2013, p.97) explained that in a case study

the researcher explores real-life through “detailed, in-depth data collection involving *multiple sources of information* …, and reports a *case description* and *case themes*” (italics in original). The focus of a case study can be associated with “phenomenon, events, people, or organizations [sic]” (Berg, 2007, p.285) and even processes (Yin, 2009). It, therefore, guides the researcher to provide what Geertz (1973, p.26) termed a “thick description”. Interestingly, the case study approach is also found to be associated with the process of sensemaking. Berg (2007, p.285) adopted the notion of sensemaking by Weick (1995) and argued that the core of case studies “open the door to the sensemaking processes created and used by individuals involved in the phenomenon, event, group, or organization [sic] under study.”

Why multiple-case studies? In case-study research, the researcher needs to choose between studying single or multiple cases. Multiple case studies are commonly considered as more compelling and more robust studies (Berg, 2007). These studies can increase confidence in their findings by generating and contrasting them from and between different units (Yin, 2009). Given the objectives of this research, gathering data about diversity and sensemaking processes from different sites and HRTs will generate more perspectives on team diversity and sensemaking processes with diverse contexts (e.g. different organisational cultures and leadership behaviour) and thus provide a rich description for the phenomenon under investigation. Therefore, and considering the social- and contextual-related nature of this study, it would be more useful to conduct a multiple-case study rather than a single-case study. For the same purpose, the collective reliability-seeking sensemaking experiences of each HRT was considered as a unit of analysis.

6.3.2 Research setting: Petrochemical Industry in Saudi Arabia

In qualitative research, the setting and sample of the research need to be purposefully selected (Creswell; 2014; Strauss and Corbin, 1994). Thus, and as discussed by Miles and Huberman (1994), qualitative research must include four aspects: a) the setting; b) the actors; c) the events; and d) the process. Regarding the research setting, this research is conducted in the petrochemicals sector in Saudi Arabia (*see* Chapter 5 for a general review). The petrochemical industry in Saudi Arabia offers a fertile land for diversity and sensemaking research considering its a) high levels of diversity within its workforce; b) exposure to unexpected events; and c) need for sensemaking to anticipate and contain such events. Therefore, and considering the fact these companies work in very complex conditions and

have less than their fair share of accidents – using Weick and Sutcliffe (2007) criteria of HROs, it could be argued that choosing Saudi Arabian petrochemical industry will provide an insightful findings to HROs, sensemaking, and diversity literatures by exploring, describing, and explaining how diversity in HRTs influences the reliability-seeking sensemaking processes and the interplay between organisational culture, leadership behaviour, and diversity in generating this influence.

6.3.3 Selection criteria and study sample

As introduced previously, this research aims to explore, understand, and describe how diversity in HRTs influences the reliability-seeking sensemaking processes and the interplay between organisational culture, leadership behaviour, and diversity in generating this influence. It, therefore, used specific selection criteria for the participating sample to capture such complexity. Overall, this research involved operational-level teams (i.e. HRTs) who operate in trying conditions, deal directly with plants' heavy machinery, and encounter unexpected events on a daily basis (e.g. work emergences, near misses, and accidents). To capture the interaction between diversity and HRTs' sensemaking processes, the study sample selection took into consideration two dimensions: a) accident rates; and b) diversity rate. These dimensions were helpful in relating teams' ability to anticipate unexpected events with their diversity rate. The dimension of accident rates relied on team accident reports. Teams with more than average accident rates compared to other teams within the same organisation were considered as teams with high-accident rates. On the other hand, and regarding the dimension of diversity rate, the focus in this study was on the surface-level diversity such as social category diversity (e.g. gender, nationality, and age) and Informational/functional differences (e.g. rank, education, experience – *see* Chapter 4 for a brief review). Salient differences (e.g. gender, age, and nationality, and rank) can elicit social categorisation processes in groups and affect their collective identification – i.e. sense of belonging (Steven et al., 2008). These effects can result in team members resist diversity, devalue, and stereotypically judge dissimilar others. These effects may also extend to interact with sensemaking processes, which are social and associated with the way individuals judge and view each other (Weick, 1995).

Gathering sampling information and the selection processes was facilitated with the assistance of HR and R&D departments in participated companies. Several emails have been sent to the heads of R&D in 6 companies

explaining the research aims, data confidentiality (including the sensitivity of accident data) and the way of data management, in addition to participants rights. With attentive follow-ups, 2 companies refused to participate, and a sample of 17 HRTs was drawn from 4 large petrochemicals companies in Jubail and Yanbu industrial cities. The sample was divided into four groups according to their overall rates of diversity and accidents (*see* Table 6.1).

Table 6.1 Distribution of case studies (i.e. teams) based on their diversity/accidents rates

		Diversity Rate	
		High (teams)	Low (teams)
Accident Rates	High	T5, T6, T7, T8, T13	T9, T10, T11, T12
	Low	T1, T2, T3, T4	T14, T15, T16, T17

As shown in (Table 6.1), 17 HRTs were selected across the two criteria with the assumption that having more than one team in each group will help to reduce any unique factors and provide more robust results. This selection criteria and sample were helpful in capturing HRTs' realities within different contexts and conditions, and to relate the findings to the wider interplay of organisational culture and leadership behaviour.

6.3.3.1 Research actors, events and process

As just discussed, actors of this research were the members of operational-level teams (i.e. HRTs). Those teams operate in trying conditions, deal directly with plants' heavy machinery, and encounter unexpected events on a daily basis. Research actors were asked to report their most recent experience of an unexpected event. The data collection process was guided by the Critical Incident Technique (CIT) by Flanagan (1954) and was focused on collecting information concerning incidents and observable activities (more details in Section 6.4.1 below).

As shown in table (6.2) data sample consisted of 57 interviews from 17 teams (9 teams from high diversity groups and 8 teams from low diversity groups). High diversity group included 31 technicians (18 of them from high accident groups and 13 from low accidents groups) whereas low diversity groups included 26 technicians (13 with high accidents rates and 13 with low accidents rates). For most of the teams, all technicians were involved in the

research. One technician from the high-diversity/high-accidents group was unable to participate due to a work-related injury.

Table 6.2 Numbers of semi-structured interviews.

Teams		Number of semi-structured interviews
High diversity groups (9 teams)	**High accidents** (5 teams)	**18** (one missing)
	Low accidents (4 teams)	**13** (all involved)
Low diversity groups (8 teams)	**High accidents** (4 teams)	**13** (all involved)
	Low accidents (4 teams)	**13** (all involved)
Total interviews		**57**

Regarding the attributes of involved HRTs, this research included teams with both high and low diversity rates. High diversity groups included technicians with demographical (e.g. gender, nationality, and age) and informational/functional differences (e.g. rank, education, and experience). In addition to the demographical differences, informational/functional differences such as rank (e.g. senior vs juniors) and status (e.g. formal technicians vs informal contractors) are pertinent for the interactions of HRTs as they may lead to different perceptions of in-team knowledge and power and ultimately varying team interactions. Table (6.3) below provide an overall summary of the attributes of HRTs involved in this research.

Table 6.3 Illustration of high-diversity HRTs attributes.

Accidents Rates	Team No.	Orgs. Name	Gender Split	Nationality Split	Age Split	Ranks Split	Status Split
Low Accidents	1	A	3 Males	1 Western 2 Saudis	No reported differences	3 Seniors	3 Formals
	2	D	1 Female 2 Males	1 Asian 2 Saudis		2 Seniors 1 Junior	1 Helper 2 Formals
	3	B	3 Males	3 Saudis		1 Senior 2 Juniors	3 Formals
	4	C	2 Females 2 Males	4 Saudis		4 Seniors	4 Formals
High Accidents	5	B	3 Males	3 Saudis		1 Senior 2 Juniors	3 Formals
	6	D	2 Females 2 Male	4 Saudis		4 Seniors	4 Formals

Accidents Rates	Team No.	Orgs. Name	Gender Split	Nationality Split	Age Split	Ranks Split	Status Split
	7	**A**	4 Males	1 Asian 3 Saudis	1 Saudi was reported to be significantly older than the remaining 3 technicians	3 Seniors 1 Junior	1 Helper 3 Formals
	8	**D**	3 Males	1 Asian 2 Saudis	No reported differences	2 Seniors 1 Junior	1 Helper 2 Formals
	13	**C**	4 Males	4 Saudis	Working with different-location teams		

In the other hand, low diversity groups involved 26 technicians. Table (6.4) below provide an overall summary of low-diverse HRTs involved in this research.

Table 6.4 Illustration of low-diversity HRTs attributes.

Accidents Rates	Team No.	Orgs.	Gender Split	Nationality Split	Age Split	Ranks Split	Status Split
Low Accidents	**14**	**B**	3 Males	All Saudis	No reported differences	All seniors	All formals
	15	**A**	3 Males				
	16	**D**	3 Males			All juniors	
	17	**C**	4 Females				
High Accidents	**9**	**B**	4 Males	All Saudis	No reported differences	All juniors	All formals
	10	**A**	3 Females				
	11	**C**	3 Males				
	12	**B**	3 Males				

6.4 Research Instruments

6.4.1 Primary data: Interviews

In qualitative research, there are mainly four basic data collection types: observation, interviews, documents, and audio-visual materials (Creswell, 2014). Each type has its own strengths and weaknesses. For instance, observation provides the researcher with direct access to the phenomenon as it occurs (Creswell, 2014). On the other hand, documents and visual materials give the researcher more flexible and convenient access (Creswell, 2014). Despite the advantages of these sources of data, they may not serve as a core source of evidence to capture the phenomenon under investigation from the actors' own perspective. In the case of observation, for example, risk and time concerns may limit the usability of such type. It follows, therefore, that interviews can be the appropriate source of evidence

to achieve the objectives of this research. Interviews can facilitate the collection of rich and varied descriptions for interviewees' experiences, feeling, their actions and reactions (Kvale and Brinkmann, 2009). Interviews, in addition, are suitable when research subjects provide historical information (Creswell, 2014). In interviews, researcher "initiates and defines the interview situation, determines the interview topic, poses questions and decides which answers to follow up" (Kvale and Brinkmann, 2009, p.33).

In this research, I used semi-structured interviews as a primary type (instrument) of data collection. In Interviews, as expressed by Kvale and Brinkmann (2009, p.29), I was seeking "to understand the meaning of central themes of the subjects' lived world." To do so, I gave much attention to register and interpret "the meanings of what is said as well as how it is said; he or she should be knowledgeable about the interview topic, be observant or – and able to interpret – vocalization, facial, expressions, and other bodily gestures" (Kvale and Brinkmann, 2009, p.29). Whereas interviews were used as a primary data collection type, documents and visual materials were used as a secondary data source (*see* Secondary Data section 6.4.2 below for details).

6.4.1.1 Interview procedures

Regarding interviews arrangements, several emails have been sent to the research participants with an informed consent explaining research aims, their rights to participate/withdraw at any time, data confidentiality (including the sensitivity of accident data) and the way of data management (pseudonymisation and anonymisation of personal data). In addition to being notified and being authorised by their R&D departments, and to make sure that those who took part did so freely and openly and without fear of negative consequences, arrangements regarding interviews' times/places were based on each participant preferences.

This research used the work of Kvale and Brinkmann (2009) regarding qualitative research interviewing and the Critical Incident Technique (CIT) by Flanagan (1954) to guide interviews procedures. In general, an individual semi-structured interview was set, formulated, guided, and conducted with each technician who has encountered and reported unexpected work incidents to capture their realities. Another focus was on those technicians who have had the responsibility of directing their teams or have been on the position of power (i.e. influential team members) during the incidents. Given that this research is also intended to understand the relationship of leadership behaviour and HRTs sensemaking processes (*see* Chapter 4 for

a brief review), participants reports were used to identify team members who were assigned or acted in a leadership role. It was assumed that individual interviews would be suitable to address current research questions considering the proposed impact of individual differences and realities on the reliability-seeking sensemaking processes. It was also presumed that individual interviews would be more convenient for the research subjects considering the sensitive nature of discussions concerning diversity, organisational culture, and leadership.

Each interview was started by me introducing the study participant with the study goals, the purpose of the interview, used equipment (e.g. voice recorder), and his or her right to ask any questions before the beginning of the interview. During the interview, I used a guide containing a list of themes to be discussed with proposed questions for each theme (*see* Appendix A for the interview guide). The interview guide was developed to 1) collect participants' descriptions of occasions while working on the field when something unexpected, puzzling, and incomprehensible happened, 2) express their (and teammates) feelings and reactions to the situational demands (what and why); and then 3) to think about and comment on the factors (events, behaviours, interactions, etc.) that were critical to their (and teammates) feelings and reactions. After evaluating the interview progress thematically (i.e. covered topics) and dynamically (i.e. conversation flow), a debriefing will be provided by me, and the participant will be invited to add any further information. I stopped collecting the data once I noticed repetitions on participants' narratives and perspective, a sign that the data are saturated (Charmaz, 2006; Creswell, 2014). As proposed in this research, interviews were conducted with technicians from different backgrounds. Most of these technicians were non-native English speakers and, as a work necessity and requirement, were using the English language to communicate and interact with their peers. Interviews were between 15 to 60 minutes long.

6.4.1.2 Critical Incident Technique (CIT)

As introduced previously in research process section (see Section 6.3.3.1 above), specific interview's design and procedures were also was guided by the Critical Incident Technique (CIT) by Flanagan (1954). This was helpful to allow research participants to focus on specific areas related to the process of sensemaking. Flanagan (1954) defined CIT as a "set of procedures for collecting direct observations of human behavior [sic] in such a way as to facilitate their potential usefulness in solving practical problems and

developing broad psychological principles" (p.327). The use of CIT extended from the studies of Aviation Psychology and received the attention from other fields, including management (e.g. White and Locke, 1981). Several studies in the field of personnel psychology and applied psychology advocated the reliability of the results obtained by using CIT (Andersson and Nilsson, 1964; Ronan and Latham, 1974).

CIT helps the researcher to collect information concerning incidents and observable activities in systematically defined criteria, plans and specifications. Specifically, CIT gives more attention to the situations that are observable (e.g. persons, conditions, places, or activities), their relevance to the general aim of the activity or study, their extent of effect on the general aim. CIT also stresses the importance of careful selection of study participants and specifies that "observers should be selected on the basis of their familiarity with the activity" (Flanagan, 1954, p.339). It, therefore, requires the researcher to collect, analyse, and interpret interviewee's response towards particular events. In this research, CIT helped me to identify the critical factors that contributed to/shaped the reliability-seeking sensemaking processes of the studied HRTs.

6.4.2 Secondary data

In addition to interviews, this research utilised other data sources for augmentation and theory building purposes. Using different sources, as noted by Roulston (2011) in her work on the challenges of interviewing, can be useful to examine the outcomes of interviews. Moreover, the essence of good case study is the using of multiple sources of evidence (Yin, 1994). An example of these multiple sources is documentation, which may include reports (e.g. meetings, events, and incidents reports), newspaper articles, and previous researches of the same site (Yin, 1994). Documentary information is important for any case study (Yin, 1994). In addition to its usefulness in making inferences, documents can help the researcher to identify any contradictory information that would require further investigation (Yin, 1994). Potential weaknesses of using documents were reported by Yin (1994) as biased selectivity, reporting bias, and limited access.

In this study, I used documentation as a secondary source of data to complement the evidence from the core source (i.e. interviews), build and understand research findings. Regarding documents, available accidents reports were used in this study just to provide more specific details regarding incidents (e.g. times and places, and numbers of involved technicians) and to inform further interviews. However, the implications of using reports were

very limited, given the confidentiality and the time-limited access to these reports. Only three reports (for two teams) were available to access. To overcome this issue, many modifications have been applied to the interview's guide (e.g. adding questions asking about time, places, etc.).

In addition to documents, I also used relevant literature during the data analysis stage to further the development of theory. In particular, it was an important part of the iterative process during data collection and analysis. This step helped me to understand emerging concepts and their plausible relationships, an essential aspect for grounded theory (Strauss and Corbin, 1994). Before data collection, I considered that postponing literature review was difficult in my case as a PhD student. This problem was discussed by Dunne (2011), who argued that such a requirement could affect researches' progress and funding. Dunne argued that:

> *"This is particularly true for Ph.D. students, whose research funding, ethical approval and progression through the doctoral process may all be heavily dependent upon producing a detailed literature review prior to commencing primary data collection and analysis." (2011; p. 115-116)*

To meet halfway, reviewing literature prior to data collection was confined to provide a broader understanding of fields under investigation. This included defining and introducing the areas of sensemaking, HROs, organisational culture, leadership, and workgroup diversity. Overall, reviewing literature was also important for the originality of this study, as argued by Hutchinson (1993). It helped me to locate my work within the wider field, and to understand and prepare to potential risks (Belgrave and Seide, 2019).

6.5 Ethical Considerations

In social research, there are several implicit commitments that bind social researchers and participants together (Burns, 2000). These commitments govern the relationship between ethics and trust, which have a significant impact on the research outcomes (McQueen and Knussen, 2002). Therefore, it is fundamental for any qualitative inquirer to ensure that the participants will be made aware of the study's purpose and procedures prior to their participation (May, 2011). They also must be aware of their rights, as stressed by Berg (2007), including their right to refuse, terminate their participation. This research used informed consent to ensure that the interviewees were aware of the nature of the study, their rights, and the consequences of their participation (McQueen and Knussen, 2002).

This research was conducted in line with University of Leeds's research ethics policies and protocols and will follow qualitative research guidelines (e.g. Berg, 2007; Kvale and Brinkmann, 2009; McQueen and Knussen, 2002) to ensure that all ethical considerations are covered. Participants' confidentiality and anonymity were preserved by using pseudonyms or codes in place of their names and locations. Interviews data was used for non-commercial purposes and upon the participants' consent that the transcripts reflect their views accurately. All collected data was stored and accessed through the researcher's drive provided by the University of Leeds.

6.6 Data analysis

6.6.1 Grounded approach (Strauss and Corbin, 1994)

This research was drawn on a number of thematic analysis tools and procedures. First, it was drawn on procedures form a grounded theory-building approach (Strauss and Corbin, 1990; 1994) to analyse and interpret data. Grounded theory, as defined by Strauss and Corbin (1994, p.273), is "a *general methodology* for developing a theory that is grounded in data systematically gathered and analyzed [sic]" (italics in original). Grounded theory is mainly distinguished from other qualitative methodologies by its stress upon theory development (Creswell, 2013; Strauss and Corbin, 1994). It is also set apart from deductive approaches by developing general theories through a constant and systematic comparative analysis of research data (Strauss and Corbin, 1994).

Procedures of data analysis in grounded theory reflect its emphasis on verification. However, this emphasis appears during and within the study, rather than being suggested as a future aim of the quantitative study (Strauss and Corbin, 1994). Additionally, Strauss and Corbin (1994, p.274) noted that grounded theory increases the "conceptual density" referring to the "richness of concept development and relationships". This research used the procedures of grounded theory to trace the relationships between diversity and sensemaking. As anticipated, this allowed for the development of conceptually dense theories that, as noted by Strauss and Corbin (1994, p.278), "consists of *plausible* relationships proposed among *concepts* and *sets of concepts*" (italics in original). This grounded approach helped in providing a theoretical conceptualisation by focusing on the "reciprocal changes in patterns of action/interaction and in relationship with changes of conditions either internal or external to the processes itself" (Strauss and Corbin, 1994, p.278).

6.6.2 Trustworthiness and reliability

The overall design of this study gave much attention to the potential trustworthiness and reliability issues (i.e. those related to study credibility, transferability, dependability, and confirmability). For instance, and regarding ***credibility*** issues, this study was designed to include both high- and low-diversity HRTs. Analysing low-diversity teams served as a 'deviant case analysis', as referred by Lincoln and Guba (1985), and provided evidence to challenge/support emerging patterns from high-diversity groups. Moreover, and to increase credibility and get extra check on preliminary findings of the study, techniques like peer debriefing were adopted (Lincoln and Guba, 1985). This step was helpful in attuning my attitude toward data and analysis and provide me with an opportunity to discuss and challenge initial codes and evolving theories on diversity-RSSPs relationship.

Regarding ***transferability***, using multiple-case studies allowed the generation of thick descriptions and increased the external validity of research findings (Lincoln and Guba, 1985). These descriptions included detailed accounts of the study's social and situational characteristics (e.g. teams' compositions, individuals' attributes, field and contextual features). As the study evolved, external auditing was conducted to ensure the ***dependability*** of study process and findings (Creswell, 2013; Lincoln and Guba, 1985; Miles and Huberman, 1994). As discussed previously in this chapter, data collection was guided by Critical Incident Technique (Flanagan, 1954), which puts a high emphasis on the procedures of data collection (i.e. a systematically defined criteria). External auditing involved the examination of both study process and its preliminary findings and was very helpful in assessing the adequacy of data.

To achieve ***confirmability*** and to attend to the context of the knowledge construction, I was very keen to make notes regarding any changes on my methodological decisions, research priorities and approaches in addition to reflecting upon changes on my personal beliefs and interests, as recommended by Koch (1994). These notes were written after interviews and during initial analysis, and served as a reflexive journal, as referred by Lincoln and Guba (1985).

6.6.3 Research stages and procedures

As introduced previously, this research was set to capture the influence of diversity on reliability-seeking sensemaking processes in HRTs and the interplay between organisational culture, leadership behaviour, and diversity

in generating this influence. Figure (6.1) below summarised the phases of data analysis. Research stages and procedures involved three phases that are initial/open coding, axial coding, and selective coding. **Initial coding** involved breaking down the data and comparing/looking for codes (events, behaviours, interactions) that have potential relevance (i.e. to the diversity-sensemaking relationship). The next phase included the **axial coding** that aimed to focus the initial codes in categories that reflect relationships among them. This stage involved digging for properties and dimensions of each category, and constant comparison between identified categories and data. The third and final phase involved the **selective coding** and working on distilling the aggregate dimensions of identified categories.

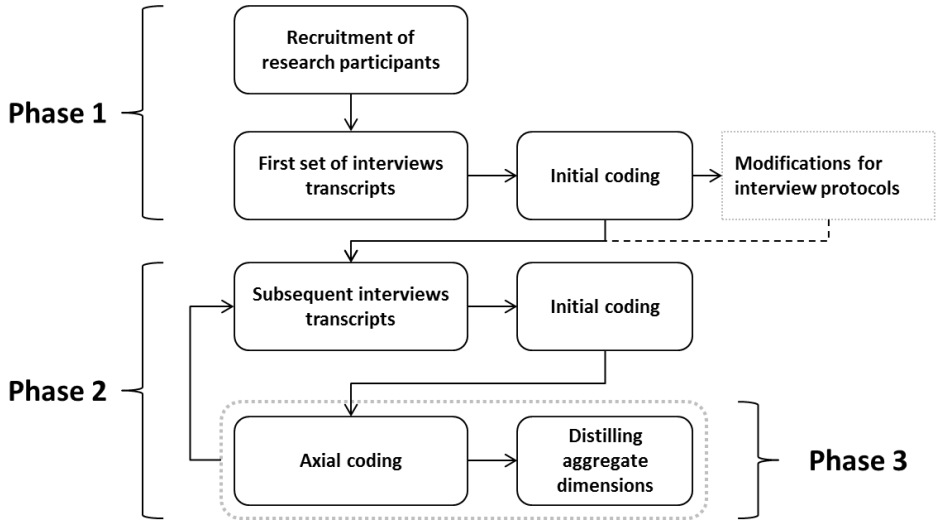

Figure 6.2 Illustration of data collection and analysis phases.

The initial stage of data analysis focuses on listening and writing first impression and initial codes (i.e. memoing). This phase was critical in the development of the interview protocol (*see* Appendix A for interview guide and notes on iterations). It helped me to modify and refine my interview guide and to find better strategies to reduce confusion and reluctance while asking questions. As research progressed, this step resulted in more focused and detailed responses. This initial stage of analysis was the starting point of Struss and Corbin's 'open coding' phase and resulted in a number of 1st order codes. This stage was followed by the transcription process. Transcribing interviews helped me to become more familiar with and immersed in the data. Each transcription was revised by comparing the actual recordings with what was written. This step was achieved over separate time periods to ensure that revisions are done with fresh eyes. During the first-order analysis, coding was heavily committed to participants

terms and concepts. During this analysis, I focused on listening and writing memos contained questions to data, comparisons between concepts, and evolving ideas. This resulted in more than 200 first-order codes and an overwhelming number of categories.

After open coding, I started to focus the initial codes in categories that reflect relationships among them – that was the axial coding phase (Strauss and Corbin, 1998). This phase was achieved by digging for properties and dimensions of each category, looking for similarities and differences among them, and constant comparison between identified categories and data. It involved a careful comparison between the critical components (or incidents) on the stories for each participant followed by a focused construction of the collective sensemaking episodes of teams using their members' narratives and available documents. In this, I looked for the critical elements of the individuals' stories (e.g. behaviours, perceptions, and feelings) and tried to integrate them in one whole story that reflects team reliability-seeking sensemaking processes and the influence of team diversity, leadership, and organisational culture in these processes. This step was part of the multiple-case studies design on this research (Yin, 2009) and was essential to generate in-depth findings and contract them from and between different units (i.e. HRTs). For example, and after conducting a set of interviews with one team (e.g. with four technicians), I collected their accounts and excerpts that described their experiences (the incident), how did they responded to this incident (critical behaviours and factors that had a significant effect on the incident), in addition to their perceptions about the role of these behaviours and factors on their reactions (e.g. why do you think this factor was critical?).

The axial coding phase led to reduce/focus the identified codes and group them in meaningful subcategories. After, I started giving labels and descriptions for identified categories that link them with their respective subcategories. This step aimed to facilitate better understanding and navigation through participants' first- and second-order codes at a more abstract level. After, I started to scrutinise emerging first-order codes and second-order themes and see if they can describe sensemaking processes in HRTs, specify the factors that contribute to these processes, and explain how diversity interacts with these processes. This step was a start to the development of tentative answers to the research questions and resulted in the second-order themes, as shown below in figure (6.3).

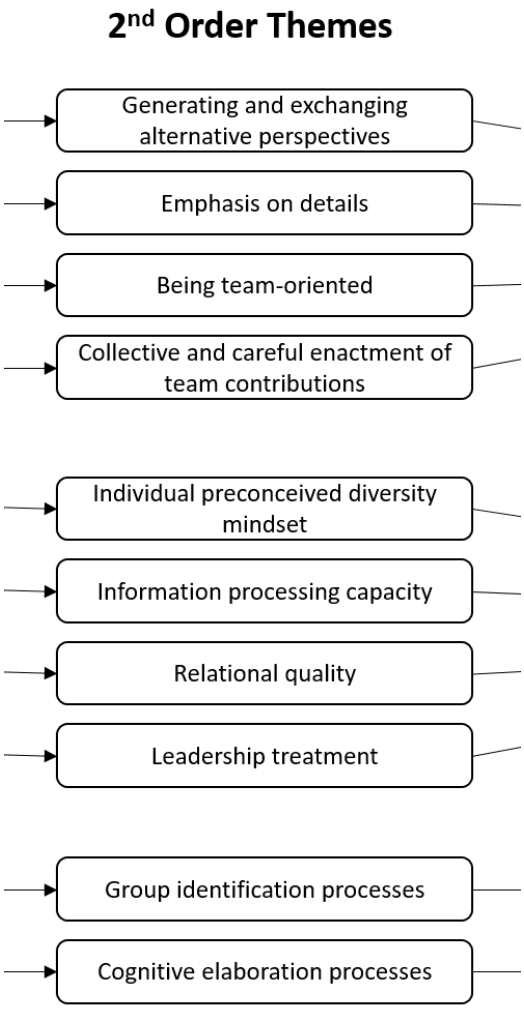

Figure 6.3 Second-order themes.

Several revisions have been made to ensure that emerging second-order order themes are indicative of first-order concepts and can help to describe the effects of diversity on reliability-seeking practices of HRTs. These revisions were done by going back to interviews' recordings, memos, and transcripts. The last phase involved working on distilling the aggregate dimensions of identified second-order themes. In this phase, I was focusing on combining second-order themes into aggregate categories that can jointly explain the research phenomenon and its theoretical dimensions. After, this phase involved examining and integrating existing literature into theory development. This process was important to foster conceptualisation (Strauss and Corbin, 1998) and to show how this research builds on and contributes to existing knowledge (Stern, 2007). The result of assimilating first and second-order codes into the aggregate dimensions formed the basis of my data structure, as shown in figure (6.4) below.

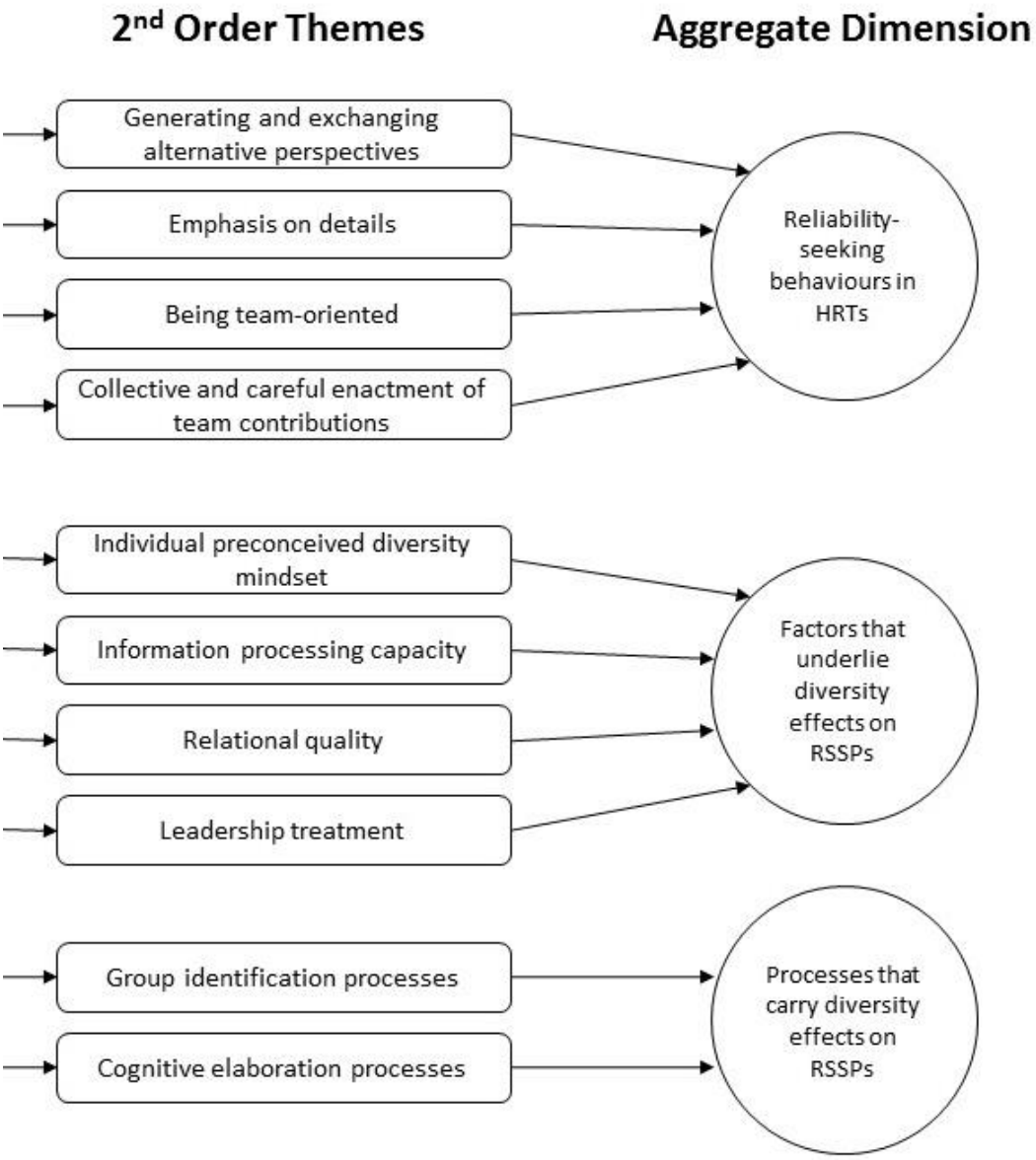

Figure 6.4 Assimilating 2nd order codes into the aggregate dimensions.

Building on this data structure, the next four chapters will describe and discuss research results, draw all findings together and present a suggested theoretical model of diversity and sensemaking in HRTs.

Chapter 7
Unpacking Reliability-seeking Sensemaking Processes (RSSPs)

7.1 Introduction

This research aimed to understand the influence of diversity on sensemaking processes in HRTs and the interplay between diversity, leadership behaviour, and organisational culture on generating this influence. Given that the overarching aim of this search was to inductively explore this phenomenon, this study needed to unpack all behaviours that constitute reliability-seeking sensemaking processes in HRTs (will refer to them as RSSPs) – which include all behaviours that facilitate the anticipation and containment of work errors while working in tightly-coupled and risky tasks such as dealing with tanks shutdowns, leaks, and schedule maintenances. Unpacking these behaviours will allow for a better understanding of the relationship between diversity and HRTs' reliability-seeking interactions and the role of leadership behaviour and organisational culture in diversity-RSSPs interactions.

This chapter explored and analysed stories of unexpected work events (e.g. emergencies, near misses, and accidents) from 17 teams (including 57 technicians) working in four leading petrochemical companies in Saudi Arabia. It is structured to unpack RSSPs in HRTs, and to expore the relationship between RSSPs and HRTs outcomes. Next three chapters will provide an in-depth analysis for the relationship between diversity in HRTs and their RSSPs (Chapter 8), identify the factors and processes that influence diversity-RSSPs relationship (Chapter 9), and, lastly, will introduce a model of group diversity and sensemaking processes in HRTs (Chapter 10).

7.2 Unpacking Collective RSSPs in HRTs

Overall, research results revealed many practices through which field technicians were able to operate attentively and effectively (i.e. reliably) during unexpected and risky situations. This section will unpack team RSSPs. It will highlight those reliability-seeking behaviours that are seen in low accidents teams and are not in high accident teams regardless of diversity level. This will cover all practices through which field teams were

able to operate reliably during many unexpected and risky situations. Table (1) below lists these reliability-seeking behaviours with their associated descriptions.

Table 7.1 Reliability-seeking behaviours in HRTs with low accident rates

Reliability-seeking Behaviour	Description
Generating and exchanging alternative perspectives	Processing teammates' inputs, generating and exchanging different perspectives with the team.
Emphasis on details	A tendency to question peers' perspectives, refuse simplification, and preference of details.
Being team-oriented	Believing that team is more productive than individuals and therefore focus on team goals and consider and give attention to teammates inputs.
Collective and careful enactment of team contributions	Acting collectively with a tendency to avoid hesitation to ask for or provide support for their teammates while dealing with work issues and includes technical and emotional support.

As shown in table (1), acting reliably needs team members to exchange and generate alternative perspectives (e.g. raise concerns and discuss issues) on a continuous basis with a high emphasis on details (e.g. questioning inputs to make sure that they are not missing something), high consideration of team goals and individuals inputs (i.e. being team-oriented) and collective and careful enactment of team contributions. Careful enactment involves team members' tendency to avoid hesitation to ask for or provide support for their teammates while dealing with work issues and includes technical (e.g. know-how) and emotional support (e.g. showing trust, psychological reassurance). These behaviours together were important to enforce psychological, social, and technical foundation for the RSSPs in HRTs.

With regard to how these behaviours collectively form HRTs' collective RSSPs, many technicians stated the behaviour of ***generation and exchanging of alternative perspectives*** as the starting point of their RSSPs. This behaviour, which was classified as critical by many participants and as defined previously, emphasises the importance of the team-level processing of individuals' inputs before feeding them back with more details. As participant (56) explained:

> *"You need to give me something to help. I can't even know that you need help without you telling me something. For me, it was difficult in the beginning. I was thinking that I need to share the whole situation,*

> *which I'm sure about. This is not the case. Just say whatever you think or feel. 'I smell this' is enough to get the team together."*

This behaviour of generation and exchanging of alternative perspectives involves exchanging, processing, and feeding back inputs from and to all team members. This form of inputs sharing was found as a source of success for HRTs. As participant (28) explained:

> *"This is the why I said we are an amazing team, whatever you say is under the scope of another team member. You will find someone saying do you mean this, did you think about this, or did you ask this."*

Participants' narratives, as shown in previous examples, might explain the role of the generation and exchanging of alternative perspectives in the team collective RSSPs. It seemed possible that sharing inputs regarding work issues was found as the trigger and the call for team members to engage in RSSPs. To get the most of this behaviour, many participants referred to listening skills as an important element of this behaviour. As participant (35) stated that "*listening is important for team functioning. In fact, the best technician here is the one who listens well.*" It seems that listening well can shape the quality of generating and feeding back alternative perspectives. As participant (35) continued:

> *"… this help us to come with a useful information. You have more details so you can build more reliable and convincing idea. Being unable to listen to your teammates will make you always in rush and less useful for you team."*

Among the reliability-seeking behaviours, there is also the ***emphasis on details***. This behaviour was linked by many participants with RSSPs and good handling of work issues in general and work safety in specific. The emphasis of details reflects individuals' tendency to question peers' perspectives and preference for details. While describing why details are critical for team outcomes, participant (44) stated that any individual "needs to know every detail for his safety and the whole team". From the receiver perspective (i.e. who receive the details), participant (43) showed a high preference for details and emphasised that "[he] can't work without having some details". Taking all participants accounts together, it seems that work-relevant details have a significant impact on both individual's psychological state (e.g. feeling less pressured and more confident while dealing with work issues) and their RSSPs outcomes (e.g. high safety and good handling). As participant (05) explained why details are critical for her while dealing with work issues:

> *"This makes me go with more confidence. I have details which will save the time and will help me to decide from where I have to start and what is the best action."*

Details-centred interactions, which can be manifested through both emphasis on details behaviours in addition to exchanging and generating alternative perspectives, were found to boost information saturation within teams and between team members. Participants' narratives also went through other behaviours that seemed to supplement other team needs, specifically, social and psychological needs. These behaviours included team-oriented acts that reinforce social and emotional ties between team members and promote team's collective sense of responsibility and engagement in addition to supporting seeking/providing behaviours that foster individuals' sense of capability and enable them to find paths around obstacles.

Team-oriented behaviour involved acts that reflect members' focus on team goals and consider and give attention to teammates' inputs. Acting in a team-oriented manner was found to increase the sense of personal responsibility towards the team in addition to motivating individuals to be close and interact with their teammates (i.e. establish and keep close relationships). These behaviours were manifested in many instances and were expressed by many participants (e.g. "we work as friends", "I'm very happy to work with them."). Taking a careful look at participants' narratives revealed that these socially-centred behaviours were very critical to keep teams in control under chaotic conditions. As participant (17) explained how such acts appear and affect team psychologically:

> *"It's all about feeling surrounded by teammates working for the same purpose. I can't even think that I could work issues alone. We encourage each other and remind each other that we can do it. Only in this moment and with those teams your brain can work."*

The last behaviour that was reported as part of HRTs' RSSPs can be termed as ***collective and careful enactment of team contributions***. In addition to acting collectively, careful enactment involves team members' tendency to avoid hesitation to ask for or provide support for their teammates while dealing with work issues and includes technical (e.g. know-how) and emotional support (e.g. showing trust, psychological reassurance). As participant (38) described how HRTs act collectively and carefully:

> *"We do it together, I got your back and you got mine. You told me when there is something that I need to be worried about and I will do*

so. In these situations [referring to work emergencies], my two eyes are not enough. Report whatever you see to your colleague."

Participant (38) statement showed that providing support is not an option but an obligation of any HRT's member to meet and deal with work complexities. This attitude was mentioned by many participants and was also seen as a core characteristic of any HRT. As participant (57) expressed:

"… this is why they put us in teams. If it was only related to technical skills and expertise we might see some technicians working alone. There isn't. They put us in team because they know that no one can do jobs like this alone without having someone to give support"

The results of this exploration suggested that acting reliably needs team members to exchange and generate alternative perspectives on a continuous basis with a high emphasis on details, team goals, and individuals' inputs, and to enact team contributions collectively and carefully. Nonetheless, several questions still remain to be answered. Firstly, how do RSSPs behaviours relate to events in HROs?. Secondly, how does team diversity affect team RSSPs and what are the key factors that underlie diversity-RSSPs relationship? The remaining of this chapter will attempt to provide answers for each question.

7.3 How do RSSPs behaviours relate to outcomes?

The previous section introduced four RSSPs that facilitate HRT success and presented examples. This section will give more attention to the relationship between those RSSPs and work events, and particularly, unanticipated work issues. It will compare between low/high accident teams and explain how behaviours (or lack of behaviours) are related to critical events regardless of diversity level. It will present how the variability in the critical behaviours is related to work events. Each behaviour that was reported previously has a corresponding table below with exemplary participants' quotes.

As summarised below in Table (7.2), generating and exchanging of alternative perspectives was reported as an important element for team RSSPs. For HRTs, acting this behaviour was critical while dealing with work issues and was associated with effective team interactions and positive outcomes (e.g. "it's like working in a thinking tank"). Reports indicated that collective generation and exchanging of alternative perspectives was significant for reliability seeking milieu. This way of interaction was associated with team members: 1) creating a larger pool of perspectives; 2)

establishing a culture that prefers rich and detailed descriptions; 3) interacting with lower level of simplified interpretations of work issues; 4) showing a higher level of attentiveness and a higher sense of capability; in addition 5) building and updating their reliability know-how and practices. The first row in table (7.2), represents some exemplary quotes that reflect HRTs views on high level of generating/exchanging alternative perspectives and its role of their collective RSSPs.

Lower levels of generating/exchanging alternative perspectives were associated with teams losing their sensemaking capabilities (i.e. less ability to interpret puzzling and never-experienced events). Specifically, participants' reports indicated that lower engagement in this form of task-relevant dialogues led them to lose their sense of connectedness with their teammates (e.g. 'being out of the frame') and therefore, finding themselves unable to contribute and coordinate their inputs during work issues effectively. Lower generation/exchanging of alternative perspectives was also associated with team members' attentiveness and sensitivity to operations. It seemed that lower engagement on this behaviour affected in team members losing their situational awareness and becoming less sensitive to operations (i.e. unable to recognise potential failures).

Table 7.2 Behaviour table: Generating and exchanging alternative perspectives

Generating and exchanging alternative perspectives	
Level of behaviour	**Effects on outcomes (example quotes)**
High [+] – as reported in teams with low accidents rate	+ Create a larger pool of diverse perspectives – "Everyone gave an opinion and we developed a good understanding about the issue, what to do, and when to act very quickly. It was a successful mission." + Boost team members sense of capability – "He talks with me, asks the others about their opinions. He was very keen to organise our roles". + Facilitate enactment – "turn ideas into actions". + Triggers collective discussions – "whatever you say is under the scope of another team member".
Absence [-] – as reported in teams with high accidents rate	– Feeling of lost connectedness – "it is the feeling that you are setting outside the frame", "My understanding was disconnected". – Lower coordination with team inputs – "Being unable to listen to your teammates will make you always in rush and less useful for you team".

In regard to details-oriented behaviours, and as summarised below in Table (7.3), emphasis on details was found to be critical for the effective handling of work issues. Participants' narratives indicated that interacting in a detail-oriented manner (i.e. with high tendency to ask about and question teammates' inputs) was vital in: 1) increasing team members' situational awareness; 2) regulating their psychological states during work issues (e.g. feeling less time-pressured and more confident while dealing with work issues); in addition to 3) improving their RSSPs outcomes (i.e. effective and safe handling). Table (7.3) also below provide some example quotes that were shared across a large number of technicians working in groups with lower accidents rates.

Lower emphasis on details, on the other side, was associated with lower quality RSSPs in HRTs. Interviews' results linked the lack of individuals' emphasis on details to them being unaware of potential escalation on work issues in addition to acting recklessly with simplified interpretations. Reports also associated lower details-seeking behaviours with distorted inferences and less effective RSSPs. Dealing with work issues without detailed and sufficient information was found to affect individuals' efforts negatively and, in many times, to disrupt team collective RSSPs efforts – as participants indicated below in table (7.3).

Table 7.3 Behaviour table: Emphasis on details

Emphasis on details	
Level of behaviour	**Effects on outcomes (example quotes)**
High [+] – as reported in teams with low accidents rate	+ Direct individuals' attention to the joint situation – "Once he asked me again … I knew that there are some solutions to try there". + Create a culture that prefers using rich and detailed descriptions – "You have more details so you can build more reliable and convincing idea". + Improve coordination – "I have details which will save the time and will help me to decide from where I have to start".
Absence [-] – as reported in teams with high accidents rate	– More simplification of work issues – "they don't want to hear about any problems". – Reckless shortcuts – "the guys decided to do something else that worked at the end but was very dangerous for their and the complex safety".

Study results showed how generating and sharing alternative perspectives with a high emphasis on details are significant in improving HRTs' ability to anticipate and contain work issues. These information-centred behaviours were vital in increasing HRTs' situational awareness and attentiveness, in addition to boost and regulate their psychological states during chaotic situations. Results also showed that having a larger pool of information and expertise and feeling more comfortable were not enough for HRTs to act reliably (i.e. to turn their plans into actions). Interviews' results indicated that acting reliability requires teammates to be and act in a team-oriented manner (i.e. to believe on the team and act upon its goals), and to safely coordinate all efforts to achieve team goals. As summarised in table (4), participants reported that being or interacting with team-oriented individuals resulted in increasing teammates' sense of responsibility towards the whole team. Their narratives indicated that this sense of responsibility led them to give attention to the joint situation rather than focusing on individual duties. Team-oriented behaviours (e.g. showing commitment to team goals and appreciation to team efforts), as expressed by many participants, were also found to encourage individuals to interact with and be close to their teammates. Altogether, participants' stories regarding team-oriented behaviours provide evidence that being oriented, along with other RSSPs, is an important prerequisite to keep HRTs in control under chaotic conditions.

On the flip side, lower team-orientation was reported to affect RSSPs negatively (as summarised in table 4). Individuals with lower team-orientation were characterised as preferring to work alone and showing high resistance to teammates' inputs. Being unwilling to work in a team-oriented manner was negatively associated with team members RSSPs (i.e. lower generation and exchanging of alternative perspectives, lower questioning and details-seeking behaviours). Eventually, this can result in self-oriented individuals, at some points feeling paranoid and losing their sense of control under chaotic conditions.

Table 7.4 Behaviour table: Being team-oriented

Being team-oriented	
Level of behaviour	**Effects on outcomes (example quotes)**
High [+] – as reported in teams with low accidents rate	+ Increase the sense of personal responsibility towards the team and the joint situation – "I will do my best to give them back". + Motivate individuals to interact with and be close to

Being team-oriented	
	their teammates (i.e. establish and keep relationships) – “you will enjoy the work with them”, “He also became very excited to work and share his ideas with us”. + Emotional support and keeping team in control under chaotic conditions – “made the work very relaxed”. + Building and updating reliability know-how and practices – “he is the one who helped us to put an operations tracking board”.
Absence [-] – as reported in teams with high accidents rate	– Lower contributions – “I always let them decide”, “we avoided speaking with team”. – More simplification – “I only warn them and raise questions when there is something to be concerned about”. – Delayed interactions – “We inspect and report to the supervisor, and he discusses our opinions with them. And so on”. – Unwillingness to seek other’s inputs – “is a waste of time”. – Task conflicts – “They ask many questions about my advices and try to convince me that it is not wise choice.” – Less situational awareness and lower sense of control – “I think that our understanding was not complete”, “It was like feeling that we will not be able to fix this shutdown”.

The fourth behaviour that was also identified as critical for RSSPs was the collective and careful enactment of team contributions. As discussed in the previous section, collective and careful enactment were manifested by individuals’ commitment to be close and work together, and their propensity to ask for or provide support for their teammates while dealing with work issues. As summarised in table (5), collective and careful enactment was related to successful anticipation and containment of work issues (i.e. successful RSSPs). Many technicians reported that commitment to collective and careful enactment of team plans was associated with their feeling capable of dealing with work issues, technically and emotionally supported. In relation to work issues, participants also indicated that enacting work solutions collectively and carefully was important to achieve and improve work outcomes with a high level of safety performance. Some responses

also touched on the positive effects of collective and careful enactment on team learning and future RSSPs.

Participants' narratives also described how lower levels of collective and careful enactment could affect HRTs. Overall, many technicians indicated that lacking in-team collectiveness and carefulness lead to them feeling excluded and humiliated (as a result of lower collectiveness), feeling less confident and paranoid and resulted in them losing their motives and willingness to collaborate with each other. The second section on table (5) provides example quotes reflecting participants' perspectives on the negative consequences of lower collective and careful engagement on RSSPS.

Table 7.5 Behaviour table: Collective and careful enactment of team contributions

Collective and careful enactment of team contributions	
Level of behaviour	**Effects on outcomes (example quotes)**
High [+] – as reported in teams with low accidents rate	+ Feeling in control over the joint situation – "They don't handle specifics and look at the situations and progress as a whole. This is important for us". + Team learning and better future RSSPs – "I learned that I have to add the surroundings like the 'fence' into the formula while checking work issues".
Absence [-] – as reported in teams with high accidents rate	– Unsafe handling – "Suddenly the sling released and the desk fell on the helper's hand". – Lower coordination and outcomes – "If we worked together we might come with something better", "no one is telling the other what or where he is doing". – Feeling paranoid – "if something new happened, they will not help", "You are working and expecting that something bad will happen at any time. It was like that. I couldn't focus on my task". – Feeling excluded and humiliated – "I have more expertise in load distribution and the guys decided to do something else".

7.4 Discussion

The first result of this study indicated that RSSPs in HRTs included individuals' behaviours that involve: 1) generation and exchanging of alternative perspectives, 2) emphasis on details, 3) being team-oriented (i.e.

belief and give attention to team inputs), and 4) engaging collectively and carefully while dealing with work situations in HROs. These results corroborate the findings of a great deal of the previous work in the HROs literature such as mindful organising (e.g. Weick, 2005; Weick, et al. 2005; Weick and Sutcliffe, 2007), and heedful interrelating (e.g. Weick and Roberts, 1993). The literature on HROs stresses that, in order to perform highly in trying conditions, organisations need to be preoccupied with failure, reluctant to simplify, sensitive to operations, committed to resilience, and deferential to expertise. These practices are expected to promote mindfulness, encourage attentiveness, and thus facilitate sensemaking.

This study also found that HRTs are attentive to details and have a tendency to refuse simplification and question peers' perspectives. This emphasis on details seems to be consistent with HROs research which found that HRTs are preoccupied with failure by treating weak signals as symptoms of a potential disaster and believing that small separate errors can accumulate to become a catastrophe (Weick and Sutcliffe, 2007). It is also in line with Weick and Sutcliffe (2007) principles indicating that HROs are reluctant to simplify and arguing that less simplification allows people to make sense of the whole picture. Overall, this finding complements those of earlier studies and contributes to existing knowledge by describing in-team processes that constitute mindful organising.

In addition to the emphasis on details, findings of this study also showed that RSSPs also involve individual's tendency to generate and exchange alternative perspectives, be team-oriented, and enact team contribution collectively and carefully. These findings (i.e. RSSPs) build on the work of HROs (Perin, 2006; Weick and Sutcliffe, 2007). They demonstrate that reliable interactions in teams are more team-oriented. From a HROs perspective, HRTs are sensitive to operations. Being sensitive to operations involves monitoring interactions inside a complicated system and responding instantly to any unanticipated events (Perin, 2006; Weick and Roberts, 1993). These findings extend those of earlier studies indicating that alertness in HRTs depends on their team orientation (i.e. attentiveness to interactions) in addition to their collective and careful enactment of team contributions (i.e. attentive coordination inside a complicated system). They also extend our knowledge of the role of intragroup relations on RSSPs.

Current literature on HROs also indicates a strong relationship between the ability of HROs to cope and respond and their individuals' commitment to resilience (Allenby and Fink, 2005; Weick and Sutcliffe, 2007; Wildavsky,

1988). Commitment to resilience depends on how HRTs develop knowledge, provide feedback, improvise, learn, communicate, and recombine their varied perspectives and experiences (Weick and Sutcliffe, 2007). In this study, RSSPs, in general, were found to reflect a high commitment to resilience – as generating and exchange or alternative perspective with a high emphasis on details (reflects knowledge development, feedback, and learn); being team-oriented (reflects communication); and collective and careful enactment of team contributions (reflects recombining varied perspectives and experiences). The current study findings support the view of resilience in HROs literature and provide further discussion of its manifestations and requirements during collective RSSPs in HRTs (e.g. through leader support or teammates improvisation that facilitates thinking).

In accordance with the present results, previous studies have demonstrated that reliability-seeking interaction is also deferential to expertise – meaning that it follows the knowledge hierarchy (Weick and Sutcliffe, 2007), prioritises the individuals who have specific knowledge and who can make quick decisions to alleviate and reduce the consequences of an unexpected event (Roberts et al., 1994). Study findings are consistent with earlier research and show deference to expertise as a core element of all RSSPs (i.e. while generating and exchanging of alternative perspectives; while looking for details, and while enacting team contributions). They also provide a further explanation of the factors that may facilitate/impede in-team deference of expertise (e.g. views towards others, relational quality, and information processing capacity).

7.5 Conclusion

This chapter explored and analysed stories of unexpected work events (e.g. emergencies, near misses, accidents) from 17 teams (including 57 technicians) working in four leading petrochemical companies in Saudi Arabia. The results in this chapter provided a thick description for HRTs perceptions regarding the effective and critical behaviours while dealing with work emergencies. Overall, study results suggested that reliability-seeking sensemaking process (RSSPs) involves individuals in HRTs generating and exchanging of alternative perspectives, interacting with a high emphasis on details, acting in a team-oriented manner, and enacting team contributions collectively and carefully. Taken together, these results suggested that there was an association between RSSPs and team capability to function with high ability to anticipate and contain unwanted situations in work.

Findings of this chapter, together, complement those of earlier studies on HROs (e,g. Perin, 2006; Weick and Roberts, 1993; Weick and Sutcliffe, 2007) and contribute to existing knowledge by describing in-team processes that constitute mindful organising (i.e. RSSPs). These findings extend those of earlier studies indicating that alertness in HRTs depends on team orientation (i.e. attentiveness to interactions) in addition to the collective and careful enactment of team contributions (i.e. attentive coordination inside a complicated system). These findings extend our knowledge of the role of intragroup relations on RSSPs.

The current study findings also support the view of resilience (e.g. Allenby and Fink, 2005; Weick and Sutcliffe, 2007; Wildavsky, 1988) and defference to expertise (e.g. Roberts et al., 1994; Weick and Sutcliffe, 2007) in HROs literature, and provide further discussion of their manifestations and requirements during collective RSSPs (e.g. through leader support or teammates improvisation that facilitates thinking). Consistent with earlier research, study findings, show deference to expertise as a core element of all RSSPs (i.e. while generating and exchanging of alternative perspectives; while looking for details, and while enacting team contributions). These findings provide a further explanation of the factors that may facilitate/impede in-team resilience and deference of expertise (e.g. views towards others, relational quality, and information processing capacity).

Chapter 8
Effects of Group Diversity on RSSPs in HRTs

8.1 Introduction

The first question on this study aimed to explain how team diversity influences the process of sensemaking in HRTs (i.e. refer to as RSSPs). This chapter will explore participants accounts to understand how group diversity influences collective RSSPs by, firstly, identifying the key elements of group diversity that shape RSSPs and, secondly, analysing the key mechanisms that underlie diversity-RSSPs relationship.

8.2 Key Elements of Group Diversity that Shape RSSPs

The previous chapter focused on unpacking RSSPs in HRTs. Specifically, it highlighted those reliability-seeking behaviours that were reported as critical while dealing with work issues and accidents. Going forward, this chapter will try to understand the relationship between in-group dissimilarity and the emergence/absence of these behaviours. To do so, it will be devoted to identifying the key elements that play a role in diverse HRTs reliability-seeking processes. The examination of these elements was based on three main factors, including: 1) the reported effect; 2) emergence across the groups; and 3) frequency in the participants' accounts. This process served to identify seven key factors that relate in-group's dissimilarities with the level/quality of reliability-seeking behaviours: individual preconceived diversity mindset; information processing capacity; relational quality; leadership; group identification processes; their collective motives to engage; and the process of divergent perspectives generation. Table (6) below provides a summarised description of each factor:

Table 7.6 Key factors that underlie group diversity effects on RSSPs

Factor	Definition
Individual preconceived diversity mindset	Reflects the extent to which teammates value diversity and understand dissimilar others.
Information processing capacity	The ability to exchange, comprehend, and discuss ideas with teammates in a timely manner. This team factor includes individuals' know-how and narrative skills.

Factor	Definition
Relational quality	The extent to which teammates are psychologically linked to each other and the group.
Leadership treatment	The extent to which leaders are fair and supportive.
Group identification processes	A sense of belonging to one's social group, coupled with a sense of commonality with the group's members.
Collective motives to engage across differences	The extent to which teammates are willing to engage with each other regardless of their differences.
Generation and exchange of divergent perspectives	Reflects the ability of the whole team to generate and communicate 'novel' ideas while dealing with work issues.

Following, this study will discuss each factor and describe its interaction with diversity-RSSPs relationship in HRTs.

8.3 Key Mechanisms of Diversity's Effects on RSSPs

Look at the study results from a broader perspective showed that inconsistencies in RSSPs (i.e. disruptions in teams' reliability-seeking interactions) were common and more salient in teams who have members with dissimilar demographics (age, gender, nationality), work experience, work orientation (i.e. work beliefs). The degree of irregularity on RSSPs was lower in the teams with lower diversity levels.

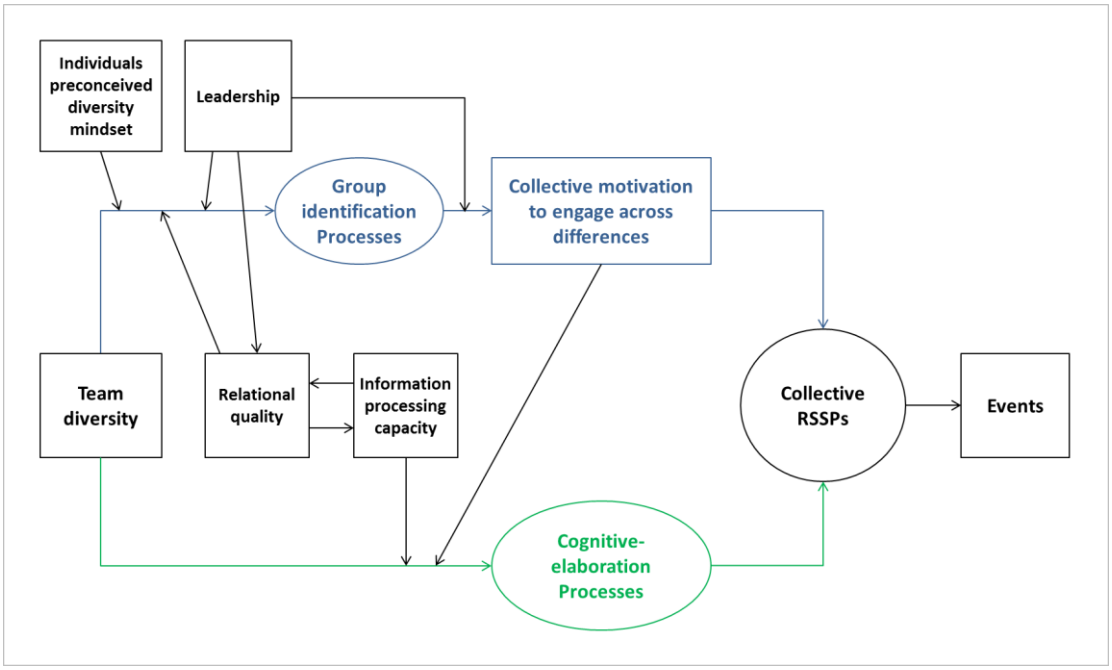

Figure 7.1 Temporally-based model of RSSPs in diverse HRTs

Overall, careful look and comparison between participants narratives, who described their experiences of dealing with work issues and commented on the critical incidents and factors, revealed that diversity's effects on RSSPs were carried through two primary pathways (mechanisms) – one is associated with **group identification processes** (*see* the blue path in figure 1 above) and the second pathway is related to team **cognitive-elaboration processes** (*see* the green path in figure 1 above). Group identification pathway is concerned with the effects of team dissimilarities on the in-group identification processes and ultimately their motivations to engage collectively in RSSPs, whereas cognitive-elaboration pathway is mainly focusing on explaining the cognitive-elaborative effects of team diversity on work-related issues that can facilitate RSSPs.

8.3.1 First Pathway: Diversity and Group Identification

As introduced in this chatper, study results revealed that dissimilarities in HRTs could affect in-group identification processes and ultimately, their motivations to engage collectively in RSSPs. In other words, looking at participants' perspectives showed that in-team differences could affect their sense of belonging to and commonality with their teammates. Results suggested that a high level of group identification seems to fuel team motives to engage collectively with their teammates in RSSPs. This state of a high sense of belonging was apparent in shaping in-team motivations (e.g. "*I will do my best to give them back*") and ultimately their collective RSSPs (e.g. "*everyone gave an opinion and we developed a good understanding"*). For HRTs, losing motivations can result in catastrophes when individuals are not aware (e.g. "*the guys decided to do something else*") or not interested in talking about their teammates' inputs (e.g. "*I found that working with females very stressful*"; "*I will not work with an old man who treats me like his youngest son*"). Lower team motivation can lead to HRTs being unable to coordinate their inputs with each other (e.g. "*we avoided speaking with team*"), and thus, limit their RSSPs (e.g. "*I always let them decide*"). In this study, most of the reports that are associated with this pathway were discussed by participants from highly diverse groups. This section analysed participants' reflections on in-group identification processes, the role of diversity and the factors that buffer/exacerbate identification level and thus, collective RSSPS.

8.3.1.1 Diversity and high group-identification in HRTs

In general, reports from diverse HRTs indicated many instances of both high and low group identification level. High level of identification was manifested

through teammates expressing positive views about their teams (e.g. "*you will enjoy the work with them*"), feeling of personal responsibility towards their teams (e.g. "*report whatever you see to your colleague*"), and actively seeking to collaborate with the group (e.g. "*I got your back*"; "*I can't even think that I could work issues alone*"). These behaviours were shaped by many factors such as individuals preconceived diversity views, the quality of the relationship between teammates, and team leadership. The remaining of this section will discuss each factor, its role on identification processes and team RSSPs in more detail.

Individuals preconceived diversity views were found to influence group identification and ultimately, their motivations to engage across differences. Participants indicated that views towards differences could increase/decrease the level of trust between group members, relational quality, and consequently fuelling/lowering team members' motivations to engage collectively in RSSPs. Experienced trust, for example, was seen to buffer dissimilar individuals' willingness and motives to engage across their differences during RSSPs. As participant (34), who worked in a team with a western technician (i.e. participant 25), described his feeling when he experienced his western colleague trust. He said, "*When he came and talked with me. I felt good that a [the nationality of the western expert] expert trusted me.*" It seemed that participant (34) was associating higher implied status with the nationality of his western colleague. This result can also suggest that the elite nature of HRTs may give different meanings for each interaction. This happened to participant (34) when he perceived his western expert question as a compliment and as a sign of trust.

This feeling of experienced trust fuelled by the higher implied status of the western colleague, resulted in participant (34) showing a high level of motivation (i.e. encouraging the generation and exchanging of alternative perspectives) and to coordinate team efforts (i.e. a manifestation of collective and careful enactment of team inputs). As the western participant (25) noticed:

> *"[Name – referring to participant 34] did a great effort when the accident happened. His good relationships with everyone in the team were important. He talks with me, asks the others about their opinions. He was very keen to organise our roles."*

Same Participant (25), commented on his experience and explained how engaging with and showing respect to his local colleagues' culture (i.e. which stem from his team orientation and belief of team importance) helped him to

overcome the difficulties he encountered while working with three local Saudi (i.e. lingual and cultural difficulties). He claimed that showing respect to his colleagues' culture resulted in him feeling more welcomed and connected and thus motivated him and his local colleagues to engage across differences (i.e. to generate and exchange alternative perspectives). As he explained:

> *"You have to be very respectful to their culture and their traditions [referring to the culture of his three local colleagues]. You also have to be a sort of person that is welling to be part of that in a lot of ways. If you keep that in mind, you will enjoy the work with them."*

Similar instances were reported frequently by many participants. Table 7.7 below lists some example quotes that link positive views towards dissimilarities to the in-team sense of belonging, motivations, and collective RSSPs.

Table 7.7 Views towards diversity and identification in HRTs

View (example)	Effect (example)
"*You have to be very respectful to their culture and their traditions*"	High identification and motivations – "***You will enjoy the work with them***"
"*Ladies here always say good words to us*"	Sense of belonging – "***I felt very good.***"; "***I think it made the work very relaxed.***" Motivations to engage in RSSPs – "***I will do my best to give them back.***"
"*With those teams [referring to teammates with different expertise] your brain can work*"	Motivations to engage collectively – "***We encourage each other and remind each other that we can do it.***"
"*We are an amazing team*"	Positive perception of teammates' contributions – "***Whatever you say is under the scope of another team member. You will find someone saying do you mean this, did you think about this, or did you ask this***"

In addition to positive views, experienced support (e.g. appreciation, compliments, and ice-breaking behaviours) was also associated with a high level of group identification. Participant (32), a contractor helper, commented on a similar experience with female technicians showing him an appreciation for his efforts with the team. In both routine and emergency tasks, participant (32) claimed that female technicians are "*better for teamwork*" because of

their continuous demonstration of appreciation for their helpers peers. Participant (32) explained:

> *"Yes I do and all my fellow helpers think that good word make difference. Even when work accident happen. And ladies here always say good words to us [referring to other helpers]. 'Thank you [name]' ... 'good job [name]' … 'what would we do without you [name]'."*

This form of emotional support, as claimed by participant (32), resulted in him feeling welcomed and simultaneously motivated to do his best for the sake of the team (i.e. being team-oriented). He explained how this climate of mutual admiration manifested during fieldwork and commented on its implications on the team collective RSSPs:

> *"I will do my best to give them back. (…) I remember how I felt very good. I think it [referring to the attitudes of appreciation] made the work very relaxed. Everyone gave an opinion and we developed a good understanding about the issue, what to do, and when to act very quickly. It was a successful mission."*

Previous examples described some reliability-seeking interactions in HRTs with high diversity level and highlighted positive diversity-identification relationship. These examples suggested that to function reliably, HRTs with high diversity levels must hold favourable views towards teammates dissimilarities and translate these good views into actions.

8.3.1.2 Diversity and low group-identification in HRTs

On the other side, participants' reports also revealed that highly-diverse teams are vulnerable to identification problems. They reported many instances of lower group identification (i.e. less sense of belonging to and commonality with the group's members) that led them to lose motivations and to show less willingness to engage in collective RSSPs. In HRTs, lower motivations to engage across differences can result in a catastrophe when individuals are less receptive to (or not interested to discuss) their teammates' inputs. Instances of less receptiveness in HRTs with high diversity levels were reported in many forms (e.g. "*I found that working with females very stressful*"; "*I will not work with an old man who treats me like his youngest son*"). Less receptiveness and lacking collective motivations can lead individuals in HRTs to be unable to coordinate their inputs with each other (e.g. "*the guys decided to do something else*"; "*I always let them decide*").

If we now turn to the factors that were critical in exacerbating HRTs identification levels, participants accounts revealed that negative

preconceived views towards dissimilar others (e.g. stereotypes) in addition to unfair leadership treatment were vital in shaping ***social categorisation processes*** – the way through which individuals place themselves and others into a social group. Study results also showed that differences in the educational background (e.g. having a degree from another country), or positions and privileges (e.g. coming from a high-status work location) among HRTs' individuals were affective in provoking ***social comparison processes*** – that processes when individuals compare themselves (i.e. their beliefs, attitudes, and abilities) with other teammates. Those processes were apparent in the relationship between HRTs' diversity and lower identification levels, which manifested as lower self-beliefs, self-confidence, motivation, and attitudes.

Starting with *social categorisation processes*, looking at participants accounts reveal many factors that exacerbate group lower identification by facilitating social categorisation processes including the negative preconceived views towards dissimilar others (e.g. stereotypes) in addition to unfair leadership treatment, as will be shown below. These factors were found to sensitise in-group social categorisation and social comparison processes that, in many instances, may lead to unwanted intergroup bias (manifested as lower team orientation, less information exchange, less emphasis on details with high tendency to blame dissimilar others, and localised attention rather than collective and careful enactment of team's inputs).

For many participants, salient differences (e.g. age, gender, and nationality) between teammates were vital in shaping how they engage in RSSPs during work incidents, reflecting an emphasis on their stereotypic perceptions of dissimilar others. Many participants, especially female technicians, indicated that they were excluded from participating during work emergencies by their male colleagues. It seemed that female technicians were not seen by their male counterparts as qualified technicians. The manifestations of these stereotypic views towards female technicians (e.g. sarcastic comments, perspectives ignorance) lead them to experience frustration and consequently losing their motivations and willingness to collaborate with their teams (i.e. lower team-oriented behaviours). Participant (12), who identified herself as a highly qualified technician, found this situation in the team she worked with during an emergency shutdown. After assessing the situation, she informed her colleagues that she has an execution plan. She described that her male counterparts "were laughing at [her] and said that [she is]

making it too complex". Experiencing these negative stereotypes can limit team members' RSSPs behaviours and may extend to affect future engagement in collective RSSPs. Participant (12) claimed that her experience of negative stereotypes resulted in changing her way and level of participation (i.e. raise concerns only) while working with male technicians. As she stated:

> *"I always let them decide … While working with men, I only warn them and raise questions when there is something to be concerned about. Other than that is a waste of time." (Participant 12)*

Participants' stories revealed an indication of a role for time pressure associated with work emergencies in inducing negative stereotypes towards dissimilar others. Participant (33) related similar experience with male technicians showing less receptiveness to her inputs during a work emergency. Although being assigned as the team leader, participant (33) stated that there was a high resistance from her male counterparts. She explained the situation:

> *"Many of them [referring to male technicians in general] do not respect our [female technicians] opinions. This happens all the time any especially when the job classified as emergency. They [male colleagues] ask many questions about my advices and try to convince me that it is not wise choice."*

As a result of this less receptiveness and ignorance towards the female team leader, participant (33) described her feeling of not being able to communicate her expertise and commented on the possible consequences of such attitudes:

> *"I think that our understanding was not complete. I have more expertise in load distribution and the guys decided to do something else that worked at the end but was very dangerous for their and the complex safety"*

Socially-rooted views about working with females were also found to exacerbate the lower level of identification within gender-diverse groups. These culturally-accepted views related to a male working with a female colleague were mentioned frequently by many participants and were associated with a high level of near misses. Some participants reported that working with dissimilar team members who can threat their conformity to their social norms (i.e. acceptable conduct) resulted in them feeling less motivated to collaborate and preferring to work in separate (i.e. lower team-orientation). For participant (07), being seen working with a female colleague

was a source of concern to him. This concern was stemming from him feeling in danger of being understood wrongly by both male and female colleagues. Here is his rationale:

> *"Everyone will talk about you when they see you working with a female. As a man, I found that working with females very stressful. You are afraid that she will understand your acts as an attempt to impose your opinion." (Participant 07)*

This socially-rooted fear and less receptiveness to work with a female technician coupled with time pressure resulted in participant (07) perceiving his female contribution as an interruption. It seemed that lower sense of belonging (i.e. "*working with females very stressful*") and its implications on individuals' motives to engage collectively (i.e. "*You are afraid*") shaped the way through which individuals perceived their teammates' inputs. Participant (07) continued and described his experience as being distracted and incapable of coordinating and putting his thoughts together (i.e. lower information exchange, and lower collective enactment). As he explained:

> *"My understanding was disconnected; whenever I thought about something specific she [his female colleague] come and interrupt me with a strange question. So I have to answer, and then, start thinking again." (Participant 7)*

This tension between the two genders, which seemed to be fuelled by both social norms and stereotypic perceptions of dissimilar gender, impacted male team members' motivations to engage with their female counterparts inputs and, ultimately, made them limit their RSSPs among them only (i.e. in-group discussion of a potential source of failure and less deference to the female technicians). As participant (22) explained his way to deal with work accidents while working with female technicians: "*the most important thing is to solve it [the problem] by yourself.*"

Age differences in teams were also seen by some participants to reflect a different kind of stereotypic perceptions that distract team collective RSSPs during work accidents. These perceptions fuelled by other factors such as the blame culture in the organisation can shape team members attitudes and behaviours towards dissimilar others. Overall, there was a tendency for the older and more experienced team members to associate ageing and years of experience with more commitment to safety. As participant (03), a >50-years-old technician who worked with <27-years old colleagues, explains:

> *"More experience means more accidents and more commitment to safety. Not like those workers who are new, you will see a worker with two years of experience refusing to wear safety glasses."*

For the three participants (15, 47 and 48), the young technicians who worked with participant (03), the experience they had with their old colleague was extremely negative. Participant (47) described how this experience resulted in them losing their focus on accident (i.e. less sensitivity to the joint situation). He explained the situation, "*he was nagging about safety until we forgot the accident itself!.*"

The young technicians felt resentful of their old colleague's attitude but seemed to be powerless to do anything. As participant (15) described, "*old people always treat you like their youngest son and you cannot say no to them!."* Participant (48) pointed to the age differences that made his and his young colleagues feeling unable to respond to their older colleague's bossy attitude. He explained, "*If he was on our age we would stop him.*" This finding suggests a significant role of social norms (i.e. regarding the acceptable conduct towards older colleagues) in shaping how team members' dissimilarities interact.

When this experience occurred with the older colleague controlling the teamwork, participant (15) claimed that this might result in the team members acting upon limited/localised perspectives rather than a wide range of perspectives:

> *"At the end we act upon his [the older colleague] decision. You don't want to upset an older man. (…). If you talk about solving the problem completely, no, his opinion was good for probably the next two months. If we worked together we might come with something better."*

For participant (48), the reoccurrence of this situation resulted in the team members not including their older colleague from team discussions. As he explained, "*We decided to avoid raising small issues in the presence of him [the older colleague]. Believe me. This is for the best of us and him.*" Participant (15) concluded and commented on this experience and its effects on his future work preferences:

> *"When my supervisor gives me a job I always give him the names that I will not work with. I will not work with an old man who treats me like his youngest son. 'Bring this'. 'Put this'. 'You don't understand'."*

Study results also showed that perceived dissimilarities could encourage *social comparison processes*. Differences in the educational background

(e.g. having a degree from another country), or positions and privileges (e.g. coming from a high-status work location) among teams can elicit social comparison processes within teams. It seemed that high achievers in teams saw working with their colleagues as a threat to their valuable status. This resulted in these high-status individuals trying to protect their status by exaggerating their abilities. For instance, results showed many reports by many participants indicating that they had negative experiences while working with technicians from high-status locations (e.g. the main branch or headquarter). For participant (29) and participant (53), working in an emergency shutdown with technicians who were requested from the company's main complex was an extremely negative experience for them because of the arrogant attitude of these visiting colleagues. Participant (29) described what happened:

> *"I remember we had a shutdown in the lab and the company requested a support from the company's main branch in eastern providence. Those people came here and started to say 'wow you only have this and this [employees privileges] … wow you work like this … we got more … we work better'. It was not all of them to be honest, but the teams I worked with were arrogant."*

Participant (51) and participant (52), who worked in the same team, added that this experience resulted in them feeling frustrated and consequently losing the confidence in their capacity. As participant (52) expressed:

> *"Their comments made me think that they have something we don't have here. When they mention something, me and my colleagues [the hosting peers] look at each other. It was like feeling that we will not be able to fix this shutdown."*

The effects of social comparison processes can limit team members' participation in collective RSSPs. As participant (29) claimed that he and his local colleagues avoided the direct contact with their visiting peers and depended on the team leader as a point of communication:

> *"As I told you, we avoided speaking with team. The supervisor was between us. We inspect and report to the supervisor, and he discusses our opinions with them. And so on."*

For participant (52), it was the distributive injustice that exacerbated social comparison processes between his functionally diverse team members, affected their sense of commonality with the group's members, and ultimately their motivations to engage in collective RSSPs. He added that ensuring equal rights for the company's work teams can decrease the desire

for social comparison processes among team members and consequently reducing diversity's negative effects (e.g. intergroup bias). He put the blame on the company's differential treatment between branches for the cross-location teams' conflicts. As he explained:

> *"Think about it. If we had the same rights nobody will try to convince the other that he got better treatment. They work in the main branch [city name]. Because of this they have better offices, accommodations, and many more. We are not the first priority to the company."*

The results of this study also revealed that team leadership could also exacerbate the negative effects of diversity on RSSPs. This effects can occur when leaders treatment are perceived as injustice (i.e. regarding the procedural, distributive, and interactional justice). Perceived injustice can affect team level of identification and therefore lower its members' motivations to engage across their differences in team collective RSSPs. This effect was more prevalent in functionally diverse teams. Specifically, leader treatment with dissimilar ranks in the functionally diverse teams was found to impact the existence and the perceptions of procedural and interactional justice and consequently resulted in the subordinates and lower-status teammates (e.g. juniors technicians, contractor helpers) showing less willingness to voice and discuss work-related issues with more powerful colleagues. In spite of desiring to be treated fairly and to have equal workload distribution among team members, some participants, especially those with lower ranks, indicated that they were given more work responsibilities by their team leaders. This resulted in these lower-status teammates feeling exploited and consequently reducing their reliability-seeking efforts (e.g. limited participation, less willingness to raise work issues). Participant (32), who worked as a contractor helper, described his experiences of working with many teams of formal technicians as "work by myself [himself] only". He explained why and how this usually happens:

> *"… they make me do their jobs [leaders and superiors]. They know that I have to meet their expectations so I get good evaluation and my contract will be renewed at the end of the year. I sometimes do a work of five. I do the inspection, I clean valves, I fill work orders' reports."*

The effects of perceived injustice on team motivations are manifested in their collective RSSPs as less willingness to raise issues and lower generation of detailed perspectives regarding work duties. These effects, ultimately, can impact the outcomes of teams' collective RSSPs and even their future capacity to act reliably. As participant (32) continued to explain how his team

members were losing many learning opportunities as a result of superiors unequal distribution of workload:

> *"I am the only guy who takes actions. If something new happened, they will not help me because they don't get more experiences and think in the same way. Their old solutions will stuck [sic] on their minds and it will become harder for them to think about different solutions."*

Participant (32) added that, over time, lower motivations for team collective engagement in RSSPs resulted in a culture that prefers to discuss how things are under control over keeping individuals alert. He expressed his strong beliefs that discussing work-related issues can threaten his job security. As he stated:

> *"Maybe on the beginning of my career here. Right now. No way. If I put them in the picture they will change me. They don't want to hear about any problems." (Participant 32)*

8.3.1.3 Group identification in low-diversity HRTs

In the context of this study, it seemed that working in diverse groups made more barriers to group identification than working in groups with lower diversity rates. Data from low diversity groups and low accidents rates did not reveal many discussions about group identification aspects (i.e. the sense of belonging and communality). Interestingly, data from low diversity and high accidents rates showed that there were some instances in which technicians from low-diversity groups felt less identified with (i.e. do not belong to) their teams, less motivated to collaborate with their teammates, and vulnerable to higher accident rates and near misses. These instances of lower identification within low-diversity groups, as reported by some technicians, were associated with perceptions of leaders' unfair treatment, and beliefs-actions conflict (including both personal and work beliefs) within HRTs. For example, there were some accounts that described experiences of belies-actions conflicts (e.g. "… *it's impossible that someone can talk like this about his colleagues. It's very annoying …*") and, as a result, indicated a lower sense of belonging while working with their teammates (e.g. "*it became clear that we don't fit together*"). There were other reports that emphasised on the role of leadership as a primary cause (e.g. "t*he supervisor shouldn't cause such hassle in the team. […]* especially in field and dangerous jobs"). A possible explanation for this finding might be that being treated unfairly by leaders, or experiencing beliefs-actions violations (e.g. goals and attitudes conflicts, or breaching of safety rules and procedures by a fellow technician) may result in team members comparing

themselves in relation to others and perceiving themselves as dissimilar from or not belonging to their objectively similar teammates, which in turn may decrease their in-group identification level. The remaining of this section will review the accounts that discussed group identification process on low-diversity groups, its associated factors, and impact on collective RSSPs.

Examining the accounts from low-diversity HRTs, who reported low levels of identification, showed that they also reported significantly lower levels of perceived justice and attributed this, in general, to the leaders' unfair treatment. These reports included many manifestations of this unfair treatment including distributive injustice (e.g. unfair distribution of workload or rewards) in addition to leaders' preferential treatment (e.g. showing more appreciation, or giving more attention to a specific team member). Starting with distributive injustice, many participants in low-diversity groups linked unfair distribution of workload to a lower level of group identification and a lower sense of connectedness with their similar teammates during work emergencies. Specifically, participants referred to increased workloads as a source of: 1) lower exchange of information; 2) unnecessarily tasks duplications; and 3) high level of individual improvisations. As participant (05) summarised the case:

> *"We were in an emergency to assess the damage after a fire. You can feel that no one was interested to talk with the other. A nightmare, nothing was right; two of us did the same task, no one is telling the other what or where he is doing. They just walk and write whatever they think. Everybody was working alone."*

Participant (60) commented on this experience and indicated that the job required more than three technicians. He explained how distributive injustice could negatively affect RSSPs (i.e. acting with high level of coordination):

> *"Personally, I think that I did the right thing. They want me to count the damage and I counted whatever in front of me. I heard that out reports weren't that good and that we didn't cover all the area. What were they thinking when they assigned the three of us only. It's a mess and there is no time to make plans. I am sure that they know that right know." (Participant, 60)*

Participants (05) and (60) accounts described the manifestations of team lower identification level and its consequences on RSSPs. However, their comments did not provide enough evidence of the reasons behind this "mess" or "nightmare", as they reported. Looking at participant (59) narrative, participant (05) and his teammate (i.e. Participant 60), showed an explicit reference to the distributive injustice (i.e. in workload) as the main cause of a

lower sense of belonging to a group and ultimately, ineffective reliability-seeking efforts. As participant (59) stated:

> *"… they brought us in the midnight after putting off a fire. You can't see your hand. And they want you to jump in the middle of the heat alone with only two other technicians. That's insane. This kind of jobs requires more than that."*

This effect was evident also in highly diverse teams, as discussed early in this chapter, when time pressure associated with workload was also reported to affect group identification in high-diversity groups, and ultimately, their RSSPs.

The other manifestation of unfair treatment was reported as leaders' preferential treatment (i.e. giving more appreciation and attention for specific team members at the expense of the others). Many of the participants' stories that included negative comments about teammates (i.e. lower identification) found group leadership fully/partially responsible. For instance, participant (04) indicated that his leader's continuous preference of one of his team, as he reported, made him and his other colleagues feel stressed and unable to work reliably. As he explained the story:

> *"We were in staggered shift during the weekend. The monitors showed unusual overload on one of the tanks. The supervisor chose me and other two technicians, one of them was his [word equivalent to 'insider' – a person who received a special treatment from the supervisor in return for telling him [i.e. the supervisor] about others and how they talk about him]. […]. His presence made us feel nervous to the extent that we went to the wrong tank and created a check request to a tank that didn't has any problem. On Monday we had a major shutdown and the maintenance team stated that they checked the reported tank and it was fine. They went to the wrong tank as we reported by mistake!"*

Examining the narratives of the remaining team members reflected similar feelings towards their leaders' differential treatment. For participant (55), this treatment was the starting point of in-group conflict. As he explained:

> *"I can't say whose fault was that. The supervisor shouldn't cause such hassle in the team. And even my colleague [referring to participant 04 who was in conflict with the 'insider'], he must put these matters away of work, especially in field and dangerous jobs." (Participant 55)*

For participant (54), in spite of the supervisor's treatment, his colleague who was driving was exaggerating. He stated that "*my colleague [participant 04] got mad and took us to the wrong place.*" It seemed that these negative feelings associated with differential treatment affected team members'

comprehension and attentiveness to the leader's instructions and resulted in them approaching the wrong tank. As participant (56), who seemed to be the 'insider', commented:

> *"… the weird thing that the guys went to the wrong tank. I don't have any reason. Maybe the driver [participant 04] was in rush. If we contacted the supervisor through the radio to double check, this problem wouldn't happen."*

Results also suggested that the conflicts between beliefs and actions (i.e. experience a violation of personal beliefs or work ethics and rules) in low-diversity groups can affect their RSSPs. Reports indicated that feeling of conflict between beliefs and actions could lower in-team sense of belonging and commonalty and accordingly, lowering teammates motives for collective engagement. In other words, experiencing a violation of the belief that each teammate must be supportive and compassionate can result in negative implications on group identification level and ultimately, their reliability-seeking interactions. This case was evident in many reports that linked lower group identification with experiences of safety breaches, rules violations, and bad manners by and between teammates. For instance, and as participant (61) said:

> *"We finished a maintenance request to clean valves and joints. After, we met for debriefing. Everything was perfect. I told my teammate that I need to go for a minutes to the toilet in my room in the complex. It was a 10 min only. When I returned I was shocked by a call of my supervisor and he told me that my teammate was complaining about me being not available. […]. I told him that I needed the toilet and it was a 10 min. in the beginning I was saying that it's impossible that someone can talk like this about his colleagues. It's very annoying... You need to only think about yourself."*

Participant (61) story summarised many reported experiences of beliefs violations. The common thread between these reports is the negative effects of these experiences on the level of group identification and their RSSPs. In his story, participant (60) comments reflected how experiencing hostile behaviours from a teammate resulted in him lowering his engagement with him (i.e. less reliability and not in a supportive manner). As he explained:

> *"I heard him in the radio [referring to the teammate with whom he had a negative experience] asking about a phone extension of a specific work station. I said to myself there is no way to help this guy. Even if I helped, he might say something else about me. So I did the same… after 10 minutes of his request, I called the supervisor and told him that*

this person is asking about a phone extension. And I left it with the supervisor." (Participant, 60)

Similar reactions were reported in some reports and were, undoubtedly, destructive to RSSPs. These reactions ranged from minimal engagement (e.g. fewer details and more general responses and inputs) to collaboration avoidance (e.g. deciding to act individually rather than collaborating with someone with whom you had a beliefs-violation experience).

Similar to beliefs-actions conflicts, some technicians on low-diversity and high-accidents groups found conflicts between teammates' individual-vs-group goals as a barrier to their sense of belonging (i.e. identification). Many participants indicated less willingness to work with, as reported in some statements, 'self-interested' teammates. Their accounts described self-interested teammates as those who give more attention to their self-goals and success and lower focus on team goals. Data suggested that goals-conflict was manifested in low-diversity groups in two forms, including working with teammates who give more attention to their personal goals and working with individuals who over-glorify their efforts in comparison to others. Participant (57) provided an example of the first form and commented on her experience of working with a colleague that revealed an explicit emphasis on individual goals and showed a lower interest in team goals. As she stated while commenting on her colleague behaviour after a successful dealing with routine work emergency:

"… she kept talking about herself and how is she going to report this on the company internal portal and her CV. She never thought about the team as a one group. Even in routine emergencies. She will help you only if helping would benefit her at the end, if not. Don't bother to ask. Her main focus is herself." (Participant, 57)

Experiencing self-interested behaviours seemed to conflict with participant (57) beliefs about teamwork and affected her sense of belonging to her team. This effect resulted in participant (57) and many respondents decreasing their commitment to work for the team common goal. As participant (57) said:

"at that moment I decided to play the game [i.e. to focus on her self-goals] and convinced myself that it's not fair to be the only technician who care about the team goals."

Some reports differentiated between the negative effects of beliefs violation and being self-centred. Reports suggested that the negative effect of self-

centred behaviours are more damaging and can extend to affect the whole team and its collective RSSPs. As participant (18) expressed:

> *"It's different. Seeing someone doing wrong thing is annoying… I know. But doing wrong things is something easy to catch and does not necessarily harm the whole team. But acting for your self-benefit is something difficult to confront and can spread to the whole team. You can't work like that in the field."*

Negative reactions towards self-centredness were also evident in participants' reports of working with individuals who over-glorify their efforts in comparison to their teammates. Participant (54) described how when/how those behaviours emerged:

> *"… you will find some technicians who insist to do their part of job first and without even asking about team progress.. Do you know why? They need this to tell supervisors that they were the first who responded to the work emergency and that they were behind the team good handling."*

Participant (54) continued and explained the relationship between exaggerated self-praise behaviours and team RSSPs:

> *"This can be a serious issue. We will lose the trust between each other. Once this kind of behaviours comes into the team, everybody become so sceptic and afraid of talk about work-related matters. This is dangerous. Your colleague might decide not to tell you about work issues or concerns and to work it alone."*

Participants from the low-diversity dataset provided additional evidence of identification processes and explored the factors that shaped group identification on low-diversity HRTs and accordingly, individuals' motivations to collaborate and engage in RSSPs.

Overall, this section explored how group diversity can affect their RSSPs through group identification processes. Participants' accounts from both high and low diversity groups showed that diverse HRTs are more vulnerable to the variation of group identification level and its negative effects on their RSSPs. Social categorisation and social comparison processes induced by salient differences in highly diverse groups coupled with preconceived negative views towards dissimilar others (i.e. stereotypes) were reported to result in negative effects on HRTs identification, motivations, and interactions within HRTs. On the side of low-diversity groups, study findings suggest a role for perceived diversity in more subtle factors (e.g. based on beliefs and goals uniformity or favourability with leaders). The salience of

diversity perceptions in low-diversity groups was triggered by unequal treatment by leaders, violation of work beliefs, breaching of safety procedures by teammates, and goals conflict (self vs team goals). Factors that buffer and exacerbate diversity-identification relationship were also discussed in this section in addition to their consequences on group motivations to engage across their differences and ultimately, their RSSPs. It is worth to mention that the role of identification can extend to affect team cognitive-elaborative activities (i.e. the processes of generating divergent and novel perspectives). This extended effect of group identification can appear as an increased/lowered team relational quality and consequently higher/lower utilisation of information processing capacity between teammates. The next section, therefore, moves on to discuss the relationship between group diversity and in-group cognitive elaboration and to explore its ramifications on the reliability seeking efforts of HRTs.

8.3.2 Second Pathway: Diversity and Team Cognitive Elaboration

Looking at the accounts of groups with lower accidents rates reveals that diversity can impact the team collective RSSPs through collective information/elaboration processes (e.g. generation of divergent perspectives). Differences in experience, backgrounds, and viewpoints were found to make it difficult to find a consensus between group members and, therefore, to encourage them to elaborate on the divergent perspectives. This includes exchanging different perspectives, processing those perspectives on the individual level, providing adjusted perspectives and discussing their plausibility for the work events. At the basic level, reports from groups with low accidents rates indicated that in-group diversity was found to create a larger pool of diverse perspectives among team members during work jobs or accidents. For example, participant (12) said:

> *"… They talk gold [talking about non-local technicians and helpers]. You are talking about someone who worked in many countries, weathers, positions, and experiences. Working within these teams is important."*

This awareness of differences in perspectives resulted in a culture that prefers using rich and detailed descriptions and avoids shared and general labels. As participant (12) commented in his experience of working in a diverse group of technicians and how discussions are managed:

> *"We know that misunderstanding might happen so it's very hard to come and say we have to fix this [sic] issues and give us general ideas.*

Everyone is waiting for something detailed and specific so we all understand what you are saying."

Results also reveal that this was vital to keep team members away from simplification (i.e. emphasis on details). As participant (39) described the role of HRTs diversity on inducing detailed-centred discussions:

"it's hard sometimes to understand and consider what everyone is thinking and saying, so we engage in more detailed discussions and revise our thoughts to make sure that we are in the same page."

This detailed exchanging and processing of divergent perspectives in diverse teams were found vital to trigger team members wariness and in other instances to boost their sense of capability (i.e. to regulate their emotional states during unexpected work events). Many participants indicated that there is a tendency for the more-experienced technicians to elaborate on and to question simplified interpretations about work issues. Participant (20), who worked in a team of three local technicians (one of them has 25 years of experience, as reported by the participant), described his experience of providing a simplified interpretation of a machinery unfamiliar noise during a night shift:

"There was a noise on the far end of the complex next to the fence. I went there to check the situation and my focus was on the equipment there. I spent around 15 minutes and came into a conclusion that everything is okay and there is nothing to worry about. I went back to the operations room and tell my colleague [the more-experienced colleague] that everything is okay. He asked me 'where did you hear that noise?' and I answered that it was next to eastern fence. He asked me again: 'the fence?' and I confirmed: 'yes'."

The simplified answer provided by participant (20) seemed to make his more-experienced colleague doubting that everything is under control. This feeling of doubt was manifested in him elaborating on and questioning his colleague's perspectives, such as asking about the location of the noise and trying to extract relevant cues (e.g. "the fence"). As a result, the team managed to identify the source of the noise. As participant (20) explained:

"... He held my hand and took me there. We arrived and in a few minutes he found that there is a problem in another location and what I heard and brought me here was only a sound echo reflected by the fence. Thankfully we managed to find the location and deal with the problem."

This detail-oriented discussion and careful integration of divergent perspectives, which seemed to be elicited by a simplified assumption by the

less-experienced technicians (i.e. “everything is okay”) and fuelled by the attentiveness of more-experienced colleague, was seen to allow team members’ clarifying their understanding of unfolding events, feeling more capable of contributing and engaging in future collective RSSPs (e.g. discussion of a potential source of failure). As participant (20) concluded:

> *“Once he [teammates with more years of experience] asked me again ‘the fence?’ I knew that there are some solutions to try there. […] I don’t know why I didn’t think about the fence and echo idea. […] At least I learned that I have to add the surroundings like the ‘fence’ into the formula while checking work issues.”*

Differences in perspectives and information were also found to encourage team members to rethink their work-relevant wisdom. Social interactions and information exchange between dissimilar team members were found to be vital in building and updating reliability know-how and practices of the whole group. As Participant (20), who commented on his positive experience of working with his more-experienced colleague, added that such experience led him to question and update his current frame of reference regarding safety and reliability-seeking behaviours (i.e. forms of sensebreaking and sensegiving). As he explained, “*I think at that time we were new here believing that everything we learned and read in safety workshops and guidelines is enough.*” Participant (20) commented that his colleague inputs “*did help [him] to understand the problem at the time and also will help [him] in the future when [he] notice similar problem.*”

Dissimilarities in team members’ experiences and expertise were found facilitate elaboration on task-relevant information and perspectives and consequently leading to more RSSPs and learning outcomes. However, it worth to mention that the beneficial effects of diversity on the collective RSSPs were not so much in the presence of different perspectives but instead the way through which they are perceived, processed and integrated. For instance, this study found that diversity-RSSPs relationship was buffered by team members’ awareness of diversity-related limitations that may impact their collective information elaboration efforts. Many accounts reflected a high level of awareness regarding lingual and cultural barriers and their potential negative impact on their groups’ processes. For many local technicians, their ability to break these barriers between them and their non-local colleagues were vital in boosting team diverse information processing processes, especially those essential for RSSPs (e.g. the generation and discussion of different perspectives and potential sources of failure). It seemed as if their understanding (i.e. as locals) of the

uniqueness of the Saudi culture in comparison to other cultures helped them to show more empathy to those team members coming from different cultures. As participant (34) described his experience of working with a technician from a different cultural background:

> *"You know. He heard about Muslim countries in the media. We broke this barrier. We started to invite him to set with us. When we bring Saudi food we invite him to try it. We [laughing] convinced him to eat using his hand instead of spoon."*

Participant (34) added that these ice-breaking behaviours were significant in motivating team members to engage across differences (i.e. improving group identification) and resulted in more information elaboration behaviours. As he explained:

> *"Like this. He enjoyed that very much and started to make jokes on us and enjoy working with us [laughing]. He also became very excited to work and share his ideas with us. For example, he is the one who helped us to put an operations tracking board. It like those board doctors use to writing updates about department's patients. Whenever something happens we write the time, location and what happened."*

Similarly, being motivated to engage across differences (as a result of the high level of group identification), coupled with a high level of information processing capacity was helpful in establishing information elaboration and generation of divergent perspectives. For participant (38), the more-experienced colleague in the team, working with less-experienced colleagues was seen as an advantage for the team. According to participant (38), less-experienced team members are more likely to catch work glitches. As he explained in his words:

> *"He did not know that his input was very valuable. As a new technician he was afraid of mistake and this is the nice thing about young technicians. They are energetic and, sometimes, they can see many things better that us [referring to old team members in general], they remember me of myself when I came here." (Participant 38)*

These beliefs and understanding of the less-experienced colleagues and their needs, which manifested in participant (38) way of interaction with his colleagues, increased team members' feeling of self-confidence, and resulted in them engaging in information elaboration activities (e.g. careful consideration and discussion of potential sources of failure, questioning of team current wisdom). On the other side, lower awareness and understanding of teammates differences was found to impair information processing and elaboration efforts. This case was evident in high diversity

teams with high accidents rates as many technicians indicated many instances in which elaboration on different perspectives was difficult. For example, participant (25), a technician from a north-western country, described his experience of working with three local technicians as setting outside the frame. As he described his experience:

> *"… I came with no idea about what to expect. I think it can happen in any place … you work with people who have similar culture … sometimes I feel that I can't follow their logic. It is the feeling that you are setting outside the frame." (Participant 25)*

Participant (25) referred to the lack of lingual and cultural familiarity in exacerbating information elaboration efforts. This factor was reported repeatedly by many participants and were seen as barriers to engage in information-elaboration processes which forms the basis for the team collective RSSPs (e.g. how cues are extracted, how alternative perspectives are generated and discussed). As stated by participant (25), this feeling of lost connectedness and inability to integrate with the dominant culture (i.e. "*you are setting outside the frame*"), participant (25) found himself incapable to participate with his local colleagues. He described how this feeling manifested, "*The only thing you can do is looking.*"

Unexpectedly, results showed that, in some instances, good views have another side that can be deconstructive for the collective RSSPs. It was evident that good views about dissimilar others can increase team motivations to engage and collaborate with dissimilar others. However, results showed that, sometimes, good views could hinder information elaboration activities. This was apparent in some narratives that showed an association between individuals good views about dissimilar others and the level attentiveness they exert. For instance, results revealed that Informational/functional dissimilarities (e.g. years of experience) might lower team members' attentiveness and sensitivity to operations by putting higher expectations on more-experienced colleagues. These expectations were found to generate a form of undoubted trust in the more-experienced peers and consequently affecting less-experienced team members' inputs in team collective RSSPs. As Participant (43), who worked in a team of three technicians and one helper, described his experience of a routine parts-checking and cleaning job:

> *"There was also a foreign helper recruited by the supervisor to help my colleague in holding and handling stuff during the work order. It is a huge task and one person cannot handle this work order. Anyway, during the work, an accident happened suddenly. This is the valve [the*

> *participant using a soft drink can to describe the valve] and there is something inside called 'desk', which open and close the valve, and the helper was holding […..] in the middle bottom and my colleague was cleaning the valve. The 'desk' on the top was held by something called 'sling'. Suddenly the sling released and the desk fell on the helper's hand and cut his four fingers."*

All of the three technicians who encountered this accident reported that their colleague helper did not commit to safety procedures. Participant (44), who was next to the helper when the accident happened, stated that he "wished that [his] friend committed to safety procedures regarding the safe standing". For participant (45), "the helper was able to protect himself and our colleague if he double-checked the 'sling'". Frequently throughout the interview with participant (43), he commented on how working with more-experienced technicians can reduce the level of attentiveness of less-experienced peers. As he explained: "*I think he [the helper] was thinking that [his more-experienced colleague] will let him know if he did something wrong.*"

In addition to the previously mentioned factors that exacerbate information processing and elaboration efforts in highly diverse teams, many participants referred to time pressure as a barrier of their cognitive elaboration activities in many incidents. Participants indicated that they were unable to engage with dissimilar others in generating divergent perspectives because of the time pressure they were under. It seemed that working under pressure resulted in these team members feeling stressed and consequently affected their abilities to evaluate alternative contributions and led them to show less receptiveness to others' perspectives. For example, participant (33), a female technician who assigned as the team leader, indicated that she was unable to participate during a work emergency because of her male subordinates being under time pressure. She commented on her experience of being excluded from team discussion while working with a male colleague in a work emergency:

> *"When I ask them to explain they just do whatever they want and claim that there is no time to explain. […]. It doesn't make any sense that there is no time to discuss work issues with one of your team. Why we are team then!" (Participant 33)*

For participant (07), the issue was not the team members' differences (i.e. gender) but their way of interaction under time pressure. He commented on his experience of working with a female colleague and her way of interaction during an emergency job:

> *"One of my female colleagues was asking and asking and asking about the progress of the work. I tried to be patient and answer her questions. (…). Until the point when there is no time to think so I work with what on my mind even though I wasn't sure about anything." (Participant 07)*

Participant (07) account revealed that time pressure effect on in-team elaboration efforts, especially in diverse groups, might happen indirectly by inducing stereotypical judgements towards dissimilar others (*as discussed in the previous section: diversity and group identification*).

For lower diversity groups, there were limited reports that explicitly mentioned instances of team members providing novel or divergent perspectives while dealing with work issues. In fact, data suggested a high tendency for similar groups to provide basic inputs while dealing with work jobs. This view was suggested by many participants and was echoed by participant (09), who described her experience with her two colleague technicians in routine but complex scheduled maintenance:

> *"We were in a maintenance job. A valve released quickly with me, and this is wrong. I talked with the girls, and they told me its normal, and maybe it's me who's getting stronger [a smile indicating a sarcastic comment]. I did the cleaning and inspected the pressure measures. Everything appeared good. However, I made a low-risk check request for the valve to make sure that nothing will happen in the future. Unfortunately, and within an hour, the valve exploded but, thanks to god, there were no injuries."*

Answering the question regarding the main cause of this accident, participant (09) did not attribute her mishandling to her teammates but pointed to the effect of their simplified and assuring inputs on her on-time judgment. She stated that the main cause was her bad evaluation of the risk level while reporting the issue. As she expressed:

> *"It was me. Maybe my friends' opinions about the issues made me unworried. But many options were in my hand: to make high-risk check request instead of low-risk … low-risk requests take around two to three days, and to shutdown tank (B) and redirect the load to tanks (A) and (C) until the check done." (Participant, 09)*

This case suggested that the lower engagement of divergent perspectives generation in low-diversity groups might not be a result of individuals' attributes similarity, but rather a result of the ways through which similar team members interact and process information. In other words, working with similar others may shape how individuals raise concerns, how concerns and inputs are perceived, and thus how team collectively interact and

collaborate. For example, participants (57) and (58), who worked with participant (09) and experienced the same incident, commented on the way through which their colleague (i.e. participant 09) raised the problem. For participant (57), it was the way through which the concern was raised (i.e. simple and less detailed) that decreased her engagement with and elaboration on her colleague inputs. As she expressed:

> *"Everyone was having something on his hands, and she only mentioned that the valve released quickly… Maybe because of this we didn't imagine how serious was the issues." (Participant, 57)*

Taking these incidents together, it seemed that lower engagement in information-elaboration processes could be a consequence of simplified voicing of work issue and effortless helping attempts. For participant (58), lower engagement and simplified contribution was "*the least help [she] could do*". As she explained the situation:

> *"She [participant 09] was on the valve. I told her don't worry we will see it together after. This is the least help I could do. She forgot to remind us after we finish the work job and the accident happened." (Participant, 58)*

Comparison of these results with those of high diversity groups, it seemed that engaging in effective information-elaboration processes while working under pressure in low-diversity groups requires a high level of information processing capacity (i.e. knowing how and when to raise concerns). In high-diversity groups, difficulties in information elaboration efforts were associated with team members familiarity with, views, and awareness about dissimilar others (i.e. including both limitations and potentials).

Comments about incidents in low-diversity groups, on the whole, demonstrated a noteworthy relationship between the way of interaction between homogenous HRTs and their cognitive-elaboration processes. Some narratives indicated that the cognitive-elaboration processes in low-diversity groups were mainly associated with group leaders or technicians from other groups. It seemed that leaders' active engagement or contributions from out-group technicians were affective in breaking/updating in-team shared wisdom and thus encouraging teammates' divergent inputs. Participants reports regarding leadership and out-groups' engagement will be discussed in the following chapter (*see* Chapter 9).

To sum up, this section discussed the second pathway (i.e. cognitive elaboration pathway) in which HRTs' diversity affects their RSSPs. Reports

from high diversity groups showed that team members' dissimilarities could improve the quality of RSSPs by creating a larger pool of divergent perspectives. This effect can be a benefit of high diversity in HRTs and can facilitate the formation of a work culture that prefers details over simplification, boost attentiveness and sense of capability, and encourage learning and developing reliability-seeking practices. Reports from low-diversity groups were also discussed. It seemed that in-group similarity might affect the ways through which team members voice work issues and provide help. This section also provided evidence for the issues that can impair diversity beneficial outcomes in addition to the factors that need to be managed well to cultivate positive outcomes (e.g. valuing and understanding of dissimilar others' differences, leaders and outgroups engagement).

8.4 Discussion

8.4.1 Diversity and identification in HRTs

Results of this study revealed that dissimilarities in HRTs could affect in-group identification processes and ultimately, their motivations to engage collectively in RSSPs. In other words, this study showed that in-team differences could affect their sense of belonging to and commonality with their teammates. In relation with diversity literature, it is well-established that team diversity can shape group identification processes – i.e. the processes through which team members organise their membership and perceive their sense of belonging within their group (Tajfel, 1978; Tajfel and Turner, 1979). Participants' accounts provided many instances in which working within diverse HRTs was associated with variations in individuals' roles perceptions, expectations, and sense of belonging within their social group. This finding builds on previous understanding linking in-team differences with group identification processes (e.g. Swann Jr et al., 2003; Van Knippenberg et al., 2007; Van Der Vegt and Bunderson, 2005) and provides evidence on its crucial role on RSSPs interactions.

Within the context of this study, diversity-identification effects on RSSPs were mainly carried through two processes that are social categorisation and social comparison processes. Social categorisation processes within HRTs were related to the way through which individuals place themselves and others into a social group. Salient differences (e.g. age, gender, and nationality) between team members were evident in shaping how they engage in RSSPs during work incidents. Especially in work emergencies, this study found that stereotypic views were frequently used as a basis of

how individuals identify other team members and as a basis of team interaction (e.g. who is qualified, how to interact with older young/old or male/female technicians). In accordance with the present results, previous studies have demonstrated that salient differences between individuals can shape group identification processes by eliciting in-group social categorisation (e.g. Chatman et al., 1998; Stevens et al., 2008; Tajfel and Turner, 1986; Turner et al., 1987). This finding extends our knowledge by providing evidence of the triggering effect of work emergencies on eliciting negative stereotypical judgements in HRTs.

Regarding the effects of the diversity-based group identification on RSSPs, this study found an association between those stereotypes-guided perceptions of and interactions with dissimilar others and group frustration, which consequently were found to impair RSSPs efforts. Overall, frustration and lower team motivation were found to lead to HRTs being unable to coordinate their inputs with each other and thus, limit their RSSPs. On the other side, high level of group identification was found to fuel team motives to engage collectively with their teammates in RSSPs. These findings have significant implications for the understanding of how group diversity may affect RSSPs. They complement those of earlier observations in diversity studies, which showed that diversity could lead to stereotypically judge dissimilar people, devalue, and resisting them (Chatman et al., 1998; Stevens et al., 2008) and link them with those views discussed in HROs and sensemaking literature linking group identification levels with mindful organising (e.g. Vough et al., 2020; Weick, 1995; Weick et al., 2005). For instance, results of this study linked group diversity with Weick's (1995) work on sensemaking, who demonstrated how identity could influence the process of sensemaking arguing that individuals' interpretations and actions are and associated with the ways through which others judge and view them. Findings also provided evidence for the relationship between identification and mindful organising suggested by Vough et al. (2020), who emphasised on the necessity of 'other-orientation' and its role in increasing awareness (of others and the joint situation), knowing where expertise resides and allowing collective RSSPs.

In addition to the social categorisation processes, results of this study revealed that diversity-RSSPs relationships could also be carried through in-team comparison processes – that processes when individuals compare themselves (i.e. their beliefs, attitudes, abilities, and rewards) with other teammates. Work-relevant differences (e.g. degree, privileges, or previous

experiences) among individuals were found to elicit social comparison processes within HRTs. These comparison processes were found to increase the chances of unwanted intergroup bias, which manifested in RSSPs as lower team orientation, less information exchange, less emphasis on details with high tendency to blame dissimilar others, and localised attention rather than collective and careful enactment of team's inputs. These findings are, in general, consistent with ideas of equity theory (Adams, 1963) that demonstrated how individuals' experiences of inequity tensions (e.g. anger in the case of under-reward perceptions) could lead them to change their behaviours to restore equity. Results also accord with insights from organisational justice literature (e.g. Hirschman, 1970), which indicated that perceptions of injustice are found to affect motivations, and ultimately individuals' behaviours. Taken together, these findings provide additional insights into the role of group diversity in HRTs' collective RSSPS. They also extend our knowledge on the outcomes and the specific manifestations of social comparison processes on RSSPs (e.g. lower team orientation, less information exchange, less emphasis on details with high tendency to blame dissimilar others, and localised attention rather than collective and careful enactment of team's inputs).

This study also found that even low-diversity HRTs are vulnerable to identification issues (e.g. lower sense of belonging, in-team conflict), low motivations to engage collectively in RSSPs, and thus exposed to higher accident rates and near misses. Deep-level differences in values and beliefs, which were reported as perceptions of behaviours that violate expectations and mutual obligations, were found to affect group identification. In relation to the diversity literature, it is well established that deep-level diversity can have strong effects on team processes (e.g. Benschop, 2001). Previous studies in diversity have demonstrated that differences in attitudes, styles of teamwork, and ways of voicing opinions can cause resistance, conflict, and misunderstanding among individuals (Benschop, 2001). In the context of this study, findings indicated that deep-level differences could lead to dire consequences in situations that require quick decisions (e.g. team disintegration and intergroup conflicts). This study also found a strong relationship between team disintegration and lower communication and low emotional support (i.e. lower team-orientation). In this study, low emotional and informational exchange were found to lower HRTs perceptions of control, increase panic, and hinder their capacity to engage collectively in RSSPs.

Results of this study also indicated that perceptions of unfair treatment in addition to experiencing contradictions between actions and beliefs (i.e. both personal and work beliefs) were found to increase perceptions of differences in low-diversity HRTs, and therefore lower levels of identification. The feeling of conflict between beliefs and actions was found to lower sense of belonging and commonality within HRTs and accordingly, lowering teammates motivations and engagement in collective RSSPs (e.g. lower collective motivations, and localised attention). These findings broadly support the work of other studies linking integrity and trust with working relationships (Mayer et al., 1995; McFall, 1987). Integrity involves “the consistency of the party’s past actions, credible communications about the trustee from other parties, belief that the trustee has a strong sense of justice, and the extent to which the party’s actions are congruent with his or her words” (Mayer et al., 1995, p.719). Integrity is an antecedent to trust that, especially in diverse contexts, enables building mutual attraction, role structure, and increases the motivation to work together. In his study of the Mann Gulch fire incident, Weick (1993) noted that loss of the team’s role structure could result in a negative effect on the team’s ability to think and react in an orderly way, resulting in an escalation of the incident. Overall, these findings extend our understanding of the relationship between diversity and RSSPs. They have significant implications for the understanding of how deep-level dissimilarities (e.g. Benschop, 2001) may influence RSSPs in HRTs.

As indicated earlier in this chapter, study results showed that diversity-identification effects can extend to affect collective motivations in HRTs. HROs literature emphasises the importance of prosocial motivation in facilitating collective RSSPs (e.g. Vogus, et al., 2014). Being prosaically motivated means that individuals must believe in, consider, and give attention to the collective system and therefore contribute for the sake of its goals (Weick and Roberts, 1993). In the context of this study, low group identification outcomes (i.e. low levels of belonging) were reported to produce in-team frustration and conflict, which ultimately affected individuals’ motivations to engage collectively in RSSPs. These effects can emerge as a result of dissimilarities-triggered stereotypes, prejudice, and discrimination and can be reflected in the individuals’ self-belief, self-confidence, attitudes, and consequently, their motivations. These findings are consistent with the idea that undesirable diversity’s effects can extend to fuel frustration, conflict, and dissatisfaction among all organisational members (e.g. Stevens et al., 2008). They also accord with earlier observations by Chatman et al.

(1998), which showed that diversity could reduce face-to-face interaction and increases other forms of interactions such as memos. In the context of this study, participants accounts revealed many instances in which technicians were more inclined to use other forms of interactions (e.g. leadership-mediated) in addition to instances of limited interaction (e.g. delayed reports). Taken together, these findings provide a further explanation of the role of both high- and deep-level diversity on group motivations and link diversity's effects with RSSPs in HRTs. They also extend our knowledge on the outcomes and the specific manifestations of diversity-induced social processes on RSSPs in HROs.

8.4.2 Diversity and cognitive elaboration in HRTs

Another important finding of this study was the influence of group diversity on RSSPs through cognitive-elaboration activities – i.e. those activities that are triggered by team differences and generate, discuss, and share divergent and novel perspectives of work-related issues. This study found that differences in backgrounds and expertise were associated with HRTs generation of a larger pool of diverse perspectives. In accordance with this finding, previous studies on diversity identified elaboration of task-relevant information as the core of the positive effects of diversity (Hinsz et al., 1997; Van Knippenberg et al., 2004). This finding contributes to our understanding of diversity-RSSPs interactions. It sheds new light on the role of diversity-fuelled elaboration behaviours on RSSPs in HRTs (i.e. detailed questioning, discussing, and elaborating on different perspectives). It also suggests a practical implication of group diversity on HROs in dealing with work simplification. As noted by Weick and Sutcliffe (2007), who identified the avoidance of simplified interpretations as one of the five principles of HROs in managing unexpectable. Relational quality and information processing capacity (e.g. language and narrative skills) were found in this study to improve this positive influence of diversity on RSSPs. These findings together integrate diversity and social psychology into HROs theorising and broadly support the work of other studies linking in-group communication with team elaboration (e.g. Earley and Mosakowski, 2000).

Results of this study also showed that elaboration activities derived from in-group dissimilarities were also significant in triggering team members wariness (i.e. to doubt that everything is good) and boosting their sense of capability (i.e. to feel that there is enough expertise to manage unfolding event). This finding broadly supports the work of other studies in HROs area linking experiencing contradictory feelings with reliability-seeking interactions

(Vogus, et al., 2014). In their work, Vogus et al. (2014) suggested the necessity of team members experiencing an emotional ambivalence – to have both positive (hope) and negative (doubt) emotions while dealing with work issues and complexities and argued that being ambivalent can create a "balance between confidence and caution" (Vogus, et al., 2014, p. 593). This finding provides evidence that experiencing contradictory emotions is vital for RSSPs (e.g. to voice their concerns, to ask for leaders and experts support, to recheck simplified assumption, etc.) and builds on our previous understanding of group diversity in inducing these emotions.

In addition to the importance of its existence, earlier observations on HROs and self-managing team's literature also emphasised on having this emotional ambivalence in balance (Langfred, 2004; Vogus, et al., 2014). This means that the level of hope in HRTs should not exceed the level of doubt, and vice versa (Langfred, 2004; Schulman, 1993; Vogus, et al., 2014; Weick and Sutcliffe, 2007). This foundation has some evidence in this study and was, surprisingly, associated with team diversity. In the context of this study, it was found that in-group differences can unbalance team members' emotional ambivalence. This effect of diversity on emotional ambivalence was more evident in HRTs with high-diversity in demographics (e.g. nationality and gender) and in teams with differences in ranks and years of experience (e.g. junior with senior technicians). For instance, study results showed that in-group differences could lead team members (e.g. junior technicians) to put higher expectations on other individuals (e.g. more senior technicians), show a higher trust (i.e. unchecked hope) and lower questioning (i.e. less doubt) on colleagues' inputs. This unchecked hope was found to result in simplified and less details-centred interactions in HRTs. These findings have significant implications for the understanding of how in-group dissimilarities may interact with the emotional aspects of HRTs (e.g. Vogus, et al., 2014). They also corroborate the findings of a great deal of the previous work in workgroups diversity that linked all status-based differences (i.e. differences that ascribe individuals in a higher implied status) with group identification (e.g. DiTomaso et al., 2007; Magee and Galinsky 2008; Sidanius and Pratto, 1999). It also provides support for HROs studies' ideas on the role of expectations on collective RSSPs (Langfred, 2004; Schulman, 1993; Vogus, et al., 2014; Weick and Sutcliffe, 2007). In addition, it broadly supports the work of Taylor and Armor (1996) in positive illusions linking stressful events with unrealistic optimism.

The other side was also apparent in this study. The dominance of fear over the hope was mainly associated with team differing in their demographical characteristics (e.g. nationality and gender). Individuals from different nationalities may have different backgrounds, languages, or styles of interactions. This study found that extreme situations (e.g. work incidents) can narrow diverse HRTs' interactional capacity, infuse their feeling of anxiety, which in turn may transform into a panic. This feeling was associated with individuals in HRTs asking '*what can I do*', and being unable to think, or feeling '*outside the frame*'. These manifestations of the dominance of fear over the hope in this study fit and extend Vogus et al. (2014) work regarding emotional imbalance and its relationship with HROs. Given the dramatic nature of the consequences, this is an important finding. It shows how these situations are disastrous to RSSPs; it was related to panic, lower generation and exchanging of alternative perspectives, loosing of attention on the joint situation, and ultimately potential escalation on work unanticipated issues and complexities.

Surprisingly, this study found that experienced trust (e.g. by leaders or senior teammates) can help in rebalancing the hope over the fear and restoring collective RSSPs. In this study, showing trust to individuals by team members who have higher ranks or expertise were found to boost individuals' sense of confidence (i.e. to restore their hope) and their motivation and ability to integrate their inputs to HRTs collective efforts. The role of experience trust in HROs was observed by Weick and Roberts (1993), who viewed trust as an element of heedful subordination – the process of integrating constructed actions with the system. Consistent with the literature (e.g. Vogus, et al., 2014), results showed that restoring emotional balance can encourage and motivate individuals in HRTs to engage in information-elaboration processes, allow them to utilise their different expertise and, ultimately generate different and novel perspectives. Taken together, these findings may help to understand the social and relational factors that contribute to the existence of emotional ambivalence. These findings also build on previous understanding of group diversity and team processes and their role on the coexistence of emotional ambivalence (e.g. stereotypes, implied status, and previous experience through social categorisation).

Another important finding was that the benefits of diversity in HRTs could also extend to future RSSPs. The results of this study indicated that differences in perspectives and information were found to encourage team

members to rethink their work-relevant wisdom. This accords with earlier observations in HROs literature (e.g. Weick and Roberts, 1993; Weick et al., 2005), which showed that social interactions and information exchange between dissimilar team members (e.g. between inexperienced newcomers and experienced technicians) could help in building and updating reliability know-how and practices of the whole group. These findings together, while preliminary, suggest that dissimilarities in HRTs can affect collective RSSPs positively through cognitive-elaboration processes and raises important questions about the factors that can promote diversity's positive outcomes.

Overall, the first pathway of diversity-RSSPs relationship (i.e. diversity-identification) contributes to our understanding of how surface- and deep-level dissimilarities in HRTS can affect group identification, collective motivation, and ultimately, their RSSPs. Findings on diversity-identification pathway build on previous understanding of the relationship between group diversity and team interactions and provide further insights into diversity's effects on RSSPs in HRTs (e.g. on collective motivations, role perception, joint-vs-localised attention). Together, these findings bridge the gap between group diversity and mindful organising in HROs. Furthermore, this study provides evidence on another form of group diversity influence on RSSPs, which is the cognitive-elaboration pathway. It, therefore, explains how team dissimilarities can trigger emotional, social, and informational processes in HRTs. Findings on this pathway (i.e. cognitive-elaboration) suggest that differences in backgrounds and expertise can create a larger pool of diverse perspectives, promote attentiveness, facilitate divergent thinking and RSSPs, and enable HRTs to rethink their work-relevant wisdom. This section also sheds light into the relevant factors to the diversity-RSSPs relationship (e.g. preconceived views, relational quality), which will be discussed in the following sections.

8.4.3 Relevant Factors to Diversity-RSSPs Relationship

In this study, preconceived views towards differences, leadership behaviour, relational quality, and information processing capacity were identified as the key factors that relate HRTs' diversity with the level and quality of their RSSPs. For instance, the results of this study found that categorisation processes were exacerbated by ***preconceived views*** (i.e. stereotypical judgments) towards dissimilar others. The most obvious finding that emerged from the analysis is that salient differences (e.g. age, gender, and nationality) within HRTs were found to elicit stereotypical judgments towards dissimilar teammates and shape in-team interactions and performance.

These results corroborate the findings of a great deal of the previous work in group diversity (e.g. Earley and Mosakowski, 2000; Van Knippenberg et al., 2013). Especially in emergencies, study results showed that negative stereotypic views were frequently used as a basis of how individuals identify other team members and as a guide for team interaction (e.g. who is qualified, how to interact with older young/old or male/female technicians). These findings broadly support the work of group diversity studies in this area linking diversity with attitudes towards others (e.g. Mehra et al. 1998; Randel and Jaussi 2003).

In the context of this study, views towards others were found to increase/decrease the level of identification in HRTs, individuals' relational quality, and consequently fuelling/lowering team members' motivations to engage collectively in RSSPs during work incidents. Together, these findings are important and add to our understanding of the emotional aspects of HRTs. They also provide insights into the relationship between in-team dissimilarities and their emotional processes that can ultimately affect their collective engagement in RSSPs. These findings also provide further evidence for the relationship between individuals' differences and emotional regulatory styles (Hughes et al., 2020) and thus, their effects on collective RSSPs. Emotion regulation refers to the deliberate processes through which individuals influence their emotional states (Gross, 1998; 2015; Hughes et al., 2020; Niven, 2017).

Findings of this study also suggest a significant role of situational demands on diversity-RSSPs interaction. In the context of this study, risky situations were found to elicit negative stereotypical views towards teammates (e.g. preconceived views regarding their capabilities to deal with situational demands), reduce their emotional states, and result in others-avoiding behaviours. These observations correspond with those on emotional regulation literature (e.g. Hughes et al., 2020) and have significant importance that they add to our understanding of the social and emotional processes of HRTs. They also explain earlier observations on HROs literature (e.g. Vogus, et al., 2014; Weick and Roberts, 1993; Weick et al., 2005) and show how views (i.e. the way through which individuals imagine each other) can shape how HRTs engage in RSSPs in a diverse context.

Overall, this study also showed an important role of valuing diversity in boosting diversity-RSSPs relationship. Positive views towards dissimilarities were found to increase the in-team sense of belonging (i.e. identification), motivations, and consequently their collective RSSPs. As presented in the

study results, the relationship between positive views and identification was manifested through teammates expressing positive views about their teams (e.g. "*you will enjoy the work with them*"), feeling of personal responsibility towards their teams (e.g. "*report whatever you see to your colleague*"), and actively seeking to collaborate with the group (e.g. "*I got your back*"; "*I can't even think that I could work issues alone*"). This finding broadly supports the work of group diversity studies linking diversity views with identification (e.g. van Knippenberg et al., 2007). It also links emotion regulation literature and discretional performance literature (e.g. Little et al., 2016) with HROs and provides further explanation for the influence of valuing diversity on RSSPs in HRTs. As noted by Niven et al. (2019), expressing positive views towards others reflects individuals' good intentions and attitudes, and thus increases the admiration of others and their prosocial motives.

In the context of this study, high identification was reflected positively in the diverse HRTs' work perceptions, motivations, and interactions. As reported, team positive views were associated with a high level of satisfaction, trust, sense of responsibility, and mutual support within diverse HRTs. These results are in line with those of previous studies on diversity beliefs, which reported an important role of positive diversity views on improving diversity-identification relationship (e.g. Chattopadhyay et al., 2004; Gonzalez and Denisi, 2009). They also link diversity with HROs' studies, which demonstrated the importance of developing a high-quality interaction for teams to function reliability during unwanted situations (e.g. Campbell, 1990, cited in Weick, 1993). Building on Campbell (1990)'s three imperatives for social life (i.e. honesty, trust, and self-respect), Weick (1993) demonstrated that when respectful interaction is developed, HRTs will be able to engage in RSSPs even in adverse situations (e.g. the collapse of role structure).

Findings also indicated that attitudes of understanding and valuing within diverse HRTs were found to facilitate cognitive-elaboration processes (i.e. the second pathway in this study) and to improve the quality of teams collective RSSPs. Current study findings demonstrated that positive beliefs on the added value of the differences between individuals could encourage interactions in HRTs, helping individuals to restore confidence, and ultimately engaging in information elaboration activities (i.e. generating and considering alternative perspectives, and deferring to expertise). This relationship between diversity favouring mind-sets and elaboration processes is consistent with earlier observations that linked diversity favouring mind-sets with better informational uses (e.g. Homan et al., 2007a;

Van Knippenberg et al., 2004) and overall team performance (e.g. Ely and Thomas, 2001; Homan et al., 2007a; Richard et al., 2003). These findings together are important and suggest that challenging negative preconceived views towards team differences may help cultivate diversity's positive outcomes on RSSPs in diverse HRTs.

Together, these results provide important insights into the role of deep-level attributes (e.g. views and beliefs) on shaping team interactions and ultimately, collective RSSPs. Regardless of diversity level, this study found that the alignment in team's deep-level and implicit attributes (e.g. views) was more vital in determining the outcome of RSSPs in HRTs (i.e. comparing to surface-level attributes). This finding is consistent with Healey et al. (2015) work, which demonstrated that gaining the coordination benefits of team's controlled, deliberative, and conscious processes (referred to as C-System processes) is associated with their alignment with the automatic and spontaneous processes that occur without conscious awareness (referred to as X-System processes). Results of this study found that negative and dissimilar beliefs (i.e. implicit stereotypes) towards dissimilar teammates were apparent in hindering collective RSSPs in HRTs with high diversity levels. In accordance with this result, previous studies have demonstrated that implicit attitudes and beliefs can trigger behavioural and emotional reactions that influence team members' motivations and behaviours (Healey et al., 2015; Hughes et al., 2020; Strack and Deutsch, 2004). Even in HRTs with low diversity levels, this study found that holding dissimilar beliefs might hinder social interactions in HRTs, and ultimately their RSSPs. This finding fits with Healey et al. (2015) illustration of illusory concordance. As indicated in their study, having explicit similarities and implicit dissimilarities (e.g. beliefs) can fluctuate team members' behavioural tendencies and reduce their collective synchronicity (Healey et al., 2015).

On the other hand, results of this study also showed that deep-level agreement on HRTs with both high and low diversity levels were significant in motivating team members to engage collectively in RSSPs, generate and discuss different interpretations, and to enact and coordinate their contributions carefully. The positive effect of deep-level agreement corroborates these earlier findings by Healey et al. (2015). These shared beliefs, as posited by Healey et al. (2015, p.410), "can contribute to team coordination by acting as a form of glue that holds together the activities of team members with complementary knowledge and skills, enabling them to take actions that are consistent with one another".

In addition to the preconceived views, results of this study showed that diversity-RSSPs relationship was also influenced by the ***relational quality*** between teammates – i.e. the extent to which teammates are psychologically linked to each other. In this study, the level of relational quality between teammates was associated with the quality of their social and informational interactions. In this study, group identification processes (i.e. based on individuals' views and attributes) in addition to individuals' *information processing capacity* (e.g. language and narrative skills) were found to interact with the relational quality in HRTs. This finding accords with Ariño et al. (2001) finding that individuals' characteristics (e.g. demographics) and direct observations (e.g. language or narrative skills) are among the 'initial conditions' that can determine the level of relational quality. This finding further supports the idea of diversity role on group identification processes (e.g. Swann Jr et al., 2003; Van Knippenberg et al., 2007; Van Der Vegt and Bunderson, 2005) and has significant implications for the understanding of how RSSPs in HRTs are affected by group diversity.

In this study, the role of relational quality on RSSPs was apparent in both identification and cognitive-elaboration pathways. Generally, results of this study indicated that, during emergencies, technicians were using their previous experiences with teammates to decide/modify their engagement on the situation at hand. Findings showed that the impact of these perceptions on the future decisions becomes higher as they align themselves with other stereotypes associated with group identification processes (e.g. older technicians and bossy behaviours). Levels of relational quality were also found to affect RSSPs through cognitive-elaboration processes (i.e. the second pathway). Findings showed that this implication of relational quality on RSSPs could appear as higher/lower utilisation of information processing capacity between teammates – i.e. better/weaker exchange, comprehension, and discussion of ideas with and between teammates in a timely manner. This role of relational quality in shaping diversity-RSSPs interaction was evident in many instances in which technicians evaded or limited their collaboration with teammates due to previous experiences (e.g. when a female technician decided to limit her collaboration due to male teammates' mockery, young technicians decided not to work in future with old/senior colleagues due to previous aggressive/bossy behaviours). These findings together provide insights for the role of composition and alignment of different group attributes on RSSPs in HRTs. They also complement those of earlier studies in diversity field linking between diversity's effects and the alignment of individual characteristics, referring to this as *diversity*

faultlines (Lau and Murnighan, 1998). Faultlines theory proposes that the more the differences between teammates are correlated (e.g. men/older vs women/younger) the more likely in-team subgrouping is to be triggered, and ultimately to disrupt team processes (Lau and Murnighan, 1998; Van Knippenberg et al., 2011). Studies also indicated that the alignment between differences (i.e. diversity faultlines) could involve surface (e.g. demographics) and extends to deep-level (e.g. beliefs) and informational differences (Bezrukova et al., 2009; Homan et al., 2007b; Van Knippenberg et al., 2011).

Arino and De La Torre (1998) noted past interactions could impact future decisions through relational quality reassessments. Study findings showed that the negative and persistent effects of previous experiences on relational quality were higher among participants who had stereotypical views towards objectively dissimilar teammates. The outcomes of these reassessments of relational quality can manifest as changes in mutual expectations or unilaterally changes in behaviours (Arino and De La Torre, 1998; Arino et al., 2005). In the context of this study, these changes were manifested in many instances as withdrawal or limited behaviours (e.g. female limited collaboration with a male colleague, young technicians avoiding older). This finding, in general, is in agreement with Healey et al.'s (2015, p.402) work, which also suggested that implicit representations (e.g. stereotypes) are "deep seated and stable across time and situations" and can affect in-team coordination, sense of unity, and cohesiveness despite the presence of objective dissimilarities. It also corroborates the findings of a great deal of the previous work in collaborative behaviour area linking past experiences with future exchanges (e.g. Axelrod, 1984; Macneil, 1973; Arino and De La Torre, 1998; Arino et al., 2005). In addition to complementing those of earlier studies, these findings together provide a further understanding of the pivotal role of preconceived notions on reliability-seeking interactions in HRTs, especially in diverse contexts.

The results of this study also found that cumulative experiences can allow modifications on preconceived views and relational quality and thus, shape diversity-RSSPs interaction. In the context of this study, teams with demographic differences (e.g. nationality) showed gradual improvement in-group identification and thus, better team interactions (e.g. more trust, sense of unity, and better information exchange). This finding broadly supports the works in this area, linking cumulating experiences with in-team views and interactions (Arino et al., 2005; Healey et al., 2015). As observed by Arino et

al. (2005), cumulative experiences can refine mutual assessments, and thus influencing partners' exchanges. Results of this study also found that, over time, repeated exposure can lead to changes in preconceived views (e.g. stereotypes and beliefs between team members). This finding also corroborates the ideas of Healey et al. (2015), who suggested that "representations tend to change only following repeated exposure to an association between objects and/or attributes and are therefore less likely to change based on single instances of new information" (Healey et al., 2015, p.402). Taken together, these results provide further explanation regarding the changes in RSSPs and connect HROs theorising with HRTs' social processes.

Overall, these findings together integrate social psychological theorising with HROs. They shed light into the important role of preconceived views and relational quality on the diversity-RSSPs relationship. These factors (i.e. preconceived views and relational quality) are antecedents for group identification and in-team motivations to engage collectively (i.e. with high team-orientation, more information generation and exchange) and reliably (i.e. with a high emphasis on details, and careful enactment). They also were found to maximise team members' utilisation of diverse skills and experiences (i.e. strengthen information processing capacity). Results also contribute to our understanding of how cumulative experience and repeated exposure to the group can shape group identification and ultimately improve their social and elaborative reliability-seeking activities. This finding provides an empirical contribution to the HROs literature by showing the importance of facilitating/monitoring group interactions as a way to challenge/modify preconceived views and improve relation quality in diverse HRTs. As will be discussed in the following chapter, on-ground team leadership was found to play a vital role in shaping the interaction of these factors, buffering negative effects of group diversity, and cultivating its positive outcomes on collective RSSPs.

8.5 Conclusion

As highlighted on this chapter, results of teams with high-diversity levels indicted that diversity may affect RSSPs in HRTs through two main pathways, group identification process and cognitive-elaboration processes. Overall, the first pathway of diversity-RSSPs relationship (i.e. diversity-identification) contributes to our understanding of how surface- and deep-level dissimilarities in HRTS can affect group identification, collective

motivation, and ultimately, their RSSPs. Findings on diversity-identification pathway build on previous understanding of the relationship between group diversity and team interactions and provide further insights into diversity's effects on RSSPs in HRTs (e.g. on collective motivations, role perception, joint-vs-localised attention). Together, these findings bridge the gap between group diversity and mindful organising in HROs.

Additionally, this study provides evidence on another form of group diversity influence on RSSPs, which is the cognitive-elaboration pathway. It, therefore, explains how team dissimilarities can trigger emotional, social, and informational processes in HRTs. Findings on this pathway (cognitive-elaboration suggest) that differences in backgrounds and expertise can create a larger pool of diverse perspectives, promote attentiveness, facilitate divergent thinking and RSSPs, and enable HRTs to rethink their work-relevant wisdom.

Furthermore, study results indicated four relevant factors to diversity-RSSPs relationship, including individuals preconceived diversity mindsets, relational quality, information processing capacity, and leadership treatment. These findings shed light into the contextual factors to the diversity-RSSPs relationship (e.g. on-ground leadership, diversity management, and information processing capacity), which will be discussed in the following chapter.

Chapter 9
Contextual Factors that Shapes Group Diversity Effects on RSSPs

9.1 Introduction

As highlighted on the previous chapter, results of teams with high-diversity levels indicted that diversity may affect RSSPs in HRTs through two main pathways, group identification process and cognitive-elaboration processes. Overall, study results showed these processes were mainly carried through four factors, including individuals preconceived diversity mindsets, information processing capacity, relational quality, and leadership treatment. This chapter aims to understand how context shapes the effects of group diversity on their collective RSSPs.

9.2 Leadership and RSSPs in HROs

Looking at results from the previous two chapters revealed that diversity within HRTs could affect their RSSPs through two pathways; one related to the group identification and its effects on their motivation, and consequently their RSSPs, and another associated with groups information-elaboration processes, which was found to facilitate group RSSPs and learning. Together, these results provided important insights into the importance of diversity management on HROs to harvest its beneficial effects on RSSPs. Participants' reports went through several instances in which diversity management was critical in bringing in diversity benefits to RSSPs.

In this study, most of the participants' accounts discussed the role of team leadership as a medium of diversity management on HRTs, especially in critical moments. In critical moments, many participants reported that group leadership was central for both high identification and effective information processing, which in turn reflected on HRTs collective RSSPs. Overall, results showed that leadership role in managing HRTs' diversity was focused around ensuring justice, providing support (emotional and technical), and resolving conflicts. For instance, leadership was frequently associated with participants' accounts that discussed diversity and perceived justice in groups. Reports indicated that leaders had the main role in ensuring perceived justice – by making sure that all team members feel equally treated. Participant (29) indicated that ensuring equal rights between

teammates is vital in decreasing the desire for social comparison processes among them, and consequently reducing diversity's negative effects (e.g. intergroup bias). As he said:

> *"Everyone should work the same. And in case of emergency, the leader must make sure that everyone will got the fair reward. Belief me everyone will be happy for the other one." (Participant 29)*

In his comments, participant (29) specified that leaders are responsible for ensuring justice during work emergencies. Many similar comments associated perceived justice with team leadership fair treatment, evaluation and distribution of workloads and rewards. However, there were few comments that put the responsibility of justice on the company's policy in general. This, for instance, was the opinion of technicians who worked with supporting teams coming from another location. As participant (52) put it:

> *"Think about it. If we had the same rights nobody will try to convince the other that he got better treatment. They work in the main branch at [city name]. Because of this they have better offices, accommodations, and many more. We are not the first priority to the company." (Participant, 52)*

As discussed in the diversity-identification pathway (*see* Chapter 8), working with a team from a different location (or branch, company) can elicit social comparison processes. In participant (52) account, it seemed that social comparison processes were elicited by pre-existing differences in privileges between cross-location teams and, therefore were difficult to be addressed by the on-ground leadership. In his comment, participant (52) explicitly held "the company" accountable and added that ensuring equal rights for the company's work teams can decrease the desire for social comparison processes among team members and consequently reducing diversity's negative effects on group identification (e.g. intergroup bias).

Study results also highlighted other diversity-related obstacles that need careful management. These obstacles included minorities being unable to engage, in addition to the negative views (i.e. mindsets) towards team diversity. Results found that leaders can play a significant role in tackling these obstacles. For instance, leadership support was reported as a main cause of diverse minorities' engagement and contributions within workgroups. As participant (32) described his experience of working as a minority in a locals-dominated team and commented on the role of leadership:

> *"In the beginning it was very difficult to harmonise with the team. You know, they are from the same culture or maybe worked together before I came. Anyway, our supervisor, [name], always start by asking me for my inputs. Whenever we are together in a work-job, I know that I will get the first question. As the time goes, I found myself clicked with the team."*

Leadership role in encouraging minorities and diverse technicians was found vital in promoting diversity awareness within HRTs. Some reported added that leadership support to diverse technicians was significant in breaking the glass wall between them and their colleagues from different backgrounds, experiences, and even gender. As discussed previously in diversity-identification and diversity-elaboration pathways (*see* Chapter 8), ice-breaking behaviours were substantial in motivating team members to engage across differences (i.e. improving group identification), increasing in-team understanding of dissimilar others capabilities and limitations (i.e. diversity awareness), and resulted in more information elaboration behaviours (i.e. generating divergent and novel perspectives). Participant (33) described how work's nature could affect diversity awareness and then expressed his opinion on this issue:

> *"In emergencies we don't have time. You will get a schedule that contains names, times, locations, and list of work-jobs. You can't expect a CV for everyone. You have to get to know your colleagues. What they know, what they achieved, how they think and talk."*

Participant (33) emphasised the importance of teammates to know each other. In her comment, she specified that each technician must be aware of the know-how (i.e. "*what they know*", "*what they achieved*") and the interpersonal aspects (i.e. "*how they think and talk*") of all fellow teammates. Looking at the leadership role in promoting diversity awareness, the majority of technicians who mentioned team leadership found it an integral part of initiating and directing this process. As participant (35) commented:

> *"Here, it's the leader job to start the talk. He got time and system that contains everything about each technician. He can simply say: guys, you got a list of work-jobs, I know you had an experience on something similar. Please tell us what you know. […]. The talk brings a talk and you will know how and when to approach your teammates"*

Participants accounts revealed another substantial role of team leadership in cultivating and supporting diversity's positive effects on RSSPs. There were many reports that either explicitly or implicitly associated leaders support (e.g. encouragement, showing trust, and appreciation) with more effective

diversity interactions and consequently more RSSPs. Participant (32) narrative provide a good example of how leadership support might appear:

> *“good word make difference. Even when work accident happen… ‘Thank you [name]' ... ‘good job [name]’ … ‘what would we do without you [name]’.”*

From the leaders’ perspective, showing trust was mainly seen as a way to encourage the collective involvement of technicians during chaotic conditions. This role was reported as more important for dissimilar individuals’ interaction. As participant (41) who was assigned to lead a group of technicians during an emergency work-job explained:

> *INT: “You said that: at that moment, giving your trust to your team is important. can you explain this statement please.”*
>
> *PAR: “Think about it. No one want to take the responsibility of saying anything especially those in lower ranks. In these moments giving trust to your teammates is useful. I encountered technicians who said that they can’t even think about anything by reminding them of their pervious valuable contributions… ‘do you remember when you did this?’ ‘That was great’. ‘You can do it again’…”*

This form of emotional support (i.e. showing trust), as claimed by participant (32), resulted in him feeling confident and motivated to do his best for the sake of the team (i.e. being team-oriented). He explained how this climate of mutual admiration manifested during fieldwork and commented on its implications on the team collective RSSPs:

> *“I will do my best to give them back. (…) I remember how I felt very good. I think it [referring to the attitudes of appreciation] made the work very relaxed.” (Participant 32)*

Participant (32) continued and explained how leadership careful management of diverse HRTs extended from boosting group identification to facilitating information-elaboration processes and thus, their RSSPs. In his comment, participant (32) stated that leader’s support was important to their articulation (i.e. generating and exchanging of alternative perspectives) and coordination (i.e. collective and careful enactment of team contributions) of each other inputs. As he said:

> *“Everyone gave an opinion and we developed a good understanding about the issue, what to do, and when to act very quickly. It was a successful mission.” (Participant 32)*

Leadership encouragement was also seen and reported by some technicians from diverse backgrounds as permission to intervene in the collective wisdom (i.e. facilitating emphasis on details). As participant (20) specified:

> *"I will tell you why. Sometime you don't feel that you have the courage to tell your team that we are moving on the wrong direction. Nobody wants to hear you saying that he or she needs to redo the work or some of it again from the beginning. Here, only the leader who can make it easier for you to talk. … I mean when he/she starts to talk and ask about our thoughts."*

In addition to encouraging team members to ask questions, participants narratives also indicated an association between team leadership and in-team generating and exchanging of alternative perspectives – another important facet of RSSPs. This role of leadership was frequently apparent during chaotic conditions (i.e. work emergencies). In these conditions, many technicians emphasised their group leaders' roles in facilitating in-team communication. This view was echoed by many participants in high-diversity groups. Participant (53) comment provided a good example of how this happened:

> *"I remember when we [local team] had a problem while working with a team coming from [city name]. It was a very bad experience. My colleagues and myself were thinking that a disaster will happen if we continued working with them at that night. […]. Honestly, if [name].. our leader.. wasn't there, we couldn't make it. He simply said to us: sure, don't talk with them I will do that job, let's move on."*

Participants' reports demonstrated that work emergencies might limit their ability to communicate with their teammates and found that leaders acting in the middle was significant in facilitating the flow of information between teammates during these conditions. Participant (53) added explained how leadership involvement was reflected in team RSSPs:

> *"We are here to work and do our best. […]. So yeah, we started to work as two groups and tell him [referring to the leader] that this part was done. In this case, I remember [name – referring to the leader] was asking also about suggestions for the next steps. I imagine that he was in contact with them [referring to the visiting team] telling them that we [referring to his local teal] did this and what we suggest for the next step."*

Whilst a majority commented on the positive role of team leadership in team collective RSSPs (e.g. emphasis on details, generation and exchanging of alternative perspectives), some participants specified that the leadership role

in facilitating the generation and exchanging of divergent perspectives was buffered by leaders' skills in envisioning and coordinating team members' inputs. For example, participant (14) said:

> *"No. Not every leader can do that. Only those who can quickly imagine how team thinks, where is the missing part, call for everyone attention, and work out new solutions."*

Even with deep-level or perceived diversity (i.e. unobservable differences such as beliefs, goals, or expectations), interviews' narratives showed a noteworthy relationship between team leadership and the generating and exchanging of alternative perspectives in HRTs. As highlighted previously, results from low-diversity groups (i.e. objectively similar) showed that deep-level or perceived differences within HRTs could affect in-group identification, motivations, and capacity for information processing (*see* Chapter 8). This lower of motivation (i.e. lower team-orientation, lower generation of alternative perspectives) and lower collective information processing (i.e. lower exchange of alternative inputs) were found to negatively relate to RSSPs in HRTs and their outcomes. Interestingly, there were some reports that found leaders' active engagement or contributions were effective in breaking/updating in-team shared wisdom, fuelling motivations for collective participation and consequently encouraging teammates' divergent inputs. As participant (08) described:

> *"A simple question from the leader technician might help us. They don't handle specifics and look at the situations and progress as a whole. This is important for us. … We call it a third eye, they spot things we forgot."*

Careful diversity management was also associated with increased team-oriented behaviours. As indicated previously in the diversity-identification pathway (*see* Chapter 8), study results showed a strong relationship between diversity and identification in HRTs. Specifically, it was evident in many instances that dissimilarities within HRTs can elicit social categorisation and comparison processes between team members, and thereby lower their sense of belonging and their orientation to the team. Previous discussions also included some reports that described how team leadership (i.e. by unfair treatment) might exacerbate those negative effects of diversity. However, it worth to mention that there was some evidence that leader's awareness and careful handling of group diversity can buffer identification and sense of belonging among teammates. Specifically, most of the reports that mentioned in-team conflict referred at some point to the

team leadership as a starting point of conflict resolution. Reports emphasised the importance of leaders listening to team disputes, providing help to resolve teammates' conflicts. For instance, participant (40) mentioned that:

> *"The leader or shift supervisor [referring to the team leader] is the best persons to do that. … I will tell you why. Leaders will do everything to make sure that everyone is working side by side. They will let you say whatever you want, and will try to provide a solution that satisfies everyone."*

From many leaders' perspectives, resolving conflicts between team members was reported as a part of the job. For instance, participant (46) stated that it is "*a part of [his] job to take all precautions to prevent such possible conflicts."* Participant (46) described his experience of dealing with conflicts between genders and commented on its implications on team-orientation. As he put it:

> *"It is a hard job. First you need to understand why they are fighting and then convince each of them that they need each other to make it through here. In this harsh work conditions, it's very hard to punish them of being rude and moody. They are stressed and will put their stress on the nearest one who is not among their best friends list. So here my job is to either resolve the issues or reorganise the roles and tasks in a way that may lower their clashes. This can bring their focus back on the task not personal matters." (Participant 46)*

However, reports also identified many obstacles that stood in leaders' way to meet this responsibility. Participant (12), who also experienced working as a team leader, explained how some of these obstacles might arise:

> *"It's always effective. But believe me, it's not that easy. Most of the time you will not be involved. I know how they think. They think that it's childish to come and talk about a conflict or fight. No one wants to have you in the middle telling them who was wrong and who wasn't."*

It seemed that effective management of diversity on HRTs requires both leaders' skills in addition to team members' cooperation. In the case of team conflict, lack of team members cooperation with team leaders, especially in the highly diverse teams can lower team orientation (i.e. lower believe in teamwork, lower focus on collective goals, and thus lower attention to teammates inputs). As participant (37) put it:

> *"It is challenging. No one want to talk to the other. People will start losing trust in each other … each technician will try to find a specific task to work it alone and to distance himself from the other."*

Interestingly, the effect of in-team conflict, coupled with lower leadership involvement, was found to affect other teammates who are outside the conflict zone. As participant (48), who experienced a situation of two out of four teammates were in conflict, commented:

> *"It becomes a nightmare. You are working and expecting that something bad will happen at any time. It was like that. I couldn't focus on my task."*

In his comment, participant (48) described how experiencing conflict affected his engagement in collective and careful enactment of team contributions. Commenting on his experience, participant (48) found himself unable to regulate his emotions (i.e. working while expecting something bad will happen) and reported lower ability focus. He added and explained how conflict turned his attention from team goals to interpersonal goals and described what he did to deal with the situation:

> *"I need to talk with them [referring to the individuals who were in conflict] in a way that does not make them feel that I'm taking any side. Sometime I can't help one of them so the other will not got mad and did something that might cause a problem to the whole work-job." (participant 48)*

Comparing participants accounts related to in-team conflict experiences showed a lower tendency of teammates to take part in conflict resolution. For This tendency, for example, was apparent in participant (48) statement above, which also provide a potential explanation for this attitude. In his comment, he argued that taking part in conflict resolution can escalate the issue (e.g. when one thinks that you are taking the other's side) and he added that this could affect the whole RSSPs. This view may explain why the majority of participants, as highlighted previously in this section, agreed on the role of leadership in facilitating most of HRTs' RSSPs (i.e. encouraging and supporting the generation and exchanging of alternative perspectives, emphasis on details, team-oriented behaviours, and collective and careful enactment of team contributions). It also seemed that the agreed-upon authority that leaders have to resolve disputes justifies and facilitates their conflicts resolution efforts. While this view was implied in many accounts, it was stated explicitly by some participants. For instance, participant (20) indicated that "*only the leader who can make it easier for you to talk*". Although the significant role of team leadership in managing diversity, this section also indicated many situations in which leadership role can be less effective. These situations include when team members do not

involve in their RSSPs or show less receptiveness towards their leaders. These reactions towards team leadership can happen as a result of threats to self-image or, in the case of female leaders, socially-rooted views about working with the female (*see* Chapter 8: Diversity and identification in HROs for details).

9.3 Information Processing Capacity

Results of this study discussed how dissimilarities in HRTs can affect their identification levels and consequently their desire and ability to process and disseminate information – i.e. their ***information processing capacity*** (*see* Section 8.4.3 in Chapter 8). As discussed previously, dissimilarities in team members' attributes and expertise were found to shape their identification levels and elaboration efforts, and consequently influencing their RSSPs and learning outcomes. However, It worth to mention that the beneficial effects of diversity on the collective RSSPs were not so much in the presence of different perspectives but instead the way through which they are perceived, processed and integrated. This form of consideration of different perspectives was heavily associated with team members' relational quality (i.e. induced by their motivations to engage across their differences) in addition to their information-processing capacity – ability to exchange, comprehend, and discuss ideas with teammates in a timely manner. This section will highlight the role of information processing capacity on diversity-RSSPs interaction and will shed light on the participants' accounts regarding what affects their information elaboration efforts.

Looking at the narratives form high diversity teams with low accidents revealed that the positive effects of in-group dissimilarities on team cognitive-elaboration (i.e. generation of divergent perspectives) were buffered by the level of team members' appreciation of each other differences (i.e. positive diversity views and high relational quality) in addition to individuals' information processing capacity (this includes know-how, narrative and communication skills). Many participants, explicitly and implicitly, indicated that positive effects of diversity on team collective RSSPs will be higher when individuals have a capacity to process teammates inputs (i.e. high information processing capacity) in addition to showing favourable beliefs in the value of their teammates' differences (i.e. high relational quality). These attitudes of understanding, valuing, and negotiation of similarities/differences within groups were frequently mentioned by many participants and were seen as vital in determining the

quality of team collective RSSPs. Participants (17, 40, 41 and 42), who worked together in a team comprised of two Saudi males (i.e. 40 & 41) and two Saudi females (17 & 42), commented on their experience of dealing with an installation mistake. Participant (17) described what happened to her:

> *"We were in a maintenance job and I made an installation mistake. I noticed that when I saw an unrealistic reading. The annoying thing at that time is the fact that there were several ideas in my head but I don't know. I was distracted from where I should start. I thought the best thing to do is to start with [referring to participant 40 – one of the male colleagues]. So I told him about the problem and that he is the best one who can do it. I also told him about the solutions on my mind. And we fix the problem."*

It seemed that participant (17) understanding and valuing of her male colleague competencies, coupled with her information processing capacity encouraged her to engage in elaboration processes while responding to a situational necessity (i.e. by deferring to her male colleague). As she explained:

> *"We are new here [referring to her and the other female colleague]. Also men are used to this sort of work [works that needs high physical abilities]. I will be honest with you. In some occasions, working with men is better than working with my female colleagues. I do not mean that they are not qualified. Most of them here [female colleagues] are better than men in term of education and training. The nice thing in men is that they turn ideas into actions and do not overthink about what to do especially in occasions like that. Maybe because they are here before we came." (Participant 17)*

The other two male technicians also showed high understanding of their female colleagues' skills and capabilities. There seemed to be a mutual understanding between the team members that the females are the brains, and the males are the muscles. These mutual positive beliefs on the added value of the differences between individuals resulted in team members helping their teammates to restore confidence and ultimately engaging in information elaboration activities (i.e. generating and considering alternative perspectives, and deferring to expertise). As participant (41) expressed his and his colleague's positive beliefs about their female technician that made them act accordingly and provide both emotional and practical support to their teammate:

> *"When she was talking with [name – referring to participant 40) I can tell you she was very very stressed. We, I mean me and [participant 40], knew that she knows better than us and we always talked about that. She just finished her training courses. These courses are updated*

> *every year and there are many new examples of accidents and how to handle them. So at the moment our job was to let her calm down."*

Believing in the value of team members' differences and its role in facilitating information elaboration activities was also found to underpin the relationship between team dissimilarities and learning outcomes and ultimately their future RSSPs capabilities. For instance, and as highlighted previously, some participants' narratives specified several positive experiences of working with their teammates despite their dissimilarities in years of experience. The common thread between these narratives lies in the way in which they see each other. For participant (20), working with his more-experienced technician represented a learning opportunity. As he stated, "*I think it is comforting for you to work with more experienced technicians. There are many things that you can learn from them only.*" These positive beliefs seemed to shape how participant (20) perceived and interact with his more-experienced colleague questions during the fieldwork. As he stated, "*he wanted me to learn.*"

Being motivated to engage across differences (as a result of the high level of group identification), coupled with a high level of information processing capacity was helpful in establishing information elaboration and generation of divergent perspectives. For participant (38), the more-experienced colleague in the team, working with less-experienced colleagues was seen as an advantage for the team. According to participant (38), less-experienced team members are more likely to catch work glitches. As he explained in his words:

> *"He did not know that his input was very valuable. As a new technician he was afraid of mistake and this is the nice thing about young technicians. They are energetic and, sometimes, they can see many things better that us [referring to old team members in general], they remember me of myself when I came here." (Participant 38)*

These beliefs and understanding of the less-experienced colleagues and their needs, which manifested in participant (38) way of interaction with his colleagues, increased team members' feeling of self-confidence, and resulted in them engaging in information elaboration activities (e.g. careful consideration and discussion of potential sources of failure, questioning of team current wisdom).

9.4 Discussion

This section will provide discussions on how study findings build on previous understanding of team diversity, and team processes in HRTs/HROs.

9.4.1 Leadership and RSSPs in HRTs

The present study was designed to explore how team diversity affects collective RSSPs (first research question) and to identify factors and processes that contribute to the relationship between diversity in HRTs and their RSSPs (second research question). With respect to the first research question, study findings (as discussed in Chapter 8) provided empirical evidence for the processes that carry diversity's effects on RSSPs in HRTs (i.e. group identification and cognitive-elaboration processes). Results also highlighted some possible factors that can shape and interfere with diversity-RSSPs interaction (i.e. preconceived views, relational quality, and information processing capacity). Consistent with the literature, previous findings further support the idea that the beneficial effects of diversity on the collective RSSPs are not so much in the presence of in-team differences but instead, the way through which they are perceived, processed, and coordinated (Healey et al., 2015; Lau and Murnighan, 1998; Van Knippenberg et al., 2004).

The second question in this study sought to determine the interplay between organisational culture, leadership behaviour, and diversity in influencing the process of sensemaking (i.e. RSSPs) in diverse HRTs. Results of this study did not find significant evidence (i.e. explicit references) for the role of organisational culture on the collective RSSPs in HRTs. Participants accounts revealed that the role of organisational culture was formed: 1) based on cumulative experiences between individuals during work incidents; and, as will be discussed in this section, 2) through the interactions with team leadership. However, there were some reports that showed an intervening effect of organisational policy (e.g. privileges and incentives) on group identification level (i.e. through social comparison processes). Although the little evidence in this study, this finding accords with earlier observations in justice-diversity literature (e.g. Antino et al., 2019; Joshi and Roh, 2009; Spell et al., 2011), which showed that perceptions of injustice could trigger social-categorisation and comparison processes and ultimately, impair team performance. It is also in line with those of HROs literature that emphasises the role of fairness in facilitating honest reporting (Griffith,

2009), improving safety (Petschonek et al., 2013), and the creation of a culture of safety (Patrician et al., 2016).

On the other side, and in addition to diversity mindsets and relational quality, study results showed a noteworthy relationship between diversity effects and leadership behaviour. In this study, on-ground team ***leadership*** was found to play a vital role in buffering the negative effects of diversity and cultivating its positive outcomes on collective RSSPs, especially in critical moments. This finding broadly supports the work of other studies in this area, linking leadership with positive diversity outcomes (Van Knippenberg et al., 2013). It also accords with other HROs observations, which emphasised the role of careful management of diversity on cultivating its positive effects on collective RSSPs (Weick, 1993; Weick and Sutcliffe, 2007). The results of this study indicated that team leadership could improve group identification (i.e. the sense of belonging) by ensuring justice and providing support (e.g. promoting diversity, showing trust and appreciation, and resolving in-team conflicts). This finding broadly supports the work of other studies in this area linking diversity-identification relationship with team leadership (e.g. Van Knippenberg et al., 2013). It also in agreement with those studies on team leadership, which demonstrated that leadership is well-situated to attune diversity effects on team processes (Hackman and Wageman, 2005; Zaccaro et al., 2001).

Results of this study link diversity management with HROs theorising. Previous studies on HROs have stressed the importance the leadership who “foster norms that encourage mutual respect for differences and discourage bullheadedness, hubris, headstrong acts, and self-importance” (Weick and Sutcliffe, 2007, p.153). Consistent with the literature, this study showed leadership behaviours were essential in shaping in-team interactions and individuals’ relational quality in the long term. Results also found a strong relationship between lower in-team conflicts and team leadership. This finding emphasises the importance of leaders listening to team disputes, providing help to resolve teammates’ conflicts. These forms of support are in agreement with Corley and Gioia (2004) description of attentive leaders who give attention to situational demands and react accordingly to facilitate collective sensemaking. However, the findings of the current study suggest that effective management of diversity on HRTs requires team members’ cooperation In addition to leaders’ attentiveness.

Results of this study also showed that leadership role could also extend to motivations. Especially in diverse contexts, findings indicated that the

positive impact of leaders' fairness and support on diverse HRTs' identification were found to motivate them to engage in RSSPs (e.g. to voice their concern, generate plausible interpretations, etc.). The literature on HROs (e.g. Weick and Sutcliffe, 2007) demonstrated that unjust practices could create an atmosphere that discourages individuals from participating in RSSPs. In the context of this study, leadership support was found to improve in-team relational quality and, in the long term, allowing better utilisation of different informational capacities between diverse teammates. This finding concerning the role of leadership in managing diversity (i.e. through fairness and support) provides broader support for the work of other studies in organisational performance area linking justice and support (i.e. those manifested in leadership behaviours) with better performance (Aryee et al., 2002; Zapata-Phelan el al., 2009). It also provides further understanding of the role of leadership in managing HRTs, especially in diverse contexts.

Another important finding was that on-ground diversity management (i.e. leaders' active support for diverse technicians) were also found important to maximise the utilisation of in-team differences, which in turn can facilitate their cognitive-elaboration processes (i.e. generating, exchanging, and discussing divergent and novel perspectives). Prior studies on HROs have noted the importance of diverse perspectives and in allowing RSSPs. As observed by Weick and Sutcliffe (2007, p.95):

> "Unfortunately, diverse views tend to be disproportionately distributed toward the bottom of the organization, which means that the people most likely to catch unanticipated warning signals have the least power and argumentative skill to persuade others that the signal should be taken seriously."

In addition to the restricted power and lower argumentative skills, results of this study showed that the complex nature of work emergencies was also found to limit communication within diverse HRTs. Findings indicated that leadership engagement during such situations was significant in encouraging diverse technicians in team collective RSSPs. In line with Weick and Sutcliffe (2007) observations, this study found that leadership encouragement was also perceived and reported by many technicians from diverse backgrounds as permission (i.e. an authorisation) to intervene in the RSSPs. These forms of active support by team leadership were found in this study to increase in-team engagement, contribute to the development in-team understanding of dissimilar others capabilities and limitations (i.e. diversity awareness and relational quality). Together, these findings link the work of studies in both HROs and diversity management, suggesting an

essential role of team leadership on diverse HRTs effectiveness. As Weick's (1993, p.649) demonstrated, "leaders of highly effective teams briefed their crewmembers on four issues: the task, crew boundaries, standards and expected behaviors [sic] (norms), and authority dynamic."

In this study, leadership role was not only limited to managing diversity from afar. Findings showed that active leadership engagement with HRTs was related to the diversity-RSSPs positive interaction. Specifically, leaders' on-ground engagement and contributions were found to break/update in-team shared wisdom while dealing with work emergencies, fuelling motivations for collective participation and, consequently encouraging teammates' divergent inputs. This finding accords with earlier observations of Corley and Gioia (2004), which showed that leadership has a significant role in fulfilling sensegiving imperatives during work overload, tensions, and uncertainty. It also strengthens the idea that on-ground leadership is essential to cultivate the positive effects of in-group dissimilarities on RSSPs in HRTs.

Results of this study also indicated that leadership behaviour could facilitate articulation in high-diversity teams. Previous studies on HROs have demonstrated an important association between RSSPs and articulation – defined as "the social process by which tacit knowledge is made more explicit or usable" (Weick et al., 2005, p.413). In this study, in-team dissimilarities (e.g. language, background) were found to limit articulation (i.e. generating and exchanging of alternative perspectives) and subordination of inputs in HRTs (i.e. collective and careful enactment of team contributions), and thus collective RSSPs in HRTs. Taken together, these findings suggest that leadership behaviour is vital in buffering the negative effects of diversity on HRTs' ability to articulation and ultimately, their collective RSSPs, where team members, as noted by Dougherty and Takacs (2004, p.574), "are mindful of the 'big picture' to which they contribute a part". These findings extend and explain earlier observations in HROs studies on sensemaking and collective mind (e.g. Weick and Roberts, 1993; Weick et al., 2005) linking between articulation, narrative skills, and insider-newcomer interactions with collective heedful interrelations.

Role of leadership was also vital even in attuning the effects of deep-level dissimilarities. As discussed in this chapter (*see* Section 8.2.1), this study found that even low-diversity HRTs are vulnerable to identification issues (e.g. lower sense of belonging, in-team conflict), low motivations, and thus are exposed to higher accident rates and near misses. Findings indicated that perceived dissimilarities among low-diversity HRTs, which were in more

subtle factors (e.g. based on beliefs and goals uniformity or favourability with leaders), were found to affect group identification, and consequently collective RSSPs in HRTs. Findings of this study showed that leadership role could either exacerbate or attenuate the unwanted effects of deep-level diversity on collective RSSPs in HRTs. In this study, perceptions of leadership unfair treatment in addition to experiencing contradictions between actions and beliefs (i.e. both personal and work beliefs) within HRTs were found to increase in-team perceptions of differences, and therefore lower group identification. On the other side, findings also showed that leaders' active engagement in team processes, listening to individuals' disputes, providing help to resolve in-team conflicts were vital in lowering perceptions of deep-differences and attuning their detrimental effects. Together, these findings broadly support previous research on leadership and deep-level diversity (e.g. Klein et al., 2011), which showed the interaction between deep-level diversity and team leadership in shaping team effectiveness. They also extend our understanding of how leadership behaviour can interplay with the diversity-RSSPs relationship.

Lastly, results of this study found that well-management of diversity in HRTs, which was found to be manifested through leadership behaviour, can result in having work norms and culture that prefers using rich and detailed (i.e. reliable) interactions. These findings are important and provide a possible explanation for the lack of explicit references to the role of organisational culture in this study and link the work of other studies in the organisational culture and leadership behaviour area (e.g. Schein, 1983; 1990) with HROs theorising (e.g. Weick and Sutcliffe, 2007). As noted by Schein (1990, p.115), "culture creation is the modelling by leader figures that permits group members to identify with them and internalize their values and assumptions." Study results also provide empirical evidence of Weick and Sutcliffe (2007) work, which emphasised on the role of leadership in creating an informed and mindful culture for RSSPs. They explain HROs scholars' focus on leadership behaviour as a way to communicate and model mindfulness for others and thus create an informed culture (Weick and Sutcliffe, 2007).

In accordance with the present results, leadership behaviour in HROs involves translating the principles of mindfulness into norms, values, and expectations that will allow organisations "to sustain mindful management of the unexpected" (Weick and Sutcliffe, 2007, p.138). These findings, while preliminary, suggest that leadership has a substantial role in shaping diversity-RSSPs interactions. Taken together, comparing these findings with

those of HROs studies shows a strong relationship between diversity and RSSPs, and suggests an important interaction between team leadership and surface- or deep-level in influencing diversity-RSSPs relationship. It can, therefore, be assumed that to cultivate beneficial effects of group diversity on RSSPs, leaders must give more attention on ensuring justice, promoting and developing diversity mindsets, and being attentive to team-specific needs during work emergencies.

9.4.2 Epistemic motivation and information processing

Results of this study revealed a prevalent role of ***information processing capacity*** on shaping diversity-RSSPs. In the context of this study, high information processing levels were contingent on HRTs' epistemic motivations – their desire and ability to engage in information elaboration activities and generate better understanding for the situations at hand (De Dreu and Carnevale, 2003; De Dreu and Steinel, 2006; Kruglanski and Webster, 1996; Scholten et al., 2007). Study findings indicated that higher group identification levels and heightened epistemic motivations were associated with a high level of satisfaction, trust, sense of responsibility, and mutual support within diverse HRTs. These results are in line with those of previous studies on diversity beliefs, which reported an important role of positive diversity views on improving diversity-identification relationship (e.g. Chattopadhyay et al., 2004; Gonzalez and Denisi, 2009). They also link diversity and motivations with HROs' studies, which demonstrated the importance of high-quality interactions for teams to function reliability during unwanted situations (e.g. Campbell, 1990, cited in Weick, 1993).

Studies on epistemic motivations indicated a potential relationship between individual differences and situational factors (e.g. time pressure and ambiguity) and low epistemic motivations (e.g. De Dreu, 2003; Kruglanski and Freund, 1983). In the context of this study, preconceived views towards individual differences were found to be vital in attuning the negative influence of such factors on their elaborative and systematic processing of information. This study findings indicated that attitudes of understanding and valuing within diverse HRTs were found to increase their epistemic motivations during work emergencies and to facilitate collective cognitive-elaboration processes (i.e. the second pathway in this study). As discussed previously (*see* Chapter 8), current study findings demonstrated that positive beliefs on the added-value of the differences between individuals could encourage interactions in HRTs, helping individuals to restore confidence, and ultimately engaging in information elaboration activities (i.e. generating

and considering alternative perspectives, and deferring to expertise). This relationship between diversity favouring mind-sets and elaboration processes is consistent with earlier observations that linked diversity favouring mind-sets with better informational uses (e.g. Homan et al., 2007a; Van Knippenberg et al., 2004) and overall team performance (e.g. Ely and Thomas, 2001; Homan et al., 2007a; Richard et al., 2003). This finding provides an additional explanation of how diversity could affect collective RSSPs (i.e. through epistemic motivations) and suggest that challenging negative preconceived views towards team differences may help cultivate diversity's positive outcomes on RSSPs.

This study also found that diversity-RSSPs interactions (e.g. careful consideration and discussions of potential sources of failure, questioning of team current wisdom) can generate a reciprocal influence on HRTs' collective epistemic motivations. This finding suggests an additional mechanism for diversity's effects on HRTs epistemic motivations and information processing efforts. As noted by Scholten et al. (2007), "the more decision makers perceive their current state of knowledge and information as insufficient to make a decision of satisfactory quality, the more they are motivated to engage in systematic processing of decision-relevant information" (p.540). This finding broadly supports the work of other studies in this area linking high epistemic motivations with better information processing under ambiguous situations (e.g. Van Hiel and Mervielde, 2002) and provides further explanation on antecedents and consequences of diversity in this relationship.

Together, these findings build on pervious understanding on epistemic motivations and group performance and provide evidence for the reciprocal influence between diversity and epistemic motivations on HROs. Findings also provide further explanation on how differences in individual's attributes and situations could shape epistemic motivations in groups generally, and HRTs specifically. Therefore, they suggest a potential answer to researchers' call for a better understanding of the interplay between individual differences, situation factors and epistemic motivations (e.g. Amit and Sagiv, 2013; Scholten et al., 2007).

Additionally, these findings, together, integrate social psychological theorising with HROs. They shed light into the factors that influence epistemic motivations, and consequently diversity-RSSPs relationship. Factors like preconceived views towards diversity were reported as antecedents for group identification, better relational quality, and heightened

in-team motivations to engage collectively (i.e. with high team-orientation, more information generation and exchange) and reliably (i.e. with a high emphasis on details, and careful enactment). As showed in this study, HRTs with heightened epistemic motivations were able to maximise utilisation of diverse skills and experiences (i.e. heighten epistemic motivations and information processing capacity). These results contribute to our understanding of how diversity contexts can shape group epistemic motivations and ultimately elaborative reliability-seeking activities. They also provide an empirical contribution to the HROs literature by showing the importance of facilitating/monitoring group interactions as a way to challenge/modify preconceived views and heighten epistemic motivations in diverse HRTs.

9.5 Conclusion

Lastly, this chapter also explored participant narratives and experiences and suggested that there is an association between on-ground diversity management (i.e. manifested in team leadership) and RSSPs. Results showed that leadership role in managing diversity in HRTs was demonstrated by ensuring justice, providing emotional and technical support, and resolving conflicts. Overall, these results indicated that team leadership could improve group identification (i.e. the sense of belonging) by ensuring justice and acting proactively in resolving in-team conflicts, which in turn can lower the negative effects of social categorising and comparison processes. Results of this study also suggest important insights into the role of on-ground diversity management (i.e. active support for diverse technicians) to maximise the utilisation of in-team differences, which in turn can facilitate their cognitive-elaboration processes (i.e. exchanging, discussing, and question inputs). Surprisingly, study results also suggested that leadership role can extend to deep-level diversity (i.e. with perceptual diversity).

Additionally, this chapter provides discussion on the interplay between diversity and information processing in HRTs (i.e. through epistemic motivations), and ultimately, their collective RSSPs. This finding suggests that high information processing levels were contingent on HRTs' epistemic motivations. This finding provides an additional explanation of how diversity could affect collective RSSPs (i.e. through epistemic motivations) and suggests that challenging negative preconceived views towards team differences may help cultivate diversity's positive outcomes on RSSPs.

The next chapters will move on to review the emergent model in more detail, the theoretical and practical implications of this study. It will also discuss the limitations of this study in addition to providing suggestions for future research.

Chapter 10
A Model of Group Diversity and Sensemaking in HRTs

10.1 Introduction

This study was designed to unpack RSSPs in HRTs, and then to explore how group diversity affects collective RSSPs, and to identify factors and processes that contributed to the relationship between diversity in HRTs and their RSSPs. This chapter draws study results together and reviews the emergent theoretical model of team diversity and sensemaking in HRTs. It has three parts – one that briefly describes forms of diversity that may have greater influence on collective RSSPs in HRTs; second that illustrates the emergent model and define its pathways; and third that explains the dynamics between model elements. This chapter will then discuss how these findings extend current theoretical understanding of the role of team diversity in sensemaking and HROs.

10.2 Diversity and RSSPs in HRTs

Regarding the influence of group diversity on RSSPs, this study found that diversity in HRTs can influence both motivations and contributions of HRTs. Overall, study results showed that inconsistencies in HRTs' RSSPs (i.e. disruptions in teams' reliability-seeking interactions) were common and more salient in teams with high-level differences of demographical (e.g. gender, nationality, and age) and informational/functional attributes (e.g. rank, education, and experience). The degree of irregularity on RSSPs was lower in the teams with low-diversity levels. However, even when no surface-diversity exists, deep-level diversity can be found. In the context of this study, perceived dissimilarities among low-diversity HRTs, which were in more subtle factors (e.g. based on beliefs and goals uniformity or favourability with leaders), were found to have an influence on RSSPs in HRTs. These differences were perceived as contradictions between actions and personal or work-relevant beliefs (e.g. ethics, values, and principles).

10.3 Diversity-RSSPs Model

For this study, answering the "how?" question was of the utmost of importance. As highlighted on Chapter 8 and shown in figure (10.1) below,

study findings revealed that the influence of HRTs' diversity on RSSPs were carried through two primary pathways – one is associated with group identification processes (*see* the blue path in figure 10.1 below) and the second pathway is related to team cognitive-elaboration processes (*see* the green path in figure 10.1 below). Group identification pathway is concerned with the effects of team dissimilarities on their identification processes and ultimately their motivations to engage collectively in RSSPs, whereas cognitive-elaboration pathway is mainly focusing on explaining the cognitive-elaborative effects of team diversity on RSSPs such as the generation and exchange of divergent and novel perspectives for work-related issues. Next sections will discuss each of these pathways and will highlight the relevant factors to the diversity-RSSPs relationship.

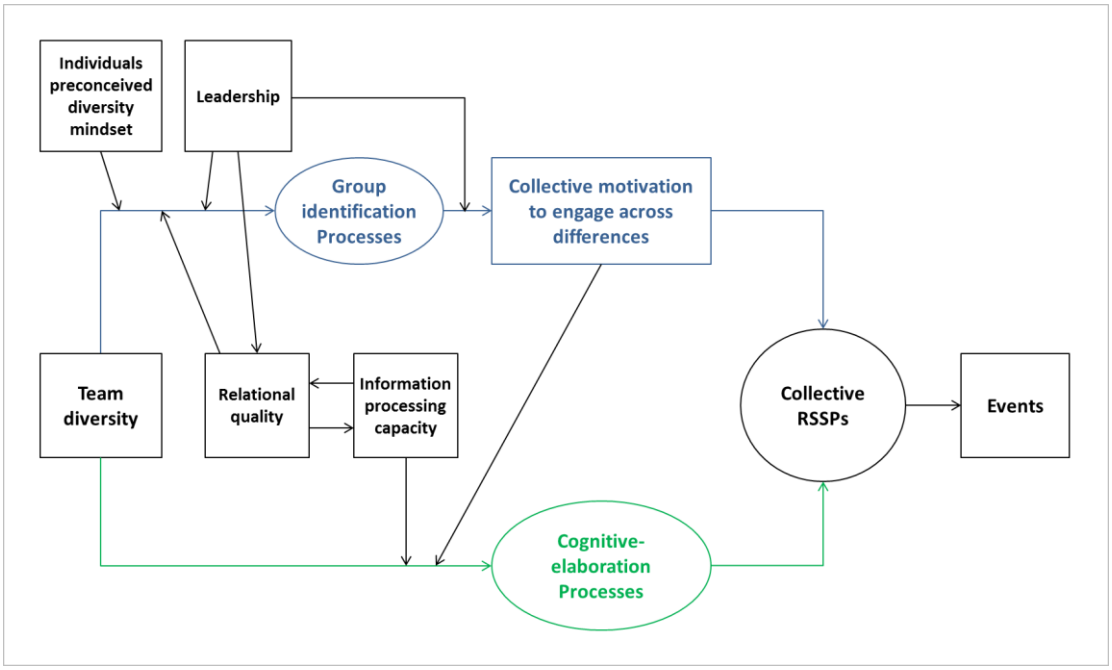

Figure 10.1 Emergent model of RSSPs in diverse HRTs

Following sections will discuss how study findings build on previous understanding of team diversity and team processes in HRTs/HROs and will emphasise how the findings extend current theoretical understanding of the role of team diversity in sensemaking and HROs.

10.3.1 Diversity and identification in HROs

Overall, the first pathway of diversity-RSSPs relationship (i.e. diversity-identification) contributes to our understanding of how surface- and deep-level dissimilarities in HRTS can affect group identification, collective motivation, and ultimately, their RSSPs. Findings on diversity-identification

pathway build on previous understanding of the relationship between group diversity and team interactions and provide further insights into diversity's effects on RSSPs in HRTs (e.g. on collective motivations, role perception, joint-vs-localised attention). Together, these findings bridge the gap between group diversity and mindful organising in HROs and extend our understanding of the role of diversity in sensemaking and HROs. In addition, this study extends our knowledge on diversity-RSSPs relationship by providing evidence of the triggering effect of work emergencies on eliciting negative stereotypical judgements in HRTs. Especially in work emergencies, this study found that stereotypic views were frequently used as a basis of how individuals identify other team members and as a basis of team interaction (e.g. who is qualified, how to interact with older young/old or male/female technicians).

Taken together, these findings provide additional insights into the role of group diversity (both surface- and deep-level diversity) in HRTs' collective RSSPS. They extend our knowledge on the outcomes and the specific manifestations of diversity-elicited processes on RSSPs (e.g. lower team orientation, less information exchange, less emphasis on details with high tendency to blame dissimilar others, and localised attention rather than collective and careful enactment of team's inputs).

10.3.2 Diversity and cognitive elaboration

Additionally, this study provides evidence on another form of group diversity influence on RSSPs, which is the cognitive-elaboration pathway. Study findings explained how team dissimilarities can trigger emotional, social, and informational processes and consequently influencing RSSPs in HRTs. Findings on this pathway (i.e. cognitive-elaboration) suggest that differences in backgrounds and expertise can create a larger pool of diverse perspectives, promote attentiveness, facilitate divergent thinking and RSSPs, and enable HRTs to rethink their work-relevant wisdom. This finding contributes to our understanding of diversity-RSSPs interactions. It sheds new light on the manifestations of diversity-fuelled elaboration behaviours on RSSPs in HRTs (i.e. detailed questioning, discussing, and elaborating on different perspectives). It also suggests a practical implication of group diversity on HROs in dealing with work simplification.

10.3.3 Relevant factors to diversity-RSSPs relationship

Study findings showed a vital role of individuals' preconceived diversity views and relational quality in guiding diversity-RSSPs relationship in HRTs.

These factors (i.e. preconceived views and relational quality) are antecedents for group identification and in-team motivations to engage collectively (i.e. with high team-orientation, more information generation and exchange) and reliably (i.e. with a high emphasis on details, and careful enactment). They also were found to maximise team members' utilisation of diverse skills and experiences (i.e. strengthen information processing capacity). Overall, these findings together integrate social psychological theorising with HROs. They shed light into the important role of preconceived views and relational quality on the diversity-RSSPs relationship. They also contribute to our understanding of how cumulative experience and repeated exposure to the group can shape group identification and ultimately improve their social and elaborative reliability-seeking activities.

In addition to preconceived views and relational quality, results indicated a crucial influence of contextual factors including on-group leadership and in-group information processing capacity (i.e. epistemic motivations, which reflects in-team desire and ability to engage in thorough information processing efforts). Regarding leadership, study findings showed that leadership role in managing diversity in HRTs was demonstrated by ensuring justice, providing emotional and technical support, and resolving conflicts. This role of on-ground leadership was found to improve group identification (i.e. the sense of belonging) in HRTs with both surface- and deep-level diversity (i.e. perceptual diversity). By ensuring justice and acting proactively to resolve in-team conflicts, leadership interaction with HRTs were found to attune the negative effects of social categorising and comparison processes on collective RSSPs. These results suggest important insights into the role of on-ground diversity management (i.e. active support for diverse technicians) to maximise the utilisation of in-team differences, which in turn can facilitate their cognitive-elaboration processes (i.e. exchanging, discussing, and question inputs).

Results also indicated a prevalent role of information processing capacity on shaping diversity-RSSPs. In the context of this study, high information processing levels were contingent on HRTs' epistemic motivations – their desire and ability to engage in information elaboration activities and generate better understanding for the situations at hand. Higher group identification levels and heightened epistemic motivations were associated with a high level of satisfaction, trust, sense of responsibility, and mutual support within diverse HRTs. This finding provides an additional explanation

of how diversity could affect collective RSSPs (i.e. through epistemic motivations) and suggests that challenging negative preconceived views towards team differences may help cultivate diversity's positive outcomes on RSSPs.

This study also found that diversity-RSSPs interactions (e.g. careful consideration and discussions of potential sources of failure, questioning of team current wisdom) can, overtime, generate a reciprocal influence on HRTs' collective epistemic motivations. Together, these findings build on pervious understanding on epistemic motivations and group performance and provide evidence for the reciprocal influence between diversity and epistemic motivations on HROs. They provide further explanation on how differences in individual's attributes and situations could shape epistemic motivations in groups generally, and HRTs specifically. Therefore, they suggest a potential answer to researchers' call for a better understanding of the interplay between individual differences, situation factors and epistemic motivations (e.g. Amit and Sagiv, 2013; Scholten et al., 2007). These results, in general, extend our theoretical understanding of group diversity by linking diversity and motivations with HROs' studies, which demonstrated the importance of high-quality interactions for teams to function reliability during unwanted situations (e.g. Campbell, 1990, cited in Weick, 1993).

Chapter 11
Conclusions

11.1 Introduction

This chapter will present the key contributions of this study in addition to discuss its limitations and potential future directions.

11.2 Study Contributions

This study is an attempt, as noted by Vogus, et al. (2014, p.595), that "illustrates one way in which the long-standing divide between mainstream organizational behaviour [sic] and research on high reliability may be bridged." As discussed in the previous chapters, the findings from this study make several contributions to the current literature.

First, study findings extend our understanding of how mindful organising can be achieved in HROs. The principal theoretical implication of this study is that RSSPs in HRTs include both traditional HRO principles but also team-specific behaviours. Overall, study results suggested that reliability-seeking sensemaking process (RSSPs) involves individuals in HRTs generating and exchanging of alternative perspectives, interacting with a high emphasis on details, acting in a team-oriented manner, and enacting team contributions collectively and carefully.

Secondly, they build on previous understanding of diversity and bridges the gap between diversity and HROs theorising. Study findings indicted that diversity may affect RSSPs in HRTs through two main pathways, group identification process and cognitive-elaboration processes. Overall, the first pathway of diversity-RSSPs relationship (i.e. diversity-identification) contributes to our understanding of how surface- and deep-level dissimilarities in HRTS can affect their RSSPs through group identification and collective motivations. They also explain (i.e. through diversity-elaboration pathway) how team dissimilarities can trigger emotional, social, and informational processes in HRTs.

Findings of this study also have an additional value in linking between contextual factors and HROs and bridging the gap between diversity, leadership literature and HROs theorising. Overall, study findings indicated that team leadership could improve group identification (i.e. the sense of belonging in HRTs) by ensuring justice and acting proactively in resolving in-team conflicts, which in turn can lower the negative effects of social categorising and comparison processes. Findings also suggest important

insights into the role of on-ground diversity management (i.e. active leader support for diverse technicians) to maximise the utilisation of in-team differences, which in turn can facilitate their cognitive-elaboration processes (i.e. exchanging, discussing, and question inputs). In addition leadership, study findings suggest that high information processing levels were contingent on HRTs' epistemic motivations. They provide an additional explanation of how diversity could affect collective RSSPs (i.e. through epistemic motivations) and suggest that challenging negative preconceived views towards team differences may help cultivate diversity's positive outcomes on RSSPs. Lastly, this study draws findings together and presents an emergent theoretical model of team diversity and sensemaking in HRTs (*see* Chapter 10).

11.2.1 Practical implications

Although the context of this study was the petrochemical industry, the findings offer several practical implications that can be extended to various high-reliability demanding contexts.

11.2.1.1 Leveraging diversity's beneficial effects

Study findings reveal a beneficial side of group diversity in RSSPs. In-group dissimilarities are found to encourage divergent thinking by increasing the need for detailed descriptions and thus keeping team members away from simplification. These diversity-fuelled interactions are important for HRTs' cognitive-elaborative processes. They trigger team members' wariness and, in other instances, boost their sense of capability by building and updating reliability know-how and practices. Already, most of the leading HROSs organisations include diverse workforces. For example, diverse workforce accounts for 81% of the workforce in the Saudi industrial and chemical industry. Within the local (i.e. Saudi) workforce, 23% are women (General Authority for Statistics, 2017). For the United Kingdom, 44.4% of NHS medical staffs are from ethnic minorities (Race Disparity Unit, 2019). Statistics on police workforce numbers in the UK also showed an increase of +2% of diverse backgrounds since 2014 (Race Disparity Unit, 2019). In the USA, more than 41.8% of the working population is classified as a diverse workforce (U.S. Census Bureau, 2019). Thus, organisations can leverage diversity's beneficial effects on RSSPs by creating cultures that promote collaboration within diverse HRTs.

11.2.1.2 Challenging preconceived views

The results of this study demonstrate the power of views (i.e. diversity mindsets) in guiding diversity-RSSPs relationship. This effect makes it difficult to manage diversity's influence on RSSPs in HRTs. However, this risk should not preclude organisations from making concentrated efforts to challenge/shape preconceived ideas and mindsets about diversity and

dissimilar others. As the results show that informal meetings were effective in breaking down the walls in diverse HRTs, organisations should institutionalise such practices and integrate them into the reliability-building culture.

Study findings also provide broader implications for HROs and extend our understanding of how individuals' experience of being involved in or witnessing accidents/near misses/events impacts their future work behaviour and approach. They provide evidence that negative views in diverse HRTs can exacerbate this impact. A key policy priority should, therefore, be to challenge preconceived views towards diversity and improve mutual understanding.

11.2.1.3 Diversity management and leadership role

The findings of this study confirm the pivotal role of leadership behaviour in shaping diversity-RSSPs interaction. These results provide evidence that leadership attentiveness to HRTs interactions and active engagement during emergency situations can attune diversity effects and facilitate constructive collaboration. Findings also pointed to the leadership role on facilitating and monitoring group interactions as a way to challenge/modify preconceived views and improve relation quality in diverse HRTs. It was also demonstrated that leadership role could extend to increase group motivations through fairness and on-ground support. Thus, leaders should make sure to support team interaction and always ensure justice as much as possible.

Although diversity was found to increase cognitive-elaboration processes in HRTs, leaders should also intervene to maximize/authorise the utilisation of in-team differences, which in turn can improve the outcomes of collective RSSPs. In instances of unexpected emergencies, leadership interventions can break/update in-team shared wisdom and enable the articulation of diverse experiences in HRTs (i.e. making tacit knowledge in diverse HRTs more explicit and useable).

11.2.2 Methodological implications

The main methodological contribution of this study is the combination and integration of data collection and analysis concepts from the critical incident and grounded theory approaches to capture the influence of diversity on sensemaking processes in HRTs. Additional methodological contribution lies in the experience gained from the study context. The petrochemical industry in Saudi Arabia provided an opportunity to study the appropriateness of CIT and GT approaches for understanding the complex interaction between diversity and RSSPs. Having a combination of HRTs with both high- and low-diversity level have enabled exploring, describing, and explaining how diversity in HRTs influences their RSSPs in addition to investigating the

interplay between organisational culture, leadership behaviour, and diversity in these processes.

11.3 Study Limitations and Future Research

11.3.1 Retrospection

The major limitation of this study is its retrospective nature that might result in a loss of data. To counter this limitation, this study was conducted with multiple people discussing the same event (i.e. multiple team members describing the same work incident). Future studies could include longitudinal approaches to get a better understanding of diversity's influence on RSSPs in different periods of time. This will help to capture changes in diversity's effects on HRTs' processes in addition to their relevant factors (i.e. preconceived diversity mindsets, and relational quality, etc.).

11.3.2 Understanding leadership role in diversity-RSSPs relationship in HRTs

This study provided empirical evidence of the importance of leadership behaviours in shaping diversity-RSSPs interaction. However, the scope of this research does not lead to a clearly defined conceptualisation of leadership behaviours in managing diversity-RSSPs interaction in HROs. Comparing some of these findings in this study with the current literature on leadership, it might be worth looking into leadership types that can facilitate diversity-RSSPs positive interaction. Future research could thoroughly study leadership behaviour in HROs. Therefore, further studies could assess how leaders manage diverse HRTs in practice. As noted by O'Leary and Sandberg (2016, p.512), "the dominant managerialist literature focuses on what diversity activities should be involved in managing diversity but does not identify which activities are actually undertaken by managers in practice".

11.3.3 Lack of generalisability

Like most research, this study has its limitations in terms of the generalisability of its findings (Yin, 2009). Despite the positive aspects of using multiple-case studies in this research, discrepancies between cases might affect the generalisability and objectivity of its results (Firestone and Herriott, 1983; Parker et. al., 2008). Future research can, however, lower these risks and validate the emergent theoretical model by replicating the findings using other contexts.

11.4 Conclusion

In order to understand the influence of diversity on RSSPs in HRTs, two pathways of diversity's effects were identified in this study. The role of diversity in HRTs' reliability-seeking interactions was captured, and its

contribution to theory and practice was discussed. The effects of diversity on the collective RSSPs were not so much in the presence of in-team differences but instead, the way through which they are perceived, processed, and integrated. Results of this study showed that diversity management, which was manifested through leadership behaviour, was determinant for the diversity-RSSPs outcomes. Future research can thus explore diversity management activities and their outcomes on RSSPs in HROs.

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List of Abbreviations

Abbreviation	Definition
HROs	High-Reliability Organisations
HRTs	High-Reliability Teams
RSSPs	Reliability-seeking sensemaking processes
CIT	Critical Incident Technique

Appendix A
Interview Guide

The table below shows the interview guide (*see* Section A.1 for notes on iterations).

INTERVIEW GUIDE

<table>
<tr><th>Research Questions</th><th>Probing questions</th></tr>
<tr><td>How does team diversity influence the process of sensemaking in HRTs, if at all?</td><td>
Checklist:
<table>
<tr><td>☐</td><td>Introduce myself, research purpose, and the interviewee's part and rights.</td></tr>
<tr><td>☐</td><td>Handle the information sheet and the consent form.</td></tr>
<tr><td>☐</td><td>Setup the interview recorder device.</td></tr>
</table>
Part 1 (a conversational start in order to put the interviewees at their ease):
1. While working on the field, can you think of the last time you encountered a situation when something unexpected, puzzling, and incomprehensible happened to you and your colleagues? (Pause till participant indicates that he/she has such an incident in mind),
Probe: Could you please describe in much detail as possible the situation you encountered?

Part 2 (RSSPs within diverse HRTs):
2. Could you please tell me, once you noticed that something had violated your expectation, how did you <u>feel</u>?
Probe (Critical Incidents): What <u>happened</u> (specific behaviours, thoughts) that gave you this feeling?
3. What about your reaction, how did you <u>react</u> to the situation?
Probe (Critical incidents): What specifically <u>happened</u> that made you to react that way?
Probe (Critical behaviours): What would have been a <u>more effective reaction</u> to the same situation?
4. What about your colleagues? how do you think they felt?
Probe: and how did they <u>react</u> to deal with such incident?
Probe (Critical factors): In your opinion, what are the <u>reasons</u> that made your colleagues to feel and react that way?
5. Could you think about anybody who reacted differently?
Probe (if NO - Critical incidents): So, you think everyone felt and react similarly; in your opinion, what made them to feel and react <u>similarly</u>?
Probe (if YES - Critical incidents): In your opinion, what made him/her to <u>feel</u> and react differently?
</td></tr>
</table>

	Part 3 (*underlying factors of RSSPs in HRTs*): 6. As a one group that works in the same organisation, I wonder if you could think about the main reasons or factors that led the team to feel and react differently (OR similarly, if so) during this unexpected incident? **Probe (based on the answer):** Could you think about any other team-related factors (e.g. social or technical, behaviours, team composition, diversity, values... etc), situational factors, and organisational-level factors (e.g. lack of safety measures… etc). **Probe (Critical factors):** Could you please tell me how did these factors play out during the incident at that time? **Part 4 (*probing diversity effects on RSSPs*):** 7. If the team were similar/dissimilar to each other, how do you think the understanding of and reacting to this unexpected incident would be? **Probe:** can you relate your answers to the incident we discussed? **Probe:** Could you think of the last time when team members' similarity/dissimilarity was helpful in increasing their ability to deal with unexpected incidents, **Probe (Critical behaviours):** What team members did as a result of team members' similarity/dissimilarity that was so helpful at that time? **Probe (Critical factors):** What were the general circumstances leading up to this? **Probe:** Okay, can you think of other occasions in which team members' similarity/dissimilarities did not make any difference, **Probe (Critical factors and behaviours):** What were the **specific circumstances, behaviours, thoughts** leading up to this?
What is the interplay between organisational culture, leadership behaviour, and diversity in influencing the process of sensemaking in diverse HRTs?	**Part 5 (*the interplay*):** 8. As a member in a field operations team, could you think about the factors that can make team diversity a blessing or a curse for a team, especially in the face of unexpected events? **Probe (Critical factors):** Could you please give me an example of a real situation **OR** relate these factors to the situation we just talked about? **Probe (Critical factors):** I wonder if you can think of other factors that are not related to your teammates and might be important? You might think about other factors on different levels in your organisation. **Probe:** Could you please give me an example of a real situation **OR** relate these factors to the situation we just talked about? **Part 6 (*finalising the interview*):** 9. Finally, thank you for your time. Do you have any questions that you would like to ask of me?

A.1 Notes on iterations

The focus of the interview guide was designed to capture HRTs perceptions about unexpected situations (e.g. accidents, emergencies, and near misses) and explore the critical factors that shaped their perceptions and influence their way of interaction with the evolving situation (positively or negatively). Questions in the initial guide were grouped in 5 parts to unpack RSSPs in HRTs and capture participants' perceptions on underlying factors of RSSPs in addition to diversity's effects on RSSPs. The remaining of the interview guide was around the second question on this research and aimed to explore participants accounts on the interplay between diversity, organisational culture, and leadership behaviour in influencing diversity-RSSPs relationship.

Interview guide (*see* Appendix 1) was revised based on the emerging information collected from participants during the initial interviews and analysis phase (*see* Section 6.6.2 Research stages and procedures). Changes on the interview guide was part of the iterative process and included the guide overall structure in addition to revising and expanding probing questions. These changes helped to elicit rich response regarding participants' experiences and allowed further insight of diversity's effects on RSSPs and the role of leadership behaviour and organisational culture on diversity-RSSPs interaction.