CRANFIELD UNIVERSITY

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Anticipatory and Retrospective Sensemaking during Unfolding Organizational Crises

School of Management

PhD Thesis
Academic Year: 2016 - 2017

Supervisor: Doctor Elmar Kutsch
Associate Supervisor: Professor David Denyer
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ABSTRACT

Existing research on sensemaking during organizational crises has identified retrospective processes in which actors give meaning to what has happened, thus reducing uncertainty and enabling action. While sensemaking is generally considered to be retrospective, several scholars dispute that sensemaking is exclusively a past-oriented process. Klein, Snowden and Pin (2007, 2011) have recently proposed a future-oriented anticipatory sensemaking process that involves the preparation and enactment of a course of action to avert a predicted threat during an organizational crisis. The topic of future-oriented sensemaking remains an on-going debate in the sensemaking literature. This research attempts to contribute to this debate by offering a deeper understanding of the forms, temporal orientation and interaction of the sensemaking processes during unfolding organizational crises. The research approach involved semi-structured interviews with twenty people from fourteen organizations across nine different industries and three continents. There are three novel contributions from this research. The first contribution is the integrative model of anticipatory and retrospective sensemaking during unfolding crises that was synthesised from the literature and evidenced in the empirical data. The second contribution is the model of anticipatory sensemaking processes during unfolding organizational crises, which was derived from the literature and enhanced based on the findings from the empirical study. In identifying future-oriented anticipatory sensemaking processes during unfolding organizational crises, the findings provide evidence for the counter-argument to the key ontological assumption that sensemaking is exclusively a retrospective process. The third contribution is that the actors created collective organizing structures during the unfolding crises, which enabled them to make sense and take action. The findings and contributions from this research have implications for both theory and practice.

Keywords: Critical incident technique, visual mapping.

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I dedicate this thesis to my husband, Mike Runswick. I would like to express my thanks and love to him. I am eternally grateful for his understanding and patience over the years when I have studied for my MSc, MBA and now PhD. Working full-time and studying part-time would not have been possible without his love, friendship and support. My thanks and love also to my two sons, Conor and Niall for their support and the numerous cups of tea along the way.

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1 INTRODUCTION

1.1 Chapter Overview

This chapter begins by introducing the research problem that motivated this research, and then presents a summary of the thesis argument along with an overview of the structure of the study. First, section 1.2 provides the rational for this research study, and section 1.3 presents a summary of the thesis argument while positioning the research problem within the organizational crises and sensemaking literatures. Then sections 1.4 and 1.5 describe the research methodology and the qualitative research study that was conducted to address the research question. Next, section 1.6 presents the findings from the empirical study, while an overview of the contributions is presented in section 1.7. Finally, section 1.8 outlines the structure of this thesis document, providing an overview of each chapter.

1.2 Rational for the Research Study

This thesis document describes the research project that was conducted to explore the forms, interaction and temporal orientation of the collective sensemaking processes during unfolding organizational crises. Crises are defined as: high-impact events that pose a threat to the goals or survival of the organization; involve uncertainty about the impact and means of resolution; require an urgent response to minimize the impact; and involve activities that were not planned prior to the event (Lerbinger, 2012; Pearson and Clair, 1998; Weick, 1988). This definition is discussed further in section 1.3 (page 4). First, before detailing the research project, a brief explanation of my interest in this research topic is presented, along with a description of how the research project was conceived.

For nearly thirty years I have worked on IT enabled change programmes across a wide range of industries including financial services, retail, government and pharmaceutical. During this time, on four separate occasions I have experienced a crisis where my colleagues and I had little or no guidance on what we should do. There was no contingency plan that we could follow to

handle the crisis that unfolded, yet we needed to take action to minimise the impact on our organization. Somehow we worked our way through these crises. The experience of these crises has left me with the question about how people make sense during an unfolding crisis in order to identify the actions they can take to minimise the impact of the crisis, when there is no contingency plan that can be followed. Two of the crises occurred during the 1990s, when the head office of the financial services organization that I worked for was badly damaged by terrorist bombs. On the first occasion, the bomb shattered all the windows in the office and damaged the IT systems and equipment. In response, my colleagues and I set about trying to make sense of what had happened, and based on this to identify what we could do to get the organization back up and running as soon as possible. While the office was made secure and temporary repairs were put in place, we repaired and restored the IT systems and equipment so that the organization could continue to operate without financial loss or reputational damage. The second bomb a few years later was more devastating. This crisis threatened the very survival of the organization as the bomb had destroyed the main office from which the organization operated its business. Plans had been put in place following the first bomb to have a contingency location with IT equipment available and to have paper copies of the latest business, financial and trading information so that the organization could operate temporarily in the absence of the IT systems. However, these were short-term contingency plans, and the damage to the office and equipment was extensive, so the plans did not cover the crisis that actually unfolded. My IT colleagues and I tried to make sense of the situation as we assessed the damage that the bomb had caused. We worked to get the IT equipment and systems back up and running. Based on the fact that the IT system back-up tapes had been destroyed in the bomb blast, we decided that our only option was to recover the mainframe machines that ran the organization’s trading, financial and settlement systems. We carried these large mainframe machines down 22 flights of stairs from the bomb damaged building in order to get the systems running at the contingency site by the next business day, and thus avert huge financial loss and reputational damage to the organization.

Two further crises occurred during the internet-boom period of the early 2000s. The first happened when the organization that I worked for launched a new online product that was designed to disrupt the retail banking market. As soon as the product was launched, the organization started to receive calls from customers identifying processing and security issues with the new product. My colleagues and I found ourselves in a situation where we had to react to minimise the impact of the numerous issues that the customers identified. We tried to make sense of each issue as it was raised, interpreting and addressing what we considered to be the cause of the problem, but we abandoned unsolved issues when a higher priority issue was reported. There was wide spread media coverage of the crisis, and it took many weeks involving long working hours spent trouble-shooting issues, before the situation settled down and the number of new or unsolved issues became manageable. During the second crisis, I was working on an IT programme that faced the prospect of failure to launch a new online business product, when that product and its launch date had already been heavily advertised to the public. Failure to launch the new online product threatened the goals, reputation, profitability and even survival of the organization. Just prior to the launch, my colleagues and I anticipated that if we continued to make progress in the development of the product at the rate we were going, we would fail to deliver the product in time for the launch. We assessed what we could do to try to ensure that we could launch the product, and decided on a course of action that involved taking a just-in-time approach to provide the product functionality required. First the financial product application process was launched online, and then within a week just as the first customers received their product, the activation process was made available. Finally, within two further weeks the product servicing elements were put online. In parallel to providing this product functionality, we also had to respond to the numerous issues that the customers identified in using the product, as well as process the unexpectedly large volume of new customers resulting from the on-going high profile marketing campaign that had been booked months in advance. We worked our way through by iteratively assessing the situation to make sense of what was happening, taking action,

and then assessing the situation again. Through this process we assessed the feedback from customers and the progress we were making with the development of the next piece of product functionality, and we took action to try to minimise the impact on the customers and the organization's reputation. It was several months before the situation settled down and became manageable.

The four crises that I have experienced are examples of unfolding organizational crises in which actors try to make sense of what has happened or what they predict will happen, in order to take action to minimise the impact of the crisis. There was no contingency plan that could be followed to handle the crisis that unfolded in practice, and yet action was needed to minimise the impact on the organization. My motivation for carrying out this research was to try to understand how people make sense during unfolding crises in order to take action to minimise the impact. I wanted to know more about how my colleagues and I could take action during an unfolding organizational crisis, if I was faced with a crisis again. This thesis document describes the journey from my initial motivation, through the research study I carried out, to the findings identified and contributions made based on the empirical data. The research study started with a literature review to identify what is known about collective sensemaking processes that are carried out during unfolding organizational crises. To this end, the review considered the literatures on organizational crisis, crisis sensemaking, the temporal orientation of sensemaking, and sensemaking in the context of intentional organizational change, and in the context of the management of foreseeable but unexpected events. The following section describes the findings from that literature review which are presented in detail in chapter 2.

1.3 Literature Review

There has been considerable debate in the organizational crisis literature on what constitutes a crisis (Smith, 2005) with multiple definitions being proposed (Cockram and Van Den Heuvel, 2012). The definition used here is that organizational crises are: high-impact events that pose a threat to the goals or survival of the organization; involve uncertainty about the impact and means of

resolution; require an urgent response to minimize the impact; and involve activities that were not planned prior to the event (Weick, 1988; Pearson and Clair, 1998; Lerbinger, 2012). The increasing frequency, severity and types of crises mean that they are an inescapable reality for many organizations (Lerbinger, 2012; Ulmer, Sellnow and Seeger, 2013) so that an organization's capability to respond during a crisis has become an important item on the executive agenda (Cockram and Van Den Heuvel, 2012). Organizational crises can be triggered by a wide range of events (Sandberg and Tsoukas, 2015) for example: earthquakes, tornadoes or floods (Mitroff, 2000); organizational process failures (Shrivastava and Mitroff, 1987) or technologies (Perrow, 1984, Shrivastava and Mitroff, 1987); or deliberate human activities such as terrorist bombings, kidnappings and cyber-attacks (Mitroff and Alpaslan, 2003). Much of the organizational crisis literature takes the view that a crisis consists of a predictable pattern of phases (Turner, 1976; Fink, 1986; Mitroff, Shrivastava and Udwadia, 1987; Hutchins and Wang 2008; Appelbaum, Keller, Alvarez, and Bédard, 2012; Buchanan and Denyer, 2013), which include a response stage (Fink, 1986) that is focused on limiting the impact of the unfolding crisis to prevent further escalation and losses. This response stage begins when the crisis is triggered and ends when the immediate threat has passed (Hale, Hale and Dulek, 2006). As crises are seen to consist of a predictable pattern of phases, there is a focus in the organizational crisis literature on the preparation of a contingency plan based on envisioned crisis scenarios, so that the contingency plan can be implemented should one of these scenarios occur (Fink, 1986; Mitroff, 2000; Hutchins and Wang, 2008). However, while crises consist of a pattern of phases, they are events that often exceed any planning expectation (Cockram and Van Den Heuvel, 2012) as they can involve uncertainty about how they will unfold (Coombs, 2014) and at the detailed level all crises differ (Egelhoff and Sen, 1992; Ley, Pipek, Reuter, and Wiedenhoefer, 2012; Kahn, Barton and Fellows, 2013; Yang and Hsieh, 2013). While there are crises in which contingency plans are followed, there are many crises involving activities that emerge as actors make sense in order to take action during the unfolding crises, and it is these crises that are the focus of this study.

Research on sensemaking processes during unfolding organizational crises has identified retrospective action-meaning creation processes in which actors respond to change in their environment to give meaning to what has happened, thus reducing uncertainty and enabling action (e.g. Weick, 1988, 1993). Through these diagnostic processes actors construct plausible interpretations of uncertain situations, so that these plausible interpretations are sufficient to sustain action (Weick, 2005; Weick, Sutcliffe and Obstfeld, 2005). This process involves enactment in which actors take notice of a change in their environment, and bracket elements from their environment that relate to the change. Then through a retrospective selection process they attempt to create plausible meaning for the change, with this plausible meaning being retained to form the focus for subsequent action and meaning creation (Weick 1988, 2005; Weick, Sutcliffe and Obstfeld, 2005). These action-meaning creation cycles occur dynamically and repeatedly as actors construct plausible interpretations that they continuously enact and modify (Maitlis and Christianson, 2013).

The literature on sensemaking in the context of the management of foreseeable but unexpected events has identified two interpretative forms of retrospective sensemaking processes through which actors can prepare for foreseeable but unexpected events that may interrupt their daily work. The first is a retrospective future-perfect-thinking process in which multiple scenarios are viewed as if they had already happened, so that based on this virtual temporal perspective, contingency plans are prepared that can be implemented if and when one of these scenarios occurs (Hayes and Birch, 2009; Gephart, Topal and Zhang, 2010; Van Den Heuvel, Alison and Powel, 2014). The second interpretative form of retrospective sensemaking utilises existing shared meaning structures to enable actors to regularly manage the unexpected when it occurs (Patriotta, 2003; Bechky and Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015). Through the use of existing shared meaning structures that have been created and modified through past experience, knowledge or sensemaking, actors can retrospectively create plausible meaning for what has happened in their environment to enable them to take action based on this plausible meaning. These structures can embody the dominant shared meaning

such organizational roles, rules, narratives, metaphors, typifications, task knowledge, workflows, processes and procedures (Weick, 1993; Patriotta, 2004; Bechky and Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015). However, while existing shared meaning structures can regularly be used to handle events that may interrupt actors' daily work, Weick (1993) found that the breakdown of the structures that embody either the dominant shared meaning or the means for creating new meaning, can lead to the collapse of sensemaking during an unfolding crisis. In addition, Weick (1993) points out that an over-reliance on these structures including contingency plans that are prepared prior to any crises, can lead to problems of entrainment or normalization where the subtle cues in the environment are ignored or discounted leading to an escalation in the situation.

While sensemaking is generally considered to be retrospective, several scholars dispute that it is exclusively a retrospective process (MacKay, 2009; Stigliani and Ravasi, 2012) and claim that this underestimates the inherently future-oriented stance that practitioners adopt in their practices (Shotter, 2005; Rosness, Haavik and Evjemo, 2016). Research in the context of intentional change, such as strategic change, new product development and organizational change, has identified a future-oriented prospective sensemaking process in which actors envision possible future events (e.g., Gioia and Chittipeddi, 1991; Gioia *et al*., 1994; Gioia, Corley and Fabbri, 2002; MacKay, 2009; Gephart, Topal and Zhang, 2010; Stigliani and Ravasi, 2012; Kaplan and Orlikowski, 2013). From the post-Weickian perspective (Gephart, Topal and Zhang, 2010; Kaplan and Orlikowski, 2013) this form of prospective sensemaking is viewed as being predominately a future-oriented process that incorporates the past and present when actors rethink the past and reconsider present concerns in the creation of envisioned futures. However, these interpretative forms of sensemaking have been identified in contexts where there is time available to articulate and elaborate the tentative interpretations rather than the time constrained situations that occur during an unfolding organizational crisis (Stigliani and Ravasi, 2012). Recently, scholars have proposed a future-oriented anticipatory form of sensemaking that can occur during unfolding crises

when actors prepare in the present to avert a predicted future threat before it occurs (Klein, Snowden and Pin, 2007, 2011; McLennan, Elliot and Holgate, 2009). However while anticipatory sensemaking is proposed as a form of sensemaking that can occur during crises, there is a dearth of empirical research on these anticipatory processes. The study of anticipatory sensemaking during unfolding crises is relevant as an important value of anticipatory sensemaking is that it functions as 'an early warning system' (Klein, Snowden and Pin, 2011, p. 3) that there is trouble on the horizon by identifying a future threat as the crisis unfolds and evolves, thus enabling actors to take action to try to avert the threat before it occurs (Klein, Snowden and Pin, 2007, 2011; Johns, 2011). In addition the study of anticipatory sensemaking as a future-oriented process affords the opportunity for new research contributions that can challenge the key ontological assumption about sensemaking as a retrospective process (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015).

It is contended here that to help explain the forms, interaction and temporal orientation of the sensemaking processes during unfolding organizational crises, it is necessary to integrate both retrospective action-meaning creation processes (Weick, 1988) and future-oriented anticipatory processes (Klein, Snowden and Pin, 2007, 2011; McLennan, Elliot and Holgate, 2009). As will be detailed in section 2.7, a model of sensemaking during unfolding organizational crises is synthesised from the descriptions of the future-oriented anticipatory sensemaking provided by Klein, Snowden and Pin (2007, 2011) and McLennan, Elliot and Holgate (2009), taken together with the model of retrospective sensemaking that was adapted from Weick (1979) and Jennings and Greenwood (2003). This study attempts to contribute to the debate on the temporal orientation and forms of sensemaking processes by offering a deeper understanding of the retrospective and the anticipatory sensemaking processes during unfolding organizational crises. As such, this study was designed to address the research question: ***What are the anticipatory and retrospective sensemaking processes during unfolding organizational crises and how do these processes interact?***

1.4 Research Methodology, Method and Design

This research involved a critical realist study (Bhaskar, 1978; 1979; 1986) that sought to discover the sensemaking processes involved during unfolding organizational crises. A retroductive research strategy was adopted for this research study as presented in section 3.3. Retroductive research (Lawson, 1997; Blaikie, 2007) is a process in which a deductive approach is used to prepare a conceptual model of the underlying processes that produce the phenomenon of interest. Then an inductive approach is used to explore the model with the aim of unearthing other structures and causal explanations at play, and thus produce a richer understanding of the phenomena of interest (Blaikie, 2007; Easton, 2010). For this research the focal processes are the sensemaking processes that are involved during unfolding crises. Two models were synthesised from the literature; a detailed model of anticipatory sensemaking was during unfolding crises (as presented in section 2.6) and an integrative model of anticipatory and retrospective sensemaking during unfolding organizational crises (as presented in section 2.7). Consistent with a critical realist approach, these models were employed to help explain the sensemaking processes that were identified in the empirical data (as detailed in section 5.3). As will be described in section 1.6 and detailed in section 5.3, the model of anticipatory sensemaking is further developed and extended based on the empirical findings.

A qualitative research methodology was used in order to gain a more in-depth descriptive view (Creswell, 1994; Partington, 2002; Denzin and Lincoln, 2011) of the sensemaking processes from the perspective of the participants. The research method adopted was the critical incident technique (Flanagan, 1954) with semi-structured interviews as a data collection method. A critical incident technique is appropriate for research that seeks to understand specific human activities (Hughes, Williamson and Lloyd, 2007). The following section provides an overview of the research study that was designed to answer the research question.

1.5 Empirical Data Collection and Analysis

The chosen method for data collection was semi-structured interviews in which the interviewees were asked to describe an organizational crisis that they had experienced. Twenty people were interviewed from the fourteen organizations, across nine different industries and three continents. Five of the organizations involved were subsidiaries of large multi-nationals, three organizations operated in the UK only, two were based in Africa, one was UK based but operated globally, while a further three were public organizations that operated world-wide. The data collection took place during the period November 2012 to July 2014. The interviewees were asked to describe an organization crisis that they had experienced which had not proceeded as expected. In addition to the interview data, secondary data was obtained where available from the organization and from news coverage of the crises. Twenty two events were identified that met the following selection criteria:

1) The event was a crisis, that is: a high-impact event that posed a threat to the goals or survival of the organization; involved uncertainty about the impact and means of resolution; required an urgent response to minimize the impact; and included activities that were not planned prior to the event.
2) The interviewee was involved in the activities to minimise the impact of the crisis i.e. they had first-hand experience of the crisis.

Narratives for the twenty-two crises were prepared based on the interviewees' descriptions, and these narratives provided a consolidated account of the processes during each unfolding crisis. The sensemaking processes identified in the narratives were interpreted and detailed through a visual mapping technique (described in section 3.7.1, page 82) based on the six sub-processes from the model of anticipatory and retrospective sensemaking during unfolding crises. The sensemaking processes were then compared, and as described in the following section, two categories of sensemaking processes were identified: reactive processes and proactive processes.

1.6 Empirical Study Findings

The findings (see section 4.2, page 95) revealed that reactive processes involved iterative cycles of past-oriented retrospective sensemaking in which the actors gathered information to diagnose the cause of the crisis or explain what was happening during the crisis. Utilising this information, actors created plausible explanations for what had occurred, and focused their actions based on these plausible explanations. Similar to the reactive sensemaking processes, the proactive processes initially involved cycles of retrospective sensemaking in which the actors created plausible explanations for what had occurred and focused their actions based on these plausible explanations. However, the proactive processes differed from the reactive processes when the actors engaged in a cycle of future-oriented anticipatory sensemaking in which a future threat was predicted and a course of action was prepared to avert the predicted threat. The anticipatory sensemaking was then followed by further cycles of retrospective sensemaking which focused on assessing what was happening in the organizational environment against this newly prepared course of action. Eighteen of the twenty two crisis involved proactive sensemaking processes, while four were categorised as reactive sensemaking processes. These two categories of sensemaking process are detailed in sections 4.2 and 4.3.

In addition, the findings show that organizing emerged during the reactive and proactive processes through the creation of shared meaning structures that either provided a collective focus in the form of a collective goal, or provided a means for the actors to make sense and take action. Organizing during the proactive processes emerged through shared meaning structures in the form of a collective goal to avert the predicted threat, and a course of action as a means to achieve this goal (see section 5.6, page 201). The reactive sensemaking processes on the other hand involved iterative cycles of retrospective sensemaking through which the actors created temporal structuring processes that were based on clock-time and provided a means to make sense and take action. These shared meaning structures emerged as the actors arranged when they would come together to share information, to try to give meaning to what was happening, and to agree what their immediate short-

term actions would be. Further detail on these temporal structures is provided in section 5.6 (page 201). The following section will summarise the main contributions in relation to the research question.

1.7 Overview of Contribution

There are three main novel contributions from this study. The first contribution is the integrative model of anticipatory and retrospective sensemaking processes during unfolding organizational crises. The findings of this study indicate that the sensemaking processes during unfolding crises are highly iterative cycles of retrospective sensemaking that are dynamically interspersed with cycles of anticipatory sensemaking when a future threat is predicted (see section 5.3). In addition, the findings suggest that enactment is a pivotal interaction point between the anticipatory and retrospective sensemaking processes. Based on how the cues from the environment are recognised, and whether or not the cues lead actors to predict a future threat, this gives rise to the form of sensemaking that then unfolds, as either an anticipatory or a retrospective process. The second contribution is the model of anticipatory sensemaking during unfolding crises. The anticipatory sensemaking process involves actors preparing in the present to avert a threat that they predict will occur in the future. The model was synthesised from the literature and enhanced based on the findings from the empirical data. This novel model provides further detail and understanding of the anticipatory processes, and confirms the three different forms the anticipatory sensemaking that can unfold; pattern matching, trajectory tracking and convergent sensemaking. In addition, the model incorporates the emergent finding that a perceived 'need to do something' arising from a sense of responsibility and/or obligation gave rise to the preparation of a course of action to avert the predicted threat during the anticipatory sensemaking process. Sensemaking in both the theoretical and empirical organizational literature is predominately viewed as a retrospective process. The identification of this future-oriented anticipatory form of sensemaking challenges the key ontological assumption that from a temporal perspective all forms of sensemaking are retrospective past-oriented processes.

The third novel contribution is how organizing emerged through the creation of shared meaning structures during the unfolding crises. These structures either provided a collective focus for the actors in the form of a collective goal, or provided the actors with a means to make sense and take action. The proactive processes involved structures in the form of the collective goal to avert the predicted threat, with the course of action being the means to achieve this goal. Three of the four reactive processes involved the creation of temporal structures that were based on clock-time (every eight hours, regular pattern of meetings at set times every day, last 24-hours/next 24-hours). These organizing structures emerged as the actors arranged when they would come together to share information, to try to give meaning to what was happening, and to agree what their immediate short-term actions would be. The temporal structures provided a 'drum beat' (Interviewee 14) or a 'routine' (Interviewee 17) to that enabled collective retrospective sensemaking through which the actors continued 'firefighting' and 'muddled' their way through (Interviewee 14).

1.8 Thesis Outline

Chapter 1 of this thesis introduces the research problem and provides an overview of the thesis. Chapter 2 locates the research problem within the extant literature thus enabling the identification of the specific research gap and question for this study. It begins by considering the context of organizational crisis, before reviewing the literatures on crisis sensemaking, the temporal orientation of sensemaking, and sensemaking in the context of intentional organizational change, and in the context of the management of foreseeable but unexpected events. Chapter 3 then presents the research paradigm, providing the ontological and epistemological foundations for this study. It addresses the philosophical approach and provides the rationale for the qualitative study that adopts a retroductive research strategy. The chapter describes the research methodology and the methods that were used to address the research question, and also provides the descriptive and interpretive analysis of the empirical data. Next, chapter 4 presents the research findings. It details the two categories of sensemaking processes identified in this study; reactive and proactive

processes that involve anticipatory and/or retrospective forms of sensemaking. Chapter 4 then describes the emergent finding regarding the actors' perceived sense of a 'need to do something' arising from their sense of responsibility or obligation.

Chapter 5 discusses the contributions made by this research study. It considers the findings in relation to the novel integrative model of the anticipatory and retrospective sensemaking processes during unfolding organizational crises, and discusses the function of enactment as a pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. Next the chapter considers the temporal orientation of the anticipatory sensemaking processes, and discusses the model of anticipatory sensemaking that was first synthesised from the extant literature, and then enhanced based on the perceived sense of a 'need to do something' which gave rise to the sensemaking processes. Chapter 5 then considers the contributions in relation to the organizing structures that emerged during the unfolding crises. Through these organizing structures the actors made sense and took action to mitigate the impact of the crises. Finally, chapter 6 presents the contribution to knowledge made by this research study, situating the findings in the existing literature. It presents the research problem and provides an overview of the research study. The chapter considers the implications for practice and reflects on the limitations of this study, before describing areas for further research.

2 LITERATURE REVIEW

2.1 Chapter Overview

Chapter 1 introduced the research problem and provided a rationale for this research study. It presented an overview of the thesis argument, and set out the structure for this thesis document by providing an outline for each of the chapters. This chapter will now locate the research problem within the extant organizational crisis and sensemaking literatures thus enabling the identification of the specific research gap and question for this study. First, section 2.2 reflects on the literature on organizational crises, before section 2.3 considers the literature on crisis sensemaking, in particular the retrospective sensemaking processes that occur during crises. Section 2.4 then considers the sensemaking literature on intentional organizational change, and what this literature says on the temporal orientation of sensemaking. Next, section 2.5 looks at the sensemaking processes in the context of the management of foreseeable but unexpected events, while section 2.6 reflects on anticipatory sensemaking, a future-oriented form of sensemaking in which a threat is identified during an unfolding crisis, while Table 2 (page 43) presents a summary of the forms of sensemaking processes identified in the different streams of sensemaking literature that are considered in this study. Section 2.7 then proposes a conceptual model of anticipatory and retrospective sensemaking during unfolding organizational crises. Finally, section 2.8 provides a summary of the sensemaking processes identified in the literature and sets out the research question for this study.

2.2 Organizational Crises

The increasing frequency, severity and types of crises mean that they are an inescapable reality for organizations (Lerbinger, 2012; Ulmer *et al*., 2013), so that an organization's capability to respond to a crisis has become an important item on the executive agenda (Cockram and Van Den Heuvel, 2012). Indeed, an organization's response to a crisis "can mean the difference between life and death to organizations, to product or service divisions, and to individual

employees" (Pearson and Clair, 1998, p. 74). Organizational crises can arise from natural, normal or abnormal events (Mitroff and Alpaslan, 2003; Hutchins and Wang, 2008; Jaques, 2010). They can be caused by natural disasters such as earthquakes, tornadoes or floods (Mitroff, 2000), or by normal events such as the failure of organizational processes, planned change, or technologies (Perrow, 1984; Shrivastava and Mitroff, 1987). In addition, crises can arise from abnormal events that result from deliberate human activities such as terrorist bombings, kidnappings and cyber-attacks (Mitroff and Alpaslan, 2003).

What then is an organizational crisis? The word crisis comes from the Greek word 'krisis' which means judgement or decision (Wilding and Paraskevas, 2006), with crises in Greek tragedies representing "historical turning points where human choice could make a fundamental difference to the future" (Shrivastava, 1993, p. 25). However, while there has been considerable debate in the organizational crisis literature on the definition of a crisis (Smith, 2005) the term crisis in everyday language "has come to denote any serious problem or damaging situation" (Shrivastava, 1993, p. 25) and this has led to some confusion in how the term is used. As a result, there is no single accepted definition of an organizational crisis (Cockram and Van Den Heuvel, 2012). Table 1 shows a range of the different definitions from the literature, and based on the definitions provided by Weick (1988), Pearson and Clair (1998) and Lerbinger (2012), the definition used here is that organizational crises are high-impact events that: pose a threat to the goals or survival of the organization; involve uncertainty about the impact and means of resolution; require an urgent response to minimize the impact; and involve activities that were not planned prior to the event.

Much of the management and organizational literature assumes that crises consist of a predictable pattern of phases (Turner, 1976; Fink, 1986; Mitroff, Shrivastava and Udwadia, 1987; Hutchins and Wang 2008; Appelbaum *et al.*, 2012; Buchanan and Denyer, 2013). This pattern includes a response stage (Fink, 1986) also called coping (Shrivastava, 1993) or containment/damage limitation (Pearson and Mitroff, 1993; Hale, Hale and Dulek, 2006) that involves

minimizing the impact of the unfolding crisis to prevent further escalation and losses. The response stage begins when the crisis is triggered, so that damage can only be minimized rather than avoided, and ends when the immediate threat has passed (Hale, Hale and Dulek, 2006). It is this response stage during an unfolding crisis that is the focus of this study.

Table 1 – Definitions of an organizational crisis

Source	Definition of an Organizational Crisis
Fink (1986, p. 15)	An unstable time or state of affairs in which a decisive change is impending.
Weick (1988, p. 305)	Crises are characterised by low probability/high consequence events that threaten the most fundamental goals of an organization.
Pearson and Clair (1998, p. 60)	An organizational crisis is a low-probability, high-impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly.
Boin (2005, p. 2)	A serious threat to the basic structures or the fundamental values and norms of a system, which under time pressure and highly uncertain circumstances necessitates making vital decisions.
MacFarlane (2010, p. 2)	An event that threatens the strategic objectives, reputation or existence of an organisation.
Pearson and Sommer (2011, p. 27)	Crises are events or trends that threaten the viability of the organisations within which they occur.
Lerbinger (2012, p. 9)	An event that brings, or has the potential for bringing, an organization into disrepute and imperils its future profitability, growth, and, possibly, its very survival.
Seeger, Sellnow and Ulmer (2012, p. 233)	A specific, unexpected, and non-routine event or series of events that create high levels of uncertainty and threaten or are perceived to threaten an organisation's high priority goals.
Coombs (2014, p. 3)	The perception of an unpredictable event that threatens important expectancies of stakeholders and can seriously impact an organisation's performance and generate negative outcomes.

As crises are seen to consist of a predictable pattern of phases, much of the crisis management literature seeks to prepare contingency plans (Elliott and Smith, 2006) based on envisioned crisis scenarios, so that the plans can be implemented should a scenario occur (Fink, 1986; Mitroff, 2000; Hutchins and

Wang, 2008). These plans are referred to by different terms in the literature, for example as crisis plans (Somers, 2009), emergency plans (Mitroff, Shrivastava and Udwadia, 1987), crisis management plans (Pearson and Mitroff, 1993; Mitroff, 2000), and the term contingency plan (Elliott and Smith, 2006) is used here. Scholars view the preparation of contingency plans as being essential to managing a crisis, as they claim that it is virtually impossible to create a plan in the heat of the crisis (Pearson and Mitroff, 1993; Calloway and Keen, 1996). As such, much of the organizational crisis management research has focused on crisis prevention and on the preparation of contingency plans, with little focus being given to how in practice actors respond during an unfolding crisis (Yang and Heish, 2013). While the preparation of contingency plans is considered to be key to managing organizational crises (Appelbaum et al., 2012), recently several scholars have called for recognition that there are crises where the response unfolds during the crisis, in particular where there is no relevant plan or the crisis is rapidly evolving (Brady, 2011; Yang and Heish, 2013). In addition, while crises consist of a pattern of phases, they are events that often exceed any planning expectation (Weick, 1988; Cockram and Van Den Heuvel, 2012; Ley, Ludwig, Pipek, Randall, Reuter, and Wiedenhoefer, 2014) as they can involve uncertainty about how they will unfold (Weick 1988; Coombs, 2014) and at the detailed level all crises differ (Egelhoff and Sen, 1992; Ley *et al*., 2012; Kahn, Barton, and Fellows, 2013; Yang and Hsieh, 2013; Ley *et al*., 2014).

Organizational crises are events that can trigger sensemaking processes (Weick, 1988, 1993; Weick, Sutcliffe and Obstfeld, 2005; Maitlis and Sonenshein, 2010) and research on sensemaking during unfolding crises has identified retrospective action-meaning creation processes in which actors give meaning in the present to activities that have occurred in the past, thus reducing uncertainty and enabling action (e.g. Weick, 1993). Organizational crises can be viewed as temporal phenomena that are characterised by fluidity, process and movement (Langley and Tsoukas, 2010; Langley, Smallman, Tsoukas and Van de Ven, 2013; Dawson, 2014), and viewed from this process perspective, organizational crises can be studied in a variety of ways. For example

organizational crises can be studied through the comparison of characteristics and variables of the crisis, or they can be studied through the processes that emerge and interact during the crises (Langley *et al.*, 2013). This process approach to the study of organizational crisis is considered again in the research method section (see section 3.7.1). The following section considers what the literature on crisis sensemaking says in relation to the action-meaning creation processes that have been identified during unfolding organizational crises.

2.3 Crisis Sensemaking

Sensemaking is an important and growing topic in the study of organizations, as it lies at the very core of organizing (Maitlis and Christianson, 2013), including organizing during unfolding crises (e.g. Weick, 1988, 1993). From a Weickian perspective, sensemaking is a retrospective process in which actors respond to change in their organizational environment by giving meaning in the present to activities that have occurred in the past (Weick, 1979, 1988, 1993, 1995, 2003, 2005; Weick, Sutcliffe and Obstfeld, 2005). Sensemaking is viewed as the overarching process that involves enactment, with organizing being an outcome of the process. A model of retrospective sensemaking (Figure 1) has been synthesised based on Weick's (1979) description of the diagnostic retrospective sensemaking process, and also Jennings and Greenwood's (2003) model of the relationship between enactment, organizing and sensemaking. This model of retrospective sensemaking shows the four sub-processes involved as: environment change; enactment; selection; and retention. Through a process of enactment, actors take notice of a change in their environment and they act to identify those elements of their environment that relate to the change in order to pay them further attention (Weick, 1979). The environment change provides "the raw material for sense-making" (Weick, 1979, p. 130) with enactment serving "to bracket and construct portions of the flow of experience" (Weick, 1979, p. 147). Thus while enactment involves the noticing and bracketing of elements from the environment that relate to the change, it is through the retrospective selection process that the actors attempt to interpret and create

plausible meaning for the changes, thus reducing uncertainty. This plausible meaning is then retained to form the focus for subsequent action and meaning creation (Weick 1988, 2005; Weick, Sutcliffe and Obstfeld, 2005).

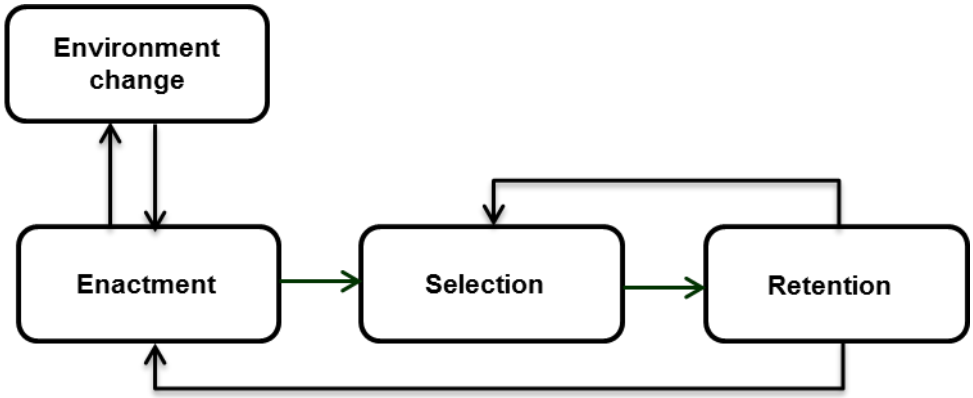

Figure 1 – Retrospective sensemaking process

(adapted from Weick (1979) and Jennings and Greenwood (2003))

Within the overarching sensemaking process, enactment is the only sub-process where the actor directly engages with the external environment in noticing changes as cues and bracketing raw data relating to these cues for further attention (Weick, 1979). The selection and retention processes both work on edited or filtered data which can include shared meaning structures that have been built through previous experience, knowledge or sensemaking, for example in the form of processes, procedures and role structures (Weick, 1993). The relationship between environment change and enactment is reciprocal. While noticing and bracketing raw data for attention is one form of enactment, a second form of enactment occurs when actors take action to change their environment, which then in turn produces further environment change (Weick, 1979; Jennings and Greenwood, 2003). Sensemaking is viewed as a retrospective past-oriented diagnostic action-meaning creation process directed at constructing plausible interpretations of uncertain situations with tentative expectations being generated based on these interpretations (see Table 2, process SP1, page 43). These plausible interpretations are sufficient to

sustain action in which the tentative expectancies are tested through the retrospective comparison with what then unfolds (Weick, 2005; Weick, Sutcliffe and Obstfeld, 2005). These action-meaning creation cycles occur dynamically and repeatedly as actors construct plausible interpretations that they continuously enact and modify (Maitlis and Christianson, 2013).

Since Weick first presented the concept of sensemaking in organizations (Weick, 1979) the literature on the topic has burgeoned with different streams of sensemaking literature developing largely independently (Maitlis and Sonenshein, 2010). The two streams of sensemaking literature that are considered here have similarities to the context of crisis, and so may provide a wider perspective that gives insight into the sensemaking processes during organizational crises. These two streams of sensemaking literature are sensemaking in the context of intentional organizational change, and sensemaking in the context of the management of foreseeable but unexpected events. Both of these streams of sensemaking literature are considered in the following sections, starting with sensemaking in the context of intentional organizational change.

2.4 Sensemaking during Intentional Organizational Change

Maitlis and Sonenshein (2010) point out that although the sensemaking literatures on organizational crisis and on intentional organizational change have developed separately with little explicit integration, there are similarities between these two contexts so that the sensemaking processes identified in the context of intentional organizational change could provide insight on the sensemaking processes during organizational crises. They identify two important parallels between these contexts: firstly, both contexts are often characterized by ambiguity and uncertainty; and secondly while crises are often viewed as occurring very quickly and change is viewed as unfolding over long periods, a crisis can also be enacted very slowly, and a change can occur in highly pressurized conditions. However, while there are parallels between these two sensemaking contexts, an area of divergence is the temporal orientation of sensemaking processes. Sensemaking is predominately considered to be a

retrospective process (MacKay, 2009; Maitlis and Christianson, 2013), however, as will be discussed in the following section, future-oriented forms of sensemaking have been presented in the sensemaking literature on intentional organizational change.

2.4.1 Temporal Orientation of Sensemaking

An area of disparity between the sensemaking literature on crisis and on intentional organizational change, concerns the temporal orientation (past, present and future) of sensemaking. Firstly, whether sensemaking is inherently a past-oriented process or can also take the form of a future-oriented process (Maitlis and Christianson, 2014), and secondly whether sensemaking can be predominately past-oriented or future-oriented while also incorporating all three temporal dimensions of past, present and future (Gephart, Topal and Zhang, 2010; Wiebe, 2010; Kaplan and Orlikowski, 2016; Rosness et al., 2016). These two perspectives on the temporal orientation of sensemaking are now considered in turn in the following sections.

2.4.1.1 Sensemaking as a Retrospective or Future-oriented Process

While the notion of future-oriented forms of sensemaking has long been implied in the sensemaking literature (Weick, Sutcliffe and Obstfeld, 2005), it was rarely explicitly stated and explored (Rosness et al., 2016). However, the view that all forms of sensemaking are essentially past-oriented processes has been challenged (Gephart, Topal and Zhang, 2010; Wiebe, 2010; Kaplan and Orlikowski, 2013; Rosness et al., 2016), and in recent years future-oriented forms of sensemaking have begun to gather more attention (Maitlis and Christianson, 2013), with prospective sensemaking being the main future-oriented form of sensemaking that has been proposed and studied.

Prospective sensemaking was first proposed by Gioia and associates to describe the future-oriented form of sensemaking that they identified in their study of a university strategic change programme (Gioia and Chittipeddi, 1991; Gioia *et al.*, 1994; Gioia and Thomas, 1996; Gioia, Corley and Fabbri, 2002; Gioia, 2006). Since then, prospective sensemaking has been researched in the

context of intentional change such as strategy making, new product development and organizational change (e.g. Gioia and Chittipeddi, 1991; Gioia *et al*., 1994; Gioia, Corley and Fabbri, 2002; MacKay, 2009; Gephart, Topal and Zhang, 2010; Stigliani and Ravasi, 2012; Kaplan and Orlikowski, 2013). This future-oriented sensemaking process involves "the conscious and intentional consideration of the probable future impact of certain actions, and especially nonactions on the meaning construction processes of themselves and others" (Gioia et al., 1994, p. 378). Prospective sensemaking is considered to be a continuous, natural every-day occurrence that is focused on interpretation, meaning construction and the generation of tentative expectations about future events (see Table 2, process SP4, page 43). It is a sensemaking process through which actors "envision a tentative future but are unable to construct an account of how to get there" (Gioia and Mehra, 1996, p. 1230). This process differs from retrospective sensemaking, which involves the interpretation of events that have occurred to enable action to be taken based on this plausible meaning. As such, the temporal orientation of retrospective and prospective sensemaking differ in that "[r]etrospective sense making is targeted at events that have transpired; prospective sense making is aimed at creating meaningful opportunities for the future" (Gioia and Mehra, 1996, p. 1229). While retrospective sensemaking is situated in the present, reflecting back over events that have occurred to make sense of the past, prospective sensemaking is situated in the present projecting forward on envisioned possible future events to make sense for the future (Gioia and Mehra, 1996).

Although prospective sensemaking was initially proposed as a form of future-oriented sensemaking, on further consideration Gioia conceded that prospective sensemaking is "a special case of retrospective sensemaking (Weick, 1979), wherein people reflect on possible courses of action as if they had already occurred" (Gioia et al., 1994, p. 378). This form of prospective sensemaking involves "a future envisioned as already having happened" (Weibe, 2010, p. 227). As such, prospective sensemaking was clarified as being a form of retrospective sensemaking that involves thinking in the future perfect tense (Gioia et al., 1994; Gioia, Corley and Fabbri, 2002; Gioia, 2006; Wiebe, 2010;

Stigliani and Ravasi, 2012), which occurs when actors envision a desired or expected future event, act as if this event has already occurred (i.e. it will have been completed) and through retrospective sensemaking create meaning for their actions from the temporal perspective that the event has occurred (see Table 2, process SP2, page 43). This sensemaking process, which is focused on interpretation through future perfect thinking, entails "an ability to imagine oneself in the future, to look back from that virtual vantage, and to construct a desired future image" (Gioia, Corley and Fabbri, 2002, p. 631). However, despite this clarification that prospective sensemaking is a special form of retrospective sensemaking involving future-perfect-thinking, some academics take a post-Weickian perspective on sensemaking and they continue to study the interpretative future-oriented form of prospective sensemaking (Gephart, Topal and Zhang, 2010; Wiebe, 2010; Kaplan and Orlikowski, 2013; Rosness et al., 2016). As such, the sensemaking literature identifies more than one form of interpretative process is referred to as prospective sensemaking. These forms of prospective sensemaking are described in more detail in the following sections and summarised in Table 2, page 43.

2.4.1.2 Post-Weickian View of the Temporal Orientation of Sensemaking

Several academics have recently proposed that sensemaking can be predominately past-oriented or future-oriented while also incorporating all three temporal dimensions of past, present and future (Gephart, Topal and Zhang, 2010; Wiebe, 2010; Kaplan and Orlikowski, 2016; Rosness et al., 2016). This post-Wieckian perspective (Gephart, Topal and Zhang, 2010; Kaplan and Orlikowski, 2013) builds on Emirbayer and Mische's (1998) view of social engagement as a temporally embedded process in which actors are able to adopt and change their temporal orientation (past, present or future) toward their particular contexts. The post-Weickian perspective takes an interpretative view of sensemaking as a process in which actors are able to be in the present but alter their conception of their temporal orientation to create a virtual temporal vantage from which they imagine themselves in the past or in the future. In addition to this creation of a virtual temporal vantage, this perspective

holds that there is no one fixed interpretation of the past, present or future, but that there are multiple interpretations based on the how actors reconstruct histories from their different prior experiences, and how in the present actors direct their attention through multiple assessments of current concerns (Emirbayer and Mische, 1998; Wiebe, 2010). As such there can be different interpretations of the past and present in the creation of envisioned futures. From this post-Weickian perspective, the future-oriented form of prospective sensemaking is viewed as being predominately a future-oriented process that is also informed by the past and present: “Future-oriented sensemaking is part of an unfolding process that incorporates past and present orientations” (Gephart, Topal and Zhang, 2010, p. 26). As Kaplan and Orilikowski (2013, p. 1) state, “[t]his process invariably comprised not only reimagining the future but rethinking the past and reconsidering present concerns”. The future-oriented form of prospective sensemaking is viewed as being an on-going, everyday occurrence in organizational life, a process involving “sensemaking that seeks to construct intersubjective meanings, images, and schemes in conversation where these meanings and interpretations create or project images of future objects and phenomena” (Gephart, Topal and Zhang, 2010, p. 13). Through this future-oriented sensemaking process “actors construct schemes for action that developed in the past, they employ these in the present to shape these into future projections” (Gephart, Topal and Zhang, 2010, p. 27). This form of prospective sensemaking is a deliberate and conscious process in which attention is focus on the future to create shared images of possible future events as identified for example during studies of strategy creation (Kaplan and Orilikowski, 2013) or organizational change programmes (Weibe, 2010) (see Table 2, process SP5, page 43).

Taken together, recent research on the sensemaking processes in the context of intentional organizational change has identified two forms of interpretative prospective sensemaking. The first is a retrospective past-oriented process involving future-perfect-thinking in which future scenarios are viewed as if they had already happened (see Table 2, process SP2, page 43). The second is a future-oriented process through which possible desired futures are envisioned.

From the post-Weickian perspective this sensemaking process is predominately a future-oriented process that also incorporates all three temporal dimensions (see Table 2, process SP5, page 43). However, these interpretive forms of prospective sensemaking have largely been researched in situations where “a more relaxed time pressure provides the opportunity for prolonged and conscious articulation and elaboration of tentative interpretations” (Stigliani and Ravasi, 2012, p. 1250), rather than the time constrained situations that occur during unfolding organizational crises. These interpretive forms of sensemaking are processes in which actors deliberately construct visions of the future. They differ from the retrospective sensemaking process that is an episodic diagnostic action-meaning creation process which is triggered by a breakdown or collapse in meaning arising from external environment changes (see Table 2, process SP1, page 43). The following section considers sensemaking in the context of the management of foreseeable but unexpected events.

2.5 Sensemaking in the Management of Foreseeable but Unexpected Events

Scholars have recently begun to research the sensemaking processes through which actors manage foreseeable but unexpected events (e.g. Patriotta, 2003; Hayes and Birch, 2009; Gephart, Topal and Zhang, 2010; Bechky and Okhuysen, 2011; Van Den Heuvel, Alison and Powel, 2014; Patriotta and Gruber, 2015; Rosness et al., 2016). This stream of sensemaking literature is considered here as there are parallels between the context of foreseeable but unexpected events and the context of crises, as both involve “disruptive ambiguity” (Weick, Sutcliffe and Obstfeld, 2005, p. 413) that interrupts actors’ activities, forcing them to make sense of the disrupted activity in order to enable action to minimise the impact of the disruption.

Research on the sensemaking processes used to handle foreseeable but unexpected events has identified that actors engage in retrospective future-perfect-thinking processes in which scenarios are viewed as if they had already happened, so that based on this virtual temporal vantage, contingency plans are created that can be implemented if and when one of these scenarios occurs

(Hayes and Birch, 2009; Gephart, Topal and Zhang, 2010; Van Den Heuvel, Alison and Powel, 2014). This form of retrospective sensemaking is linked to expertise and resilience in the ability to seamlessly implement activities to handle unexpected situations that occur (Rosness et al., 2016). In addition to these retrospective future-perfect-thinking processes, research has identified retrospective processes that utilise shared meaning structures to enable actors to regularly manage the unexpected (Patriotta, 2003; Bechky and Okhuysen, 2011; Patriotta and Gruber, 2015). Weick distinguished (1979, 1993) two different forms of organizing through shared structures. One form is focused on 'ends' or goals that embody what people collectively seek to achieve. The second form is focused on ways or 'means', that is on how people collectively act and create meaning, and this can include the pattern of interactions through which actors stabilise meaning to create new shared structures. These structures, which are created based on past knowledge, experience and sensemaking, can embody the dominant shared meanings such organizational roles, rules, processes and procedures (Weick, 1993; Bechky and Okhuysen, 2011). Research studies of the sensemaking processes that actors engage in to regularly manage foreseeable but unexpected events, has identified that actors use existing shared meaning structures to make sense of and handle these events in order to continue to carry out their work. These studies have identified that the shared meaning structures can take the form of shared task knowledge and common workflow expectations (Bechky and Okhuysen, 2011), detective stories as narratives frameworks that utilise the organization's routines, rituals or procedures for making sense of disrupted occurrences (Patriotta, 2004), metaphors as a means to assign situations and events into familiar categories (Patriotta and Brown, 2011) or the categorisation of events through 'typification' which enables actors to update their temporal based expectancy frameworks (Patriotta and Gruber, 2015). These shared meaning structures provide the flexibility for the actors to adapt to make sense of and handle a foreseeable but unexpected event, so that they can regularly "expect the unexpected" (Bechky and Okhuysen, 2011, p. 239) or "turn the 'unusual' into 'business as usual'" (Patriotta and Brown, 2011, p. 34).

While actors regularly manage foreseeable but unexpected events through the use of existing shared meaning structures, Weick (1993) found that the breakdown of these structures along with the social interactions for creating new meaning, can lead to the collapse of sensemaking during crises. He identified through his study of the Mann Gulch Disaster (Weick, 1993), that this disaster arose from a collapse of both the sensemaking structure that was based on the team role system, and the means of making sense: “What makes such an episode so shattering is that both the sense of what is occurring and the means to rebuild that sense collapse together” (p. 633). He claims that during crises when the dominant meaning structure breaks down (e.g. rules, roles, processes or procedures), actors should focus on and increase their means of making sense through “their formal and informal social ties” (Weick, 1993, p. 646), as this will lead to increased meaning and then to the creation of new shared meaning structures. Conversely, when there is a breakdown in the social ties, actors should focus on the dominant meaning structures until the social ties become clearer as the means of making sense.

In addition, Weick (2005) points out that in managing the unexpected during unique events such as crises, an over-reliance on structures including plans, frameworks or typifications can lead to problems such as entrainment or normalization, where during the crisis weak signals or cues in the environment are ignored or discounted leading to an escalation in the situation (Weick, 2005; Weick and Sutcliffe, 2011). Indeed, the use of contingency plans that are prepared prior to the crisis can complicate matters as mapping out a preconceived way to respond to envisioned crisis scenarios can discourage actors from viewing each crisis as a unique event requiring a unique response or course of action (Weick and Sutcliffe, 2011). Weick (2005) counsels that sometimes the only way to manage an unexpected event is to wait for the event to start happening and make sense of the event as it unfolds rather than respond with contingency plans assuming the event will unfold as envisaged; “Notice that in a reactive world, a highly refined planning system is less crucial than the capability to make sense out of an emerging pattern” (Weick, 2005, p. 58).

In summary, the sensemaking literature on the management of foreseeable but unexpected events has identified two forms of interpretative retrospective sensemaking processes through which actors can prepare for future events that may interrupt their daily work. The first process is a form of prospective sensemaking that involves future-perfect-thinking through which actors can envision possible future scenarios, and create contingency plans from the temporal perspective that these events have already happened, so that these plans can be implemented if and when an envisioned scenario occurs (see Table 2, process SP2, page 43). The second process is a retrospective sensemaking process in which actors use shared meaning structures to handle an interruption when it occurs (see Table 2, process SP3, page 43). However these structures can breakdown during an unfolding crisis and an over-reliance on existing structures, including contingency plans, can lead to problems of entrainment or normalization where the subtle cues in the environment are ignored or discounted leading to an escalation in the situation. Recently scholars have proposed a future-oriented anticipatory form of sensemaking in which actors recognise cues during an unfolding crisis that lead them to both predict a future threat and prepare a course of action in order to avert the predicted threat before it occurs (Klein, Snowden and Pin, 2007, 2011). The following section now considers this future-oriented anticipatory sensemaking process.

2.6 Anticipatory Sensemaking

The anticipatory form of sensemaking involves “people recognizing and preparing for difficult challenges, many of which may not be clearly understood until they are encountered” (Klein, Snowden and Pin, 2011, p.1). These challenges include low-probability, high threat events such as crises. This anticipatory form of sensemaking occurs when actors encounter events in which they predict a future threat and then make preparations to avert the threat before it occurs. Klein, Snowden and Pin (2007, 2011) term this future-oriented form of sensemaking as anticipatory thinking, which can occur as an individual or as a collective process. However, Rosness, Haavik and Evjemo (2015, p.5)

state “in everyday language ‘thinking’ is usually associated with covert cognitive process at the individual level”, and so the term anticipatory sensemaking is used here to emphasise the collective social form of the future-oriented anticipatory process rather than any individual form.

Anticipatory sensemaking is a future-oriented sensemaking process that can be triggered during an unfolding crisis when actors take notice of cues relating to a change in their environment (see Table 2, process SP6, page 43). Based on these cues the actors generate an expectation when they predict a likely future threat and they prepare in the present to avert the threat before it occurs (Klein, Snowden and Pin, 2007, 2011; Dunaway, 2010). The externally directed prediction process is based on actors noticing cues in their environment and extrapolating, foreseeing or identifying a pattern that leads them to predict the future threat. The preparation process is internally focused on the collective and what they can do to respond, “it helps us prepare to respond, not just to predict” (Klein, Snowden and Pin, 2011, p. 2) by formulating a plausible course of action during the unfolding crisis in an attempt to avert the predicted threat (Klein, Snowden and Pin, 2007, 2011). While anticipatory sensemaking, similar to retrospective sensemaking, is an uncertainty reduction process in which actors prepare to take action (Van Den Heuvel, Alison and Powel, 2014), one of the important values of anticipatory sensemaking is that it functions as ‘an early warning system’ (Klein, Snowden and Pin, 2011, p. 3) that there is trouble on the horizon by identifying a future threat (Klein, Snowden and Pin, 2007, 2011; Johns, 2011).

For clarity, the distinction is made here between anticipatory sensemaking and the forms of prospective sensemaking process that the sensemaking literature refers to on occasion as being anticipatory. The extant sensemaking literature identifies a retrospective form of prospective sensemaking that involves future-perfect-thinking through which future scenarios are viewed as if they had already happened, so that contingency plans are defined based on this virtual temporal vantage (see Table 2, process SP2, page 43). The literature refers to this form of prospective sensemaking as being anticipatory in that the

contingency plans are defined in anticipation that a scenario may happen, so that the plans can be implemented if and when a scenario does occur. However, this future-perfect-thinking form of prospective sensemaking is different from the future-oriented anticipatory sensemaking processes in which actors predict a future threat during an unfolding crisis, and in the present they identify actions that they can take in the immediate future to try to avert the threat before it occurs. There are three common forms of anticipatory sensemaking process (Klein, Snowden and Pin, 2007, 2011); pattern matching, trajectory tracking, and convergent sensemaking.

Pattern matching involves actors noticing cues in their environment and recognising that these could lead to a threat. This process involves "associating a cue with a threatening outcome" (Klein, Snowden and Pin, 2011, p. 3) such as when the actors recognise that "something may be amiss" (McLennan, Elliot and Holgate, 2009, p. 90) due to an anomaly in or a similarity to an existing pattern of activities. Based on the predicted threat, the actors prepare a course of action in an attempt to avert that threat. The process is summarised as: "The situation is A, this is likely to lead to B, so we need to do X" (McLennan, Elliot and Holgate, 2009, p. 92).

Trajectory tracking involves actors recognising and extrapolating trends "to get ahead of the curve" (Klein, Snowden and Pin, 2011, p. 3). The process involves noticing and preparing for how events are unfolding and the likely implications (McLennan, Elliot and Holgate, 2009). Trajectory tracking is summarised as: "The situation is one of A, over time this is likely to entail B, which may lead to C, so we need to do X" (McLennan, Elliot and Holgate, 2009, p. 93). For example during the September 11 attacks, the Boston air traffic controllers anticipated that aircraft departing or entering their air space could lead to more hijackings, which could result in further buildings being attacked. They did not wait for the higher chain of command to instruct them, but prepared and enacted a course of action in which they stopped all aircraft from departing or entering the Boston air space (Socias, 2008).

Convergent sensemaking involves actors recognising and foreseeing a future threat based on "the implications of different events and their interdependencies" (Klein, Snowden and Pin, 2011, p. 3). McLennan, Elliot and Holgate (2009, p. 92) summarise convergent anticipatory sensemaking as a process in which "[t]he situation is characterised by A, by B, and by C. Taken together, D is likely, so we need to do X". An example of convergent anticipatory sensemaking (Klein *et al*., 2000) involved a Marine Corps exercise in which one unit member noted from a situation report that an enemy mechanized brigade had just moved its position, which was odd as it was daytime and this enemy unit only moved at night. He wondered if it might be on an accelerated time schedule and was getting ready to attack. Checking further, he talked to another member from the unit who was also suspicious, not because of any event but because of a non-event. The rate of enemy messages had suddenly declined. This looked like the enemy was maintaining radio silence. Taking together the implications of these different events, they raised the alarm and the unit rapidly generated a course of action to counter the attack.

Based on the descriptions provided by Klein, Snowden and Pin (2007, 2011) and McLennan, Elliot and Holgate (2009), a conceptual model of anticipatory sensemaking processes has been synthesised. This model shows anticipatory sensemaking (Figure 2) as action-prediction-preparation cycles that consist of four sub-processes; environment change, prediction, preparation and enactment.

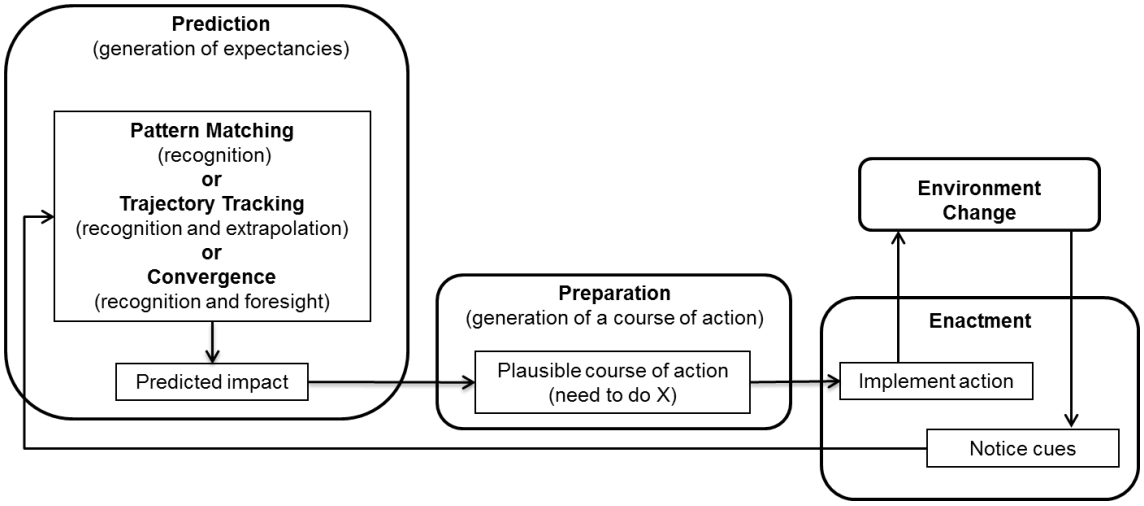

Figure 2 – Anticipatory sensemaking processes

(based on Klein, Snowden and Pin (2007, 2011), McLennan, Elliot and Holgate (2009))

Anticipatory sensemaking can be triggered when actors take notice of cues relating to a change in their organizational environment. Through the externally directed prediction process, based on cues in the environment, the actors extrapolate, foresee or identify a pattern that leads them to generate an expectation when they predict a future threat. Then through the preparation process that is internally focused on the collective and what they can do to respond, the actors formulate a plausible course of action to try to avert the predicted threat (Klein, Snowden and Pin, 2007, 2011). As such the actors prepare in the present to avert a predicted future threat before it occurs (Klein, Snowden and Pin, 2007, 2011; Dunaway, 2010). As the model shows, the action-prediction-preparation processes can unfold in three common forms (Klein, Snowden and Pin, 2007, 2011): pattern matching, trajectory tracking, and convergent sensemaking.

The distinction is made here between the contingency plans that are defined in advance of any crisis and the course of action that is prepared during an unfolding crisis. In the context of crises, prospective sensemaking involving future-perfect-thinking is carried out prior to a crisis occurring. This form of prospective sensemaking involves actors envisioning possible future scenarios and creating contingency plans from the temporal perspective that these events

have already happened, so that these plans can be implemented if and when a scenario occurs. Unlike this prospective planning process that is carried out prior to a crisis, anticipatory sensemaking involves actors identifying a plausible course of action during the unfolding crisis so that they can take action to try to avert a future threat before it occurs. The following section considers the empirical studies of anticipatory sensemaking that are reported in the literature.

2.6.1 Studies of Anticipatory Sensemaking

A review of the sensemaking literature identified four studies that involve sensemaking processes which are described as anticipatory. Each of these studies is now considered in turn, and as will be seen, while the term anticipation is used in association with the identified sensemaking processes, in three of the four studies the term refers to the generation of expectations during processes that are consistent with either retrospective sensemaking or prospective sensemaking involving future-perfect-thinking.

In the first study, Hayes and Birch (2009) researched the factors that support or hinder anticipation in wildfire Incident Management Teams (IMTs), and they claim that a key element for success in fighting wildfires is the ability to identify the likely different scenarios for how an incident may unfold in order to create contingency plans for these scenarios. Hayes and Birch (2009) describe how a separate planning team within the IMT, use the Australasian Inter-service Incident Management System (AIIMS) framework as a shared meaning structure to engage in sensemaking in which they integrate the various and possibly contradictory accounts of on-going events in order to form a plausible understanding of the incident, and based on this plausible understanding to envision the likely trajectories for the incident. They claim that the AIIMS framework provides a structure that functionalises anticipatory sensemaking by identifying the IMT personnel responsible for this activity, providing standard frameworks to predict the incident's development, and devising appropriate contingency plans for each of the likely trajectories. Utilising the AIIMS framework the planning team prepare the Incident Action Plan which considers several different time horizons (e.g. 6, 12, and 24 hours) and trajectories. As

such Hayes and Birch present a form of sensemaking in which actors focus their attention on trying to predict different likely scenarios that may happen and prepare a contingency plan for each scenario so that this plan can be implemented if the scenario occurs. The sensemaking processes that Hayes and Birch (2009) described in their study are viewed here as being retrospective future-perfect-thinking processes where plans are defined based on the view that future scenarios have already occurred, rather than being anticipatory sensemaking processes as presented by Klein, Snowden and Pin (2007, 2011).

In the second study, Van Den Heuvel, Alison and Powel (2014) link anticipatory sensemaking with assumption-based reasoning. They assessed the coping strategies used by a team of strategic command police officers to manage uncertainty in a high-risk hostage negotiation incident. Their results showed that uncertainty management occurred through the use of frameworks in the form of specific strategies, including intuitive assumption-based reasoning that allowed officers to formulate a set of working strategies. This was achieved by making assumptions that went beyond what was factually known and was subject to retraction if and when they were found to conflict with stronger evidence. Through assumption-based reasoning, the police officers based their decisions on previously learnt assumptions in order to reduce uncertainty, to formulate action plans and to act quickly with very little information. However, while these sensemaking processes are described as anticipatory, they could be viewed as retrospective sensemaking utilising future-perfect-thinking in which an expected future event is viewed as if this event has already occurred (Gioia, Corley and Fabbri, 2002). The two example quotes below which are provided in the paper by Van Den Heuvel, Alison and Powel (2014, p. 41) appear to support the view that the processes are a form of perspective sensemaking involving future-perfect-thinking where the assumption is that the event has happened (i.e. that Incident Commander (IC) is at the coroner’s court or public enquiry) and sense of the situation is then made retrospectively.

> "IC: So we are going to coroner's court, and when we get to coroner's court I need to be able to say that I got some advice and I was able to make a decision"
>
> "IC: […] what I really need is some options so that I can start making choices. Because at the moment, she dies, other people die, I'm at coroner's court or public enquiry and I am trying to explain some decisions I have made, and at the moment, I can't make any. Because I'm not being given any options by my Tac Advisor, by my intelligence people, or by you."

The third empirical study was carried out by Rankin, Woltjer and Field (2016), who researched the on-going sensemaking processes of crew when flying aircraft. Based on their research they claim that: "[s]ensemaking is thus not the activity of solely perceiving and interpreting input from the environment after the fact (retrospective) but the continuous process of fitting what is observed with what is expected (anticipatory), an active process guided by our current understanding" (p. 625). They present their initial findings of the re-framing sensemaking process of 'staying ahead' that is carried out by pilots of commercial aircrafts in order to cope with unexpected events. Each pilot retrospectively interpreted input from the environment and compared this with their expectations that had been generated through future-oriented prospective sensemaking. Then through retrospective sensemaking, based on whether the interpreted input from the environment met with the generated expectations, each pilot decided on their next actions. A surprise occurred when the pilot identified a gap between their generated expectations and the retrospectively interpreted input from the environment. This sensemaking process enabled each pilot to 'stay ahead' by generating expectancies which guided their attention and action, enabling the pilot to predict anomalies early on. However, while Rankin, Woltjer and Field (2016) use the term anticipation to describe the generation of expectancies through future-oriented prospective sensemaking, these expectations were compared retrospectively to what then happened in order to identify any gaps. As such, rather than this sensemaking process being

an the anticipatory sensemaking process described by Klein, Snowden and Pin (2007, 2011), this is principally a retrospective sensemaking process which utilises expectations that were envisioned through the future-oriented form of prospective sensemaking.

However, the fourth study from the literature does present a sensemaking process that is consistent with the anticipatory sensemaking process described by Klein, Snowden and Pin (2007, 2011). In this exploratory study, McLennan, Elliot and Holgate (2009) examined the anticipatory processes used by supervisors in the management of wildfires in Australia. They analysed transcripts from structured interviews with forty experienced wildfire supervisors and found evidence for three forms of anticipatory sensemaking as part of the supervisors' individual decision making processes. These three forms of anticipatory sensemaking resembled the forms proposed by Klein, Snowden and Pin (2007, 2011) that were described earlier in section 2.6: pattern matching; trajectory tracking; and convergent sensemaking.

In summary, four studies have been identified that involve sensemaking processes which are described as anticipatory. For three of the studies, although the term anticipation is associated with the sensemaking processes, the anticipation refers to either the generation of expectancies through the future-perfect-thinking form of perspective sensemaking, or to expectations that are interpreted through retrospective sensemaking processes. Two of the studies (Hayes and Birch, 2009; Van Den Heuvel, Alison and Powel, 2014) present an on-going sensemaking process involving active attention management in which possible scenarios are envisioned and contingency plans are formulated to handle these possible scenarios should they happen. It is considered here that this sensemaking process is consistent the future-perfect-thinking form of retrospective sensemaking. The third study by Rankin, Woltjer and Field, (2016) presents a sensemaking process involving the generation of multiple possible expectancies through a future-oriented prospective process with these expectancies being retrospectively compared to what happens in order to identify any gaps. Only the study by McLennan, Elliot and Holgate

(2009) presents anticipatory sensemaking as a process involving the prediction of a likely future threat, with the preparation of a single course of action to seek to avert the predicted threat. This view is consistent with the anticipatory form of sensemaking as presented by Klein, Snowden and Pin (2007, 2011). The crisis sensemaking literature identifies two sensemaking processes that can occur during unfolding crises; anticipatory sensemaking and retrospective sensemaking. The following section proposes an integrative model of sensemaking during unfolding crises based on these two processes.

2.7 Integrative Model of Anticipatory and Retrospective Sensemaking during Unfolding Crises

It is contended here that to help explain how the sensemaking processes unfold and interact during organizational crises it is necessary to integrate both retrospective action-meaning creation processes (Weick, 1988) and anticipatory action-prediction-preparation forms of sensemaking (Klein, Snowden and Pin, 2007, 2011; McLennan, Elliot and Holgate, 2009; Sandberg and Tsoukas, 2015), where the pivotal interaction between the cycles of sensemaking emerges through enactment. Figure 1 (see page 20) presented the model of the retrospective sensemaking processes that consist of four sub-processes: environment change, enactment, selection, and retention. In addition, Figure 2 (see page 33) presented a model of anticipatory sensemaking processes that consisted of four sub-processes: environment change, enactment, prediction and preparation. Based on these two models, Figure 3 now presents a model of sensemaking in the context of unfolding crises. In this model the retrospective past-oriented sensemaking processes unfold as cycles of action-meaning creation in which the organizational actors construct plausible interpretations that diagnose or explain what has happened, and based on these plausible interpretations they take action. In addition, the future-oriented anticipatory sensemaking processes unfold as cycles of action-prediction-preparation when the actors extrapolate, foresee or identify a pattern that leads them to predict a future threat arising during the crisis, and they prepare and enact a course of action in an attempt to avert this predicted threat. In this model, enactment sits

between the overlapping cycles of retrospective and anticipatory sensemaking, and has a reciprocal relationship with the environment (Weick, 1979; Jennings and Greenwood, 2003). The two different forms of enactment are shown in the model. The first form of enactment occurs when the actors notice change as environment cues (indicated as 'Notice cues' in the model) and they focus their attention on these cues by bracketing information about the changes. The second form of enactment occurs when the actors take action to change the environment (indicated as 'Implement action' in the model), which then in turn produces further environment change. The retrospective and anticipatory sensemaking processes involve both forms of enactment in which the actors notice cues in their environment and implement action to change their environment. However, depending on how the actors recognize and interpret these cues and whether or not the cues led the actors to predict a future threat, this gives rise to the form of sensemaking that then unfolds; either as anticipatory sensemaking or retrospective sensemaking. As such, the model shows the link between the 'Notice cues' process to 'Prediction' process as part of anticipatory sensemaking when the actors predict a future threat. In addition, the link is shown from the 'Preparation' process to the 'Implement action' process when the actors implement their agreed course of action to seek to avert the predicted threat during the crisis. The model also shows the link from the 'Notice cues' process to 'Selection' process when the way in which the actors notice the cues gives rise to retrospective sensemaking. Finally, the link is shown from the 'Retention' process within retrospective sensemaking when the actors implement action based on the plausible meaning they have created. The following section will now consider the research gap and question for this study.

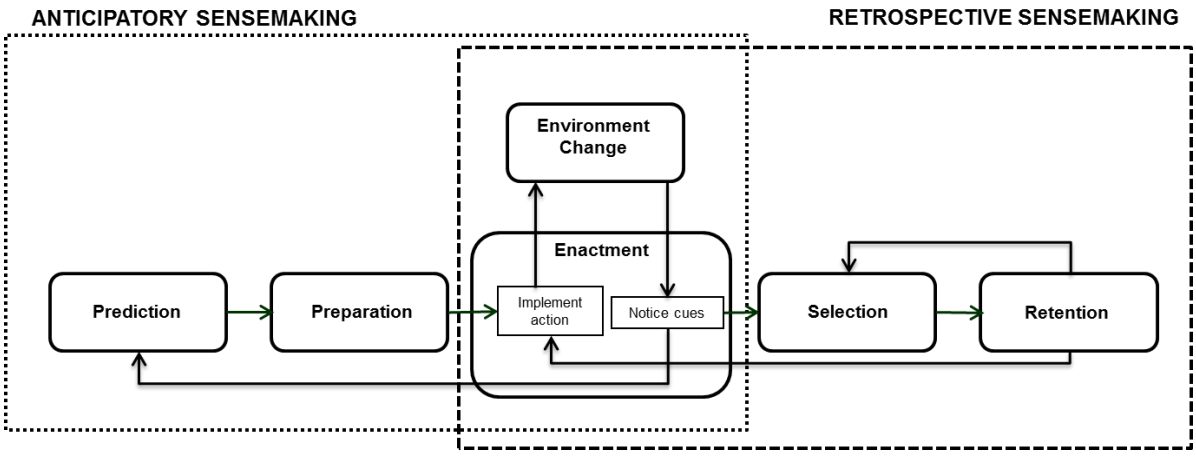

Figure 3 – Model of anticipatory and retrospective sensemaking processes during unfolding organizational crises

2.8 Research Gap and Question

As previously stated in section 2.2, the increasing frequency, severity and types of crises mean that an organization's capability to respond during a crisis has become an important item on the executive agenda (Cockram and Van Den Heuvel, 2012). Research on sensemaking during unfolding organizational crises has identified retrospective action-meaning creation processes (Table 2, process SP1, page 43) in which actors respond to change in their environment to give meaning to what has happened, thus reducing uncertainty and enabling action (e.g. Weick, 1988, 1993). In addition, research on the management of foreseeable but unexpected events has identified two interpretative forms of retrospective sensemaking processes through which actors can prepare for foreseeable but unexpected events that may interrupt their daily work. The first is a retrospective future-perfect-thinking process through which actors envision possible future scenarios and define contingency plans that can be implemented if and when a scenario occurs (Hayes and Birch, 2009; Gephart, Topal and Zhang, 2010; Van Den Heuvel, Alison and Powel, 2014) (Table 2, process SP2, page 43). The second is a retrospective sensemaking process in which actors utilise existing interpretative meaning structures such as organizational roles, rules and procedures (Bechky and Okhuysen, 2011; Weick, 1993) to make sense of changes in their environment in order to regularly manage the unexpected when it occurs (Patriotta, 2003; Bechky and

Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015) (Table 2, process SP3, page 43). However as Weick (1993) points out, such structures can breakdown during unfolding crises and an over-reliance on these structures, including contingency plans, can lead to problems of entrainment or normalization where the subtle cues in the environment are ignored or discounted leading to an escalation in the situation.

Sensemaking is predominately viewed as a retrospective past-oriented process (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015). However, the view that sensemaking only occurs as a past-oriented process has been challenged with a future-oriented form of sensemaking being identified in situations of intentional organizational change. Research in the context of strategic change, new product development and organizational change, has identified a future-oriented prospective sensemaking processes (Table 2, process SP4, page 43) that focuses on the creation and elaboration of shared views of potential futures (Gioia and Chittipeddi, 1991; Gioia *et al*., 1994; Gioia, Corley and Fabbri, 2002; MacKay, 2009; Gephart, Topal and Zhang, 2010; Stigliani and Ravasi, 2012; Kaplan and Orlikowski, 2013). From the post-Weickian perspective, this form of prospective sensemaking is viewed as being predominately a future-oriented process (Table 2, process SP5, page 43) that also incorporates the past and present temporal dimensions when actors rethink the past and reconsider present concerns in the creation of envisioned desired futures (Gephart, Topal and Zhang, 2010; Wiebe, 2010; Kaplan and Orlikowski, 2013; Rosness et al., 2016). However, these interpretative forms of sensemaking has been identified in the situations where there is time available to articulate and elaborate the tentative interpretations of the possible future events (Stigliani and Ravasi, 2012), rather than the time constrained situations that occur during an unfolding organizational crisis. The topic of future-oriented sensemaking remains an on-going debate in the sensemaking literature (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015). Recently, Klein, Snowden and Pin (2007, 2011) have proposed anticipatory sensemaking as a future-oriented form of sensemaking (Table 2, process SP6, page 43) that can occur during unfolding crises when actors recognise and prepare in the present

to avert a predicted threat. However there is a paucity of empirical studies on anticipatory sensemaking, in part perhaps because this form of sensemaking has only been proposed relatively recently. The study of anticipatory sensemaking during unfolding crises is relevant as an important value of anticipatory sensemaking is that it functions as 'an early warning system' (Klein, Snowden and Pin, 2011, p. 3) that there is trouble on the horizon by identifying a future threat as a crisis unfolds, thus enabling actors to take action in an attempt to avert the threat before it occurs (Klein, Snowden and Pin, 2007, 2011; Johns, 2011). The study of anticipatory sensemaking as a future-oriented process affords the opportunity for new research contributions that can challenge the key ontological assumption about sensemaking as a retrospective process (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015). This research seeks to make a contribution by clarifying the forms and temporal orientation of the sensemaking processes during unfolding organizational crises, and how these sensemaking processes interact. As a result, the research question to be answered by this study is: ***What are the anticipatory and retrospective sensemaking processes during unfolding organizational crises and how do these processes interact?***

Table 2 – Temporal orientation of the sensemaking processes identified in the sensemaking literature

Ref.	Form of Sensemaking Process	Temporal Orientation	Focus	Description	Stream of sensemaking literature
SP1	Retrospective sensemaking	Past-oriented	Interpretation and action	Retrospective diagnostic action-meaning creation processes in which actors respond to change in their environment to give meaning to what has happened, thus reducing uncertainty and enabling action (e.g. Weick, 1988, 1993).	Crisis sensemaking
SP2	Retrospective sensemaking through future-perfect-thinking (also referred to as prospective sensemaking)	Past-oriented	Interpretation and elaboration	Retrospective future-perfect-thinking process through which actors envision possible future scenarios and define contingency plans that can be implemented if and when a scenario occurs (Hayes and Birch, 2009; Gephart, Topal and Zhang, 2010; Van Den Heuvel, Alison and Powel, 2014).	Sensemaking in the management of foreseeable but unexpected events, and during intentional organizational change
SP3	Retrospective sensemaking that utilises shared meaning structures	Past-oriented	Interpretation and action	Retrospective sensemaking process in which actors utilise existing interpretative shared meaning structures such as organizational roles, rules and procedures (Bechky and Okhuysen, 2011; Weick, 1993) to make sense of changes in their environment in order to regularly manage the unexpected when it occurs (Patriotta, 2003; Bechky and Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015).	Sensemaking in the management of foreseeable but unexpected events
SP4	Future-oriented sensemaking (also referred to as prospective sensemaking)	Future-oriented	Interpretation and elaboration	Future-oriented prospective sensemaking processes that focuses on the creation and elaboration of shared views of potential futures (Gioia and Chittipeddi, 1991; Gioia *et al*., 1994; Gioia, Corley and Fabbri, 2002; MacKay, 2009; Gephart, Topal and Zhang, 2010; Stigliani and Ravasi, 2012; Kaplan and Orlikowski, 2013).	Sensemaking during intentional organizational change
SP5	Future-oriented sensemaking (also referred to as prospective sensemaking)	Predominately future-oriented, but incorporates all three temporal dimensions of past, present and future.	Interpretation and elaboration	From the post-Weickian perspective, this form of prospective sensemaking is viewed as being predominately a future-oriented process that also incorporates the past and present temporal dimensions when actors rethink the past and reconsider present concerns in the creation of envisioned desired futures (Gephart, Topal and Zhang, 2010; Wiebe, 2010; Kaplan and Orlikowski, 2013; Rosness et al., 2016).	Sensemaking during intentional organizational change
SP6	Anticipatory sensemaking	Future-oriented	Interpretation and action	Anticipatory sensemaking is a future-oriented process that can occur during unfolding crises when actors recognise and prepare in the present to avert a predicted threat (Klein, Snowden and Pin, 2007, 2011; McLennan, Elliot and Holgate, 2009).	Sensemaking in organizations

2.9 Chapter Summary

This chapter has sought to locate the research problem within the extant organizational crisis and sensemaking literatures thus enabling the identification of the specific research gap and question for this study. The retrospective sensemaking processes identified during unfolding crises were described along with the model of retrospective sensemaking that was synthesised from the literature. Next the temporal orientation of sensemaking was considered, as this is a key area of divergence in the literature. Then the retrospective sensemaking processes identified in the management of foreseeable but unexpected events were described, before considering anticipatory sensemaking which is a future-oriented process that can occur during an unfolding crisis. Finally, a model of anticipatory and retrospective sensemaking during unfolding crises was synthesised and the research question for this study was presented. The next chapter, Chapter 3, will provide the rationale for the qualitative study that adopts a retroductive research strategy. In addition, the data collection and data analysis processes are detailed. Finally, a description is provided of the twenty-two crises that were identified in the empirical data.

3 RESEARCH METHODOLOGY

3.1 Chapter Overview

Chapter 1 introduced the research problem, while chapter 2 located the research problem within the extant literature thus enabling the identification of the specific research gap and question for this study. This chapter presents the research paradigm, along with the research methodology, methods and the design used to address the research question. First, section 3.2 presents the ontological and epistemological foundations for this research, and describes the critical realist philosophical perspective that informed the empirical study. Then, section 3.3 provides the rationale for a retroductive research strategy, while section 3.4 presents the research methodology, method and the research design. Section 3.5 then describes the data collection method which utilised the critical incident technique, while section 3.6 details the analysis process that involved a narrative strategy, followed by visual mapping and process categorisation.

3.2 Research Paradigm

A fundamental precondition for designing a research project is to first situate the research within the context of an appropriate philosophical framework or research paradigm in order for the research to be rigorous (Blaikie, 2007; Easterby-Smith *et al*., 2008; Denzin and Lincoln, 2011) and to yield high quality, defensible findings (Chia, 2002). This section details the philosophical framework and the underlying ontology and epistemology for this empirical study. A researcher is influenced by their life experiences, expectations and assumptions, which include their ontological perspective or way of looking at the world, and their epistemological assumptions about how the world can be understood (Hatch and Cunliffe, 2006; Easterby-Smith *et al*., 2008). As such, a researcher should make their ontological and epistemological perspectives explicit in any study, as both will influence the questions that the researcher asks, the choices and interpretations they make at every stage in the research process, and how they justify their research to others (Blaikie, 2007). In this

study, the researcher's ontological and epistemological perspectives are made explicit using the categorisation presented by Blaikie (2007), which is based on a variety of sources, in particular the work of Bhaskar (1978, 1979, 1986).

Philosophical perspectives refer to the underlying assumptions about the nature of the world, assumptions that will unconsciously influence the research and the theory development based on that research. The ontological perspective adopted in this study is that of a depth realist (Blaikie, 2007). This perspective views that reality exists independently of human conception and perception, and consists of three interrelated domains: the empirical domain, the actual domain and the real domain (Bhaskar, 2008; Archer, Lawson and Norrie, 2013). A detailed description of these three interrelated domains is provided below in section 3.2.1. The epistemological perspective adopted in this study is that of a neo-realist (Blaikie, 2007) in seeking to identify the structures and mechanisms that produce the patterns or relationships which are observable in the social world. From a neo-realist perspective the aim of social research is to "explain observable phenomena by reference to underlying structures and mechanisms. This involves building hypothetical models of the structures and/or mechanisms such that, if they were to exist and act in the postulated way, they would account for the phenomenon being examined" (Blaikie, 2007, p. 181). Consistent with the ontology of a depth realist and a neo-realist epistemology, the philosophical perspective of a critical realist "is ultimately a search for generative structures and mechanisms" (Blaikie, 2007, p. 147). The following section describes this critical realist perspective.

3.2.1 Critical Realism

Critical realism is a relatively new philosophical perspective (Sayer, 2000; Dobson, 2001; Blundel, 2007; Easton, 2010), which has been used across many disciplines such as economics, sociology, criminology, geography, religious studies, psychiatry, social work, history, ecology, environmental studies, information studies, media studies and interdisciplinary science studies (Blundel, 2007; Easton, 2010). Critical realism is heavily ontologically based, giving priority to ontology over epistemology (Blaikie, 2007). It is based on the

work of Bhaskar (1986), which has been expanded by several authors such as Archer, Lawson and Norrie (2013). Bhaskar's (1989) concept of critical realism takes the ontological perspective of a depth realist in viewing reality as consisting of three overlapping domains (Figure 4); the empirical, actual and real domains.

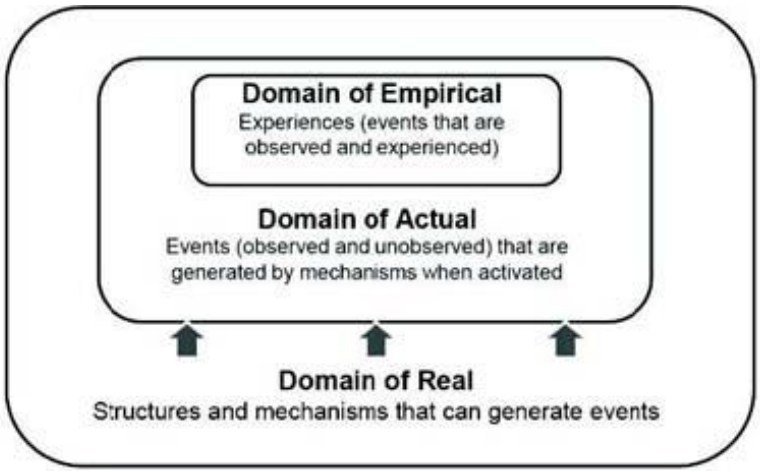

Figure 4 – Critical realist perspective: domains of reality
(Mingers, 2004)

The empirical domain consists of experiences based on observed *events* that are the external, and on visible behaviours of *entities* such as people, organizations or systems. These entities are the basic theoretical building blocks for critical realist explanation (Easton, 2010). The actual domain consists of events which exist whether or not they are observed, while the domain of the real consists of *structures* and generative *mechanisms* that produce the events. As shown in Table 3, structures are defined as "a set of internally related objects or practices" (Sayer, 1992, p. 92). Entities are organized into structures such as tribesmen within tribes, or people organized into departments within organizations. Structures can also take the form of social practices such as etiquette, or organizational practices such as roles, rules, processes and procedures. Mechanisms are "nothing other than the ways of acting of things" (Bhaskar, 2008. p. 3) that have causal powers which under specific conditions generate or lead to an event happening (Easton, 2010). The term mechanism is

problematic as it implies clear structure and invariance in operation. However as Easton (2010) clarifies, the term mechanism should not be taken literally, but refers to the underlying generative processes that give rise to an event. The real domain consists of these hidden unobservable or invisible structures and mechanisms, for example, societal and organizational cultures (Blaikie, 2007).

Table 3 – Critical realist terms

Critical Realist Term	Explanation
Entity	Entities are objects such as organizations, people, systems, relationships, attitudes or resources. They are the basic theoretical building blocks for critical realist explanation (Easton, 2010).
Events	Events are the external and visible behaviours of entities such as people, systems and things (Easton, 2010).
Structures	Structures are "a set of internally related objects or practices" (Sayer, 1992, p.92). For example objects that are arranged into structures such as people, within departments within organizations, or tribesmen within tribes. Structures can also take the form of practices. For example social practices such as etiquette, or organizational practices such as roles, rules, processes and procedures.
Mechanisms	Mechanisms have causal powers that under specific conditions generate or lead to the event happening (Danermark, Ekstrom, Jakobsen and Karlssonal, 2001; Easton, 2010). For example societal and organizational culture (Blaikie, 2007).

Critical realists seek to discover patterns of events, and the deeper underlying structures and mechanisms that create these events (Blaikie, 2007). Bhaskar (1989) argued that an event may arise from multiple underlying mechanisms that counteract each other, and so it is necessary to assume that events are independent of the underlying mechanisms and structures. There is a dynamic and synergistic interplay between the structures, mechanisms and events that lead to the emergence of new phenomena, which cannot then with certainty be reduced into the originating generative mechanisms and structures. As such, the task for a critical realist is to identify the mechanisms underlying the phenomenon of interest, in order to describe and explain how the interplay of

these mechanisms may give rise to the phenomenon (Danermark *et al*., 2001) although this cannot be achieved with certainty. A critical realist study involves an element of interpretation, as meaning is not measured or counted, but it has to be understood (Sayer, 2000). The critical realist view considers that knowledge about the external reality can be obtained, but that this knowledge is fallible (Easton, 2010). As such the task of a critical realist researcher is to improve understanding of reality rather than seek to provide a definitive truth (Blaikie, 2007). Critical realist studies are based on fallible observation and interpretation. While such studies can lead to a deeper understanding of reality, they are unlikely to lead to a full understanding of any social situation (Easton, 2010).

The aim of this research study is to contribute to knowledge on the forms, temporal orientation and interaction of sensemaking processes during unfolding organizational crises. However, it is acknowledged that any knowledge based on the findings of this study is fallible and situated in the context of the crises described, and as such this research is subject to the limitations that are detailed in the concluding chapter of this thesis (chapter 6, section 6.6, page 217). Table 4 shows the entities, events, structures and mechanisms of interest in this study. The entities are the actors who engage in the events which are the sensemaking processes during unfolding crises. The structures and mechanisms of interest are the underlying sensemaking structures and processes that actors engage in during unfolding organizational crises.

Table 4 – Critical realist terms applied to this research study

Critical Realist Term	Application in this study
Entity	Actors who engage in sensemaking processes.
Events	The sensemaking processes during unfolding crises.
Structures	Any structure that is involved in the sensemaking processes during unfolding crises.
Mechanisms	Any mechanisms that generated the sensemaking processes during unfolding crises.

The use of critical realism as a philosophical lens in this research is apparent in the design of the research study which is detailed in the section 3.4 in this chapter. In line with a critical realist approach, this study makes use of a theoretical model in the form of the model of anticipatory and retrospective sensemaking that was synthesised from the sensemaking literature. This model is used to help explain the pattern of sensemaking processes during unfolding crises (see section 5.3). The following section describes the retroductive research strategy adopted in this research, and as will be shown, the theoretical model was employed during the deductive element of the retroductive research strategy.

3.3 Retroductive Research Strategy

Blaikie (2007) states that in order to answer a research question and generate new knowledge about a social phenomenon, a researcher needs to adopt one of the four research strategies for their study: inductive, deductive, retroductive or abductive. These research strategies are based on different ontological and epistemological perspectives, and they take alternative approaches to answering the research questions with each seeking to generate new knowledge in a distinct way. An abductive strategy differs to the other three strategies in that it involves entering into the world of those being researched to seek an understanding of how they conceptualise and give meaning to their social world (Blaikie, 2007). An inductive strategy moves from the data to theory with the aim being to establish universal generalisations, while a deductive strategy moves from theory to the data with the purpose being to test theories (Blaikie, 2007). A retroductive strategy involves both induction and deduction in that it moves from theory to data and then back to theory in an iterative process: “moving from conception of a phenomenon of interest to a conception of a different kind of thing (power, mechanism) that could have generated the given phenomenon” (Lawson, 1997, p. 236). While retroduction involves induction and deduction, its goals differ from these research strategies in that retroduction seeks to identify mechanisms that explain what may have caused particular events to occur. With a retrospective strategy, first deduction is used to identify

the phenomenon of interest (such as the sensemaking processes) to suggest the mechanism that may be at play and to provide links with previous research and literature. The assumption is made that a mechanism exists and the task is to then "try to find out how this mechanism is empirically manifested" (Danermark, 2002, p. 8). Then the retroductive strategy uses induction to provide empirical event data to be explained, which explores whether the suggested mechanisms are evident in the empirical data, but also may provide evidence for other mechanisms or structures (Easton, 2010). As such, retroductive research is a process in which a theoretical model of the underlying mechanisms that produce the phenomenon of interest is first constructed (which in this study is the model of anticipatory and retrospective sensemaking), and then is empirically explored, with other mechanisms, structures and causal explanations being identified inductively (Blaikie, 2007; Easton, 2010). The retroductive research strategy (Table 5) adopts the depth realist ontology and neo-realism epistemology (Blaikie, 2007), and so this research strategy is coherent with both the critical realist perspective and the research question to be answered.

For a critical realist, methods are not dictated but should be appropriate to the particular study (Blaikie, 2007). Danermark (2002, p. 8) presents two approaches to critical realist research, one in which "[t]he task is to find the mechanisms that produce the actual phenomenon and to understand the interplay between them and how they shape the outcome", and the second approach is to assume that a particular mechanism exists and "to try to identify how this mechanism is empirically manifested". This study employs the second approach in which, based on the findings from the literature review, there is an assumption of the existence of sensemaking processes. The task then is to explore whether during unfolding crises, these sensemaking processes are evident in the empirical data while at the same time identifying the forms of sensemaking processes and whether there are structures and generative mechanisms which give rise to these processes. This research is designed to identify multiple examples of unfolding crises rather than a single unfolding crisis that is described in depth. The purpose of identifying multiple examples is

to enable the sensemaking processes to be compared and contrasted, and to explore any patterns to the processes which can then be categorised. Section 3.4 describes the research methodology, methods and techniques that are adopted in this study, and provides the rational for the research approach that is adopted. The section starts by considering the two main forms of research design, quantitative and qualitative, before providing the rational for the selection of a qualitative approach for this study.

Table 5 – Retroductive research strategy

Retroductive Research Strategy		
Aim:	To explore the forms and temporal orientation of the sensemaking processes during unfolding crises and how these sensemaking processes interact.	
Ontology:	Depth realist	
Epistemology:	Neo-realism	
Research Approach:	<u>Retroductive steps</u> 1. Create a theoretical model of the underlying processes that produce the phenomenon of interest.	<u>Steps as applied in this study</u> 1. The integrative model of anticipatory and retrospective sensemaking processes during unfolding crises.
	2. Then empirically explore the model.	2. Empirical study in which data was gathered on the sensemaking processes during unfolding organizational crises.
	3. Finally, establish which mechanisms provide the best explanation in that context.	3. Identify the forms of sensemaking processes during unfolding organizational crises.

(adapted from Blaikie (2007, p.68))

3.4 Research Methodology, Method and Design

The choice of whether to carry out a quantitative or qualitative research study depends on the phenomenon of interest and the research questions (Partington, 2002). Quantitative research involves theory testing in which

variables are measured with numbers and analysed with statistics in order to determine if the theory explains or predicts the phenomenon of interest (Creswell, 1994; Partington, 2002; Yilmaz, 2013). Quantitative studies tend to focus on “outcomes, generalisation, prediction, and cause-effect relationships through deductive reasoning” (Yilmaz, 2013, p. 313). Easterby-Smith *et al*. (2008) point out that quantitative methods can have the advantage of being quick and economical to conduct, and can be of considerable relevance to policy decisions when statistics are aggregated to form large samples. However they have a weakness in not being very effective for understanding processes or the significance people attach to actions. While, quantitative research is characterised by technical expertise, qualitative research is considered to be more of an ‘art’ form (Partington, 2002, p. 115). Qualitative research aims to describe and understand phenomena by capturing and communicating participants’ experiences in their own words (Partington, 2002; Yilmaz, 2013). The studies are concerned with process, context, interpretation, meaning or understanding (Easterby-Smith *et al*., 2008; Yilmaz, 2013). They are suited to contexts that are complex, messy, and causally ambiguous, where there is little extant knowledge (Partington, 2002). However, a weakness of qualitative studies is that data collection can take a great deal of time and resources, and interpretation of data may be difficult and relies on the skills of the researcher (Easterby-Smith *et al*., 2008).

The phenomenon of interest in this study is the collective sensemaking processes in the context of unfolding organizational crises, and the research question being asked is: ***What are the anticipatory and retrospective sensemaking processes during unfolding organizational crises and how do these processes interact?*** As such, a qualitative research design was adopted as a suitable methodology to achieve the aim of this research study which is to clarifying the forms, temporal orientation and interactions of the sensemaking processes during unfolding organizational crises. A qualitative study provides a more in-depth understanding of the sensemaking processes involved in an unfolding crisis from the perspective of the participants (Partington, 2002; Denzin and Lincoln, 2011). Qualitative research is associated

with research question that require exploration of data that is collected in the form of words or observations as opposed to numbers, and is aimed at description, comparison or explanation (Miles and Huberman, 1994; Johnson and Harris, 2002). The most common means of data collection in qualitative management studies is through interviews, non-participant observation or records such as company documents, journals or diaries (Partington, 2002). As detailed in the following sections, the research method adopted in this study is the critical incident technique with semi-structured interviews as the main data collection method. The following section details the critical incident technique, before section 3.5 (page 63) describes the data collection process.

3.4.1 Critical Incident Technique

The critical incident technique has its roots in organizational psychology, and was developed during the 1940s as part of the US Army Air Force's work for selecting and classifying aircrews (Flanagan, 1954). The technique, its history and how it has been used as a research method are presented by Flanagan in his seminal 1954 article. Originally the technique was used for several purposes: to identify the criteria for job performance; for job design; for equipment design; to define operating procedures; to identify motivation and leadership attitudes; and for counselling and psychotherapy. The critical incident technique was devised as a means to gather and analyse objective, reliable information about specific activities which would provide findings to underpin practical problem solving in areas such as employee appraisal and performance enhancement (Hughes, Williamson and Lloyd, 2007). In the critical incident technique, an *incident* is defined as "significant instances of a specific activity" (Hughes, Williamson and Lloyd, 2007, p. 49) which to be critical "must occur in a situation where the purpose or intent of the act seems fairly clear to the observer and where its consequences are sufficiently definite to leave little doubt concerning its effect" (Flanagan, 1954, p. 327). It is a method for collecting and analysing contextualised data that reflect real-life experiences about human activities (Hughes, Williamson and Lloyd, 2007), and so is an appropriate research method to employ in this study to focus the data gathering

on the sensemaking processes during unfolding organizational crises. A case study approach was considered as an alternative research approach to the critical incident technique. Easterby-Smith *et al*. (2008) describe several different case study methods based on different ontologies; Yin (realist ontology), Eisenhardt (realitivist ontology) and Stake (constructionist ontology). Consistent with the depth realist ontology, Yin's case study approach involves theory testing and up-front research design (Easterby-Smith *et al*., 2008; Yin, 2009). However, the case study approach was dismissed on the basis that the approach is appropriate for research where the cases are known up-front during the research design (Creswell, 1994; Yin, 2009). In this study, the crises were not known prior to their identification during the interviews with the participants, and so the case study approach was rejected in favour of the critical incident technique. Flanagan (1954) defined the five steps involved in the critical incident technique as shown in Table 6. The following sections describe each step and how the step was carried out during this study.

Table 6 – Five steps of the critical incident technique

Five steps of the Critical Incident Technique	
Step 1	Establish the general aims
Step 2	Establish the specifications
Step 3	Collect the data
Step 4	Analyse the data
Step 5	Interpret and report the data

3.4.2 Establish the General Aims for the Study

The first step of the critical incident technique is to create a functional description which states the specific activity to be studied along with the aim of the activity so that success or effectiveness of the activity can be assessed against this stated aim. Defining this functional description is seen as a pre-condition before any other aspects of the study can proceed. "In its simplest

form, the functional description of an activity specifies precisely what it is necessary to do and not to do if participation in the activity is to be judged successful or effective" (Flanagan, 1954, p. 337). The aim of this research is to explore the forms, temporal orientation and interaction of sensemaking processes during unfolding organizational crises. As such, as shown in Table 7 below, the specific activity or phenomenon of interest in this research are the sensemaking processes, while the unit of analysis is an unfolding crisis, and the aim of the specific activity is to make sense of the unfolding organizational crisis to enable action.

Table 7 – Functional description of the activity to be studied

Functional element	**Description**
Specific activity or phenomenon of interest	The collective sensemaking processes.
Aim of the activity	To make sense of the unfolding organizational crisis to enable action.
Unit of analysis	An unfolding organizational crisis.

3.4.3 Establish Plans and Specifications for the Study

The purpose of the second step of the critical incident technique is two-fold: to specify the target participants; and to specify the approach for data collection to ensure objectivity and consistency in the approach used. The target participants for this study were people who had first-hand experience of taking action during an unfolding organizational crisis. In order to target such people, the participants were identified on the basis that they could be called on to respond if a crisis arose within their organization or they worked in a time constrained situation such as on projects delivering key new business services or technical products where a crisis may arise during the project. However, the participants' day-to-day roles were operational or project related and were not primarily focused on responding to crises. The participant sample was not pre-specified prior to the data collection, as additional participants who fitted the target group

were identified after the data collection and analysis had commenced. Twenty participants were interviewed from the fourteen organizations, across nine different industries and three continents (Table 8). This sample size of twenty participants is comparable to other studies of activities during organizational crisis (Eisenhardt, 1989; Langley, 1990; Meszaros, 1999; Hale, Hale and Dulek, 2006). The nine industries were hospitality, engineering, construction, finance, utility, information technology (IT), energy and government. Five of the organizations were subsidiaries of large multi-nationals, three organizations operated in the UK only, two were based in Africa, one was UK based but operated globally, while a further three were public organizations that operated world-wide. The interviewees had been with their organization for between six months and thirty years, and were managers, senior managers or directors.

Table 8 – Research participants

Interviewee	Role	Industry	Duration at their organization
1	Director	Hospitality	10 years
2	Director	Hospitality	over 20 years
3	Senior Manager	Hospitality	over 20 years
4	Senior Manager	Engineering	over 20 years
5	Senior Manager	Engineering	15 years
6	Senior Manager	Construction	7 years
7	Senior Manager	Construction	7 years
8	Senior Manager	Finance	10 months
9	Director	Utility	over 30 years
10	Manager	IT	6 months
11	Director	Utility	over 10 years
12	Senior Manager	Environment	over 6 months
13	Senior Manager	Environment	15 years
14	Manager	Energy	over 6 months
15	Manager	Energy	over 5 years
16	Senior Manager	Government	over 3 years
17	Senior Manager	IT	over 4 years
18	Manager	Energy	3 years
19	Manager	Government	6 years
20	Manager	IT	over 6 months

To specify the approach for the data collection, three elements from the critical incident technique are used:

- **Situation** - this refers to the research participants and location for the data collection i.e. who is interviewed and where the interviews take place.
- **Relevance** - this relates to the types of critical incident that the participant may be involved in, which are relevant to the study and therefore worthy of being recorded.
- **Extent** - this refers to the criteria for selecting the critical incidents that will then be analysed from the empirical data.

The situation and relevance for each interviewee in this research study is shown in Table 9. As an example, Interviewee 7 worked as a member of their organization's operations team. Interviewee 7 could be called upon if a critical incident arose within their organization. The location for the interview was a meeting room at interviewee's workplace at a pre-agreed time.

To specify the extent for the data collection means specifying the selection criteria to be used. For this study the activity being researched is the sensemaking processes during unfolding organizational crises, and the two criteria used to select examples of unfolding crises from the empirical data are that:

i. The event was a crisis, that is: a high-impact event that posed a threat to the goals or survival of the organization; involved uncertainty about the impact and means of resolution; required an urgent response to minimize the impact; and included activities that were not planned prior to the event.
ii. The interviewee was involved in the activities to minimise the impact of the crisis i.e. they had first-hand experience of the crisis.

Table 9 – Critical Incident Technique - situation and relevance for each participant

Who	Situation	Relevance
Interviewee 1	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a member of the operations team who could be called upon if a critical incident arose within their organization.	**Incident**: Interviewee may have experienced an unfolding critical incident that posed a threat to the organization and involved collective sensemaking processes.
Interviewee 2	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a member of the operations team who could be called upon if a critical incident arose within their organization.	**Incident**: Interviewee may have experienced an unfolding critical incident that posed a threat to the organization and involved collective sensemaking processes.
Interviewee 3	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a member of the operations team who could be called upon if a critical incident arose within their organization.	**Incident**: Interviewee may have experienced an unfolding critical incident that posed a threat to the organization and involved collective sensemaking processes.
Interviewee 4	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 5	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.

Table 9 – Critical Incident Technique - situation and relevance for each participant (continued)

Who	Situation	Relevance
Interviewee 6	**Location**: Interview via telephone at pre-agreed meeting time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 7	**Location**: Interview via telephone at pre-agreed meeting time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 8	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 9	**Location:** Interview via telephone at pre-agreed meeting time. **Participant**: Interviewee was a member of the operations team who could be called upon if a critical incident arose within their organization.	**Incident**: Interviewee may have experienced an unfolding critical incident that posed a threat to the organization and involved collective sensemaking processes.
Interviewee 10	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.

Table 9 – Critical Incident Technique - situation and relevance for each participant (continued)

Who	Situation	Relevance
Interviewee 11	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 12	**Location:** Interview via Skype at pre-agreed meeting time. **Participant**: Interviewee was a member of the operations team who could be called upon if a critical incident arose within their organization.	**Incident**: Interviewee may have experienced an unfolding critical incident that posed a threat to the organization and involved collective sensemaking processes.
Interviewee 13	**Location**: Interview via telephone at pre-agreed meeting time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 14	**Location**: Interview via telephone at pre-agreed meeting time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 15	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.

Table 9 – Critical Incident Technique - situation and relevance for each participant (continued)

Who	Situation	Relevance
Interviewee 16	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 17	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 18	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 19	**Location**: Meeting room at interviewee's workplace at a pre-agreed time. **Participant**: Interviewee was a project team member who could be called upon if a critical issue arose on the project.	**Incident**: Interviewee may have experienced an unfolding project issue that posed a threat to the project and involved collective sensemaking processes.
Interviewee 20	**Location:** Interview via Skype at pre-agreed meeting time. **Participant**: Interviewee was a member of the operations team who could be called upon if a critical incident arose within their organization.	**Incident**: Interviewee may have experienced an unfolding critical incident that posed a threat to the organization and involved collective sensemaking processes.

3.5 Data Collection

The third critical incident technique step is to plan the data collection method. This can be by direct observation or through interviews where participants recollect critical incidents in which they were involved. Flanagan stated that "[t]he critical incident technique is frequently used to collect data on observations previously made which are reported from memory" (1954, p. 341). He describes four forms that this data collection can take: individual interviews; group interviews; questionnaires; and data from records. Over time as the critical incident technique has been used by researchers, the data collection methods have been expanded to include different variations of these four data collection methods, for example focus groups, surveys, performance records, and work diaries (Marrelli, 2005). However as Butterfield, Borgen, Amundson and Maglio (2005) identified in their review of studies using the critical incident technique, the emphasis on how the data is collected has shifted from direct observation to retrospective self-report by those who have experienced the event. A common approach used is interviews in which the interviewer uses open questions to ask the interviewee to orally recount an example of a time the interviewee faced a particular situation (Marrelli, 2005). The chosen method for data collection in this study is semi-structured interviews as this form of interview provides an open and flexible way in which to gather data on particular types of experiences, enabling the interviewees to describe the events they have experienced in their own words. In addition, semi-structured interviews allow the researcher to probe areas of specific interest and in the case of this research, to guide the interviewee to elaborate on organizational crises that involved activities which were not planned prior to the crisis.

Hughes, Williamson and Lloyd (2007) emphasised the importance of informing the participants about the purpose of the study and the preservation of their anonymity. In addition, for data collection through interviews, Hughes, Williamson and Lloyd (2007) also recommend: (1) the careful wording of questions and the use of pilot interviews to minimize ambiguity and bias; (2) participants are requested to focus on incidents that they have recently taken

part in or observed first-hand to enable full and accurate responses; (3) participants are enabled to describe one or several incidents that represent positive and/or negative aspects of the activity being studied; and (4) participants are encouraged to provide factual reports rather than interpretations of what happened.

The critical incident technique is a method for collecting and analysing contextualised data that reflect real-life experiences about human activities (Hughes, Williamson and Lloyd, 2007). As such the interview protocol was designed to enable the interviewees to describe their real-life experiences of responding to organizational crises. The interview protocol (see Appendix A – Interview Protocol) consists of an introduction which explains the format of the interview, followed by specific questions on the interviewee's role and length of time at the organization. Next the primary questions ask the interviewee to describe a crisis that they have experienced. The interview questions were written with the aim of minimising ambiguity and bias (Hughes, Williamson and Lloyd, 2007), and were piloted during the first three interviews following which only minor amendments were made. In line with the recommendations made by Hughes, Williamson and Lloyd (2007), the interviewees were informed that the purpose of the interview was to gather information about the activities carried out during an unfolding crisis.

The interviews took place during the period November 2012 to July 2014. They were conducted as face-to-face interviews, except where there were geographical or diary constraints, when the interviews were conducted as telephone or Skype interviews. The interviews involved a single interviewee, with the exception of one interview where there were two interviewees at their specific request. The interviewees were asked to describe an organizational crisis which had not proceeded as expected, where they had been one of the organizational members who responded to the crisis (see Appendix A – Interview Protocol). The use of interviews in which participants are asked to retrospectively recount an example of a time they faced a particular situation, is a frequently used approach with the critical incident technique (Flanagan, 1954;

Marrelli, 2005). However, the use of this approach may have introduced error, embellishment or post hoc rationalisation in how the participants recalled and described the sensemaking processes during the unfolding crises. While such bias cannot be totally eliminated, to try to counter this and to minimise bias as recommended by Hughes, Williamson and Lloyd (2007), the interviewees were encouraged to provide factual descriptions rather than interpretations of what had happened. They were asked to recount what had happened during the unfolding crisis, who had been involved and what activities people had carried out. If an interviewee began to offer views of what they thought could or should have happened, the researcher asked a question to prompt them to provide factual details of what had happened during the unfolding crisis. The interview extract below is an example of where the interviewee offered interpretation and opinion rather than a specific example that had occurred in their experience. The interviewer asked a question to prompt the interviewee for a specific example. This is in line with the critical incident technique recommendation to request participants to focus on incidents in which they had been involved.

> *[Interviewee]: "So it is again, for the Agency's perspective I wonder how many people have actually worked on the supplier commercial side; in other words building up the relationship and engagement management with their suppliers. And a very good example is how they treat [other organization]. There is a contract therefore they run to the contract and the Agency should be a little more flexible I believe."*
>
> *[Interviewer]: "Can I ask you about an issue which has occurred in your experience. A problem that has come up that has been the most challenging to fix or resolve, and what that looked like."*

Section 6.6.3 (page 219) provides a further example where the interviewee offered general information rather than a specific example that had occurred in their experience and the interviewer asked a question to prompt the interviewee for a specific example. In addition, to corroborate the reports of the crises provided by the interviewees, secondary data was obtained where available from the organization or from media reports on the crisis. One of the crises

(Crisis 14) was described by two of the interviewees, and as can be seen by the extracts below from the two interviews, there is consistency in how the interviewees described what happened during the crisis. Table 10 provides the events that were described along with the supporting quotes from each of the interviews.

As recounted by Interviewee 3:

> *"[W]e had a major flood in our boiler house, got the call 1 o'clock in the morning, we'd had what's called a bellow's connector on the heating pipe which had unexpectedly burst and because the water is 82 degrees because it's our main primary heating system you get a lot of steam, potentially it could have evacuated us, the shift engineer on duty did a good job in as much as he managed to isolate the panel and warn people before we went into evacuation so I get the call 1 o'clock in the morning now with the director of engineering he's obviously on the way and we're confronted with a situation which wasn't life threatening, it was more business failing, we'd lost the entire building's primary heating water down the drain so there was no heating in the building and there was no hot water, the hot water is probably the more critical one of the two from the point of view guests waking in the morning trying to shower, bath and finding oh there was cold water so we set to putting the fix in, making good the repair albeit it temporary, refill the systems, re-commission them, had to bring them back on one at a time and by probably round about 7.30/8 o'clock that morning we got the building heating back up and running, we got the hot water systems back up and running, there wasn't one guest complaint, guests were completely unaware, staff were aware, the senior staff but there was no – guests would not have known it had happened, probably a little bit of luck there as well, timing wise if it had gone much past the 8 o'clock on a Saturday morning, luckily it was Saturday rather than a week day when many business travellers are getting up a bit early for their meetings, I think that may have been the saving grace because that extra half an hour or hour in bed for most people on a Saturday they wouldn't have had any hot water."*

As recounted by Interviewee 2:

"[A] major flood in the boiler house which is an example I'm going to give you where it happened earlier on in the year, we had one of our connectors fail, it was 2 o'clock in the morning and we had no hot water until 6 o'clock so my task was to get the hot water back by 6 o'clock and we never had a single guest complaint because we got the hot water back before people got up for breakfast. We didn't have a single guest complaint because the hotel was full, we had one or two of people getting early flights but it was minimal compared to – so that's a major crisis that was a 2 o'clock in the morning event, engineer on site on his own, resolved it, made it safe, made the calls to myself, my number two, we come in and we get the system going again."

"[L]ets look at the flood that happened in February of this year, we had an engineer on, we have a shift engineer here 24 hours a day … and this is retrospective and it's not anecdotal … it was hot water so there was a lot of steam, a major breakage in pipework of a major pipe so there was a lot of water flowing, a lot of electricity too, 3 o'clock in the morning which you're not the most alert … because steam, high pressure it's a little bit more dangerous than domestic hot water which we run at 60 degrees C, … we had smoke coming up through the ventilation system at the front of the hotel and it was reported so my initial thought was we had a fire in the basement and in fact we had the opposite we had water in the basement and it was the steam venting out, so the initial call came to me from the duty manager was we had a fire, we have smoke, this is the situation, so by the time I'm in the car driving down, I'm on the hands free, I speak to the engineer who's then isolated it … so it was just myself who came in with my number two, so when I got the call I live a distance away from here, my number two lives closer so it takes me 45 minutes in my car to drive here, he can be here in 20 minutes so he was first on site, he appraised me of the situation while I was on the motorway … and the fact that myself and my number two arrived that helped, that helped resolve the problem … our job at the time for the three of us was to make the building safe, get the hot water back on, check it and go at that time."

Table 10 – Comparison of two description of Crisis 14

Description	Interviewee 2	Interviewee 3
There was a major flood in their boiler house	*… major flood in the boiler house*	*… we had a major flood in our boiler house*
Cause of the flood	*… we had one of our connectors fail* *… a major breakage in pipework of a major pipe*	*… we'd had what's called a bellow's connector on the heating pipe which had unexpectedly burst*
There was a lot of steam	*… it was hot water so there was a lot of steam, a major breakage in pipework of a major pipe so there was a lot of water flowing, a lot of electricity too, 3 o'clock in the morning which you're not the most alert … because steam, high pressure it's a little bit more dangerous than domestic hot water which we run at 60 degrees C*	*the water is 82 degrees because it's our main primary heating system you get a lot of steam*
The shift engineer made the initial response to the crisis to avoid the hotel being evacuated	*… engineer on site on his own, resolved it, made it safe*	*… it could have evacuated us, the shift engineer on duty did a good job in as much as he managed to isolate the panel and warn people before we went into evacuation*
The two senior managers were called in the middle of the night	*… so that's a major crisis that was a 2 o'clock in the morning event* *… made the calls to myself, my number two, we come in and we get the system going again*	*… so I get the call 1 o'clock in the morning now with the director of engineering*

Table 10 – Comparison of two description of Crisis 14 (continued)

Description	Interviewee 2	Interviewee 3
The two senior managers drove to the hotel to get the water back on again and avoid the threat of guests getting up in the morning and not having hot water	*… so it was just myself who came in with my number two so when I got the call I live a distance away from here, my number two lives closer so it takes me 45 minutes in my car to drive here, he can be here in 20 minutes so he was first on site, he appraised me of the situation while I was on the motorway* *… and the fact that myself and my number two arrived that helped, that helped resolve the problem* *… our job at the time for the three of us was to make the building safe, get the hot water back on, check it and go at that time*	*… he's obviously on the way and we're confronted with a situation which wasn't life threatening, it was more business failing, we'd lost the entire building's primary heating water down the drain*
They needed to avoid an impact on the guests	*… so my task was to get the hot water back by 6 o'clock*	*… the hot water is probably the more critical one of the two from the point of view guests waking in the morning trying to shower, bath and finding oh there was cold water*
They worked together to restore the water. Both the water and the heating were restored	*… we got the hot water back before people got up for breakfast*	*… so we set to putting the fix in, making good the repair albeit it temporary, refill the systems, re-commission them, had to bring them back on one at a time*
Systems were back up and running by the morning	*… we come in and we get the system going again*	*… had to bring them back on one at a time and by probably round about 7.30/8 o'clock that morning we got the building heating back up and running, we got the hot water systems back up and running*

3.6 Data Analysis

The fourth step of the critical incident technique involves the analysis of the empirical data. Table 11 shows the data analysis process used in this study. First, the interview transcripts were read to identify the individual incidents described by the interviewees. Then these incidents were compared against the two selection criteria, and where they met the criteria they were identified as crises to be analysed further in this research. Next, a short narrative was prepared for each selected crisis based on the descriptions provided in the interview data. Following this, the crisis narratives were interpreted through a visual mapping technique in which the sensemaking processes were mapped and then compared to identify the patterns in the sensemaking processes and these patterns were then categorised. The remaining sections in this chapter will now describe the stages in this analysis process in more detail.

Table 11 – Data analysis stages

Data Analysis Stages (Descriptive and Interpretive)	
1	Critical incidents identified from the interview data.
2	Critical incidents analysed against the two selection criteria to identify each unfolding crisis that met the criteria.
3	Descriptive Analysis: Narrative prepared for each unfolding crisis.
4	Interpretive Analysis: Visual map prepared of the sensemaking processes involved during each unfolding crisis.
5	Interpretive Analysis: Visual maps compared to identify the pattern of sensemaking processes and these patterns where then categorised.

3.6.1 Crisis Identification based on the Selection Criteria

The initial stage of the analysis involved the identification of the critical incidents from the interview data. Each interview transcript was read to identify the different incidents that were described by the interviewees. In total forty separate incidents were identified. In the second stage of analysis the forty

incidents were checked against the two selection criteria (see section 3.4.3). Twenty-two of the incidents were selected, while eighteen incidents were excluded as they did not meet the criteria. Two incidents were excluded as the interviewee did not have first-hand experience of the crisis, and two further incidents were excluded as they were general descriptions of project issues rather than a crisis. Fourteen incidents were excluded as the interviewees described how a pre-defined response was followed during the unfolding crisis. For example sprinkler valve activations that were seen as routine: "*We routinely, if we've gone into a room and it's obviously steam the instruction is normally in that instance is to remove the head because we know that the problem is contained within a space, windows opened to vent, they will cool down so reset the fire panel*" (Interview no. 3). Further examples are the five excluded incidents which relate to a single project. All five incidents were excluded as the project team had "*de-risked time, because time was probably our biggest threat in many ways"* (Interview no. 6). As such for these five incidents there was sufficient time to resolve the incidents using their standard change management processes.

3.6.2 Narrative Preparation

Following the identification of the crises that met the selection criteria, the next stage of the analysis was the preparation of narratives for each of the twenty-two crises. Narrative strategies involve the construction of a story from the empirical data, and can be used primarily as descriptive tools or as analytical tools (Langley, 1999). Almost all process research involves the use of narratives at some point and the narrative can serve different purposes depending on the objectives of the researcher, with many researchers using narratives as a preliminary data organizing step aimed at preparing a chronology for subsequent analysis (Langley, 1999). For clarity, narratives were employed in this research study as a descriptive tool that enabled the construction of a consolidated account of the activities involved in each unfolding crisis. The interviewees had described the unfolding crises at different points throughout their interview, in answer to the interview questions and as they recollected the

events that had happened. The purpose of each narrative was to provide a single consolidated account of the activities that were carried out during the unfolding crisis. The narratives were based as far as possible on the words used by the interviewees, so that the description of each unfolding crisis was kept as close as possible to the wording in the empirical data. The example narrative below describes the unfolding crisis in which Investment Org where impacted by a heavy snowfall throughout the UK (Crisis 21).

> *There was heavy snow throughout the UK. While this was not the first time that Investment Org had been impacted by heavy snow this situation was unpredictable because the impact of the snow was varied around the country. Investment Org knew that snow was coming but they didn't know how hard it was going to hit, where and at what time it was going to happen. They suspected that some of their sites might be closed down throughout the day and that was about as accurate as they could have foretold what would happen. The head office team set up conference calls with the regional managers to get a view of what was happening, what the local information was, had all their staff turned up for work today and what the issues were. One site was already looking to close down almost immediately because the snow had hit them first. The head office team focused on obtaining up to date information on what was happening. Local councils were making decisions to close offices which could cause gridlock on the roads. Transport companies were making decisions to stop running trains and buses, and this was impacting on the decisions that head office team made as it changed decisions because then their staff needed to get home as well. Staff members were providing information based on what was being said by clients, family, on the radio or internet, which was providing a different picture in different locations across the UK. The head office team focused on gathering information on the evolving situation in the different regions. As the situation was evolving differently across the regions, it was almost a case of managing a number of incidents*

at the same time because the snow had different impacts at different times around the country. The head office team focused on obtaining reliable information to base decisions on. However, there was an issue in controlling the flow of information, and the head office team recognised that they were not in control of how the situation was evolving. They predicted that they would become swamped by the amount of information available and be unable to make decision for the local regions. The head office team agreed not to micro manage but to allow regional managers to make local decisions based on local information as the regional managers made the call every single day about local decisions, they could see what the issues were and they knew best how to run their local business. The head office team would focus at the higher level on what needed to be done to keep the business going. The head office team focused on gathering information on what was happening, to identify where work needed to be moved from one office to another and to obtain up to date information on what decisions they needed to make. After five working days, the snow was no longer causing transport and business disruption, so the head office team stopped gathering and monitoring the information on what was happening.

The narrative approach was used to prepare a descriptive account of each of the twenty-two crises that are described in Table 12. While several examples are described here to illustrate the range of crises that were identified, all twenty-two crises are presented in detail in chapter 4. The twenty-two crises include examples such as a gas leak (Crisis 17) which had it caught fire could have caused an explosion that threatened injury or death, multi-million pound damage to machinery and buildings, as well as reputational risk and financial loss due to the subsequent failure to provide a key business service. In this crisis, the team recognised that gas was being vented into a covered area where there was florescent lighting which could ignite the invisible gas and cause an explosion. From the sound of the gas they estimated that it would cause a ‘forty-foot flame thrower’, but did not know in which direction the flame

would go. So they prevented the fire brigade from entering the area and evacuated the area to protect people: "*kept people well away because at the end of the day if it had caught fire the last thing you want is to hurt someone*" *(Interview 8).*

Another example is the high profile launch of a new network technology which was being deployed for the first time ever in the world (Crisis 8). The CEO was due to give a live televised demonstration of the new technology to an audience of 800 people, including politicians, industry experts and the media across Europe. However, the technology only functioned intermittently minutes before the demonstration. If the technology did not work at moment when it was demonstrated, it risked huge reputational and financial damage to the organization. The night before the launch, the project team anticipated that it was likely that the technology would not work when it was demonstrated, so they agreed what they would do, which they would keep secret. They would give the CEO two devices (one new and one old technology) with the instruction to pick up whichever device he was directed to use at the point when the new technology was demonstrated. They would monitor the technology right up to the time when it was about to be demonstrated, and at that point depending on whether the new technology was working, they would instruct the CEO on which device to use. "*The frightening bit is that minutes before you get a call from the engineer to say it's failed*" (Interviewee 10).

A further example involves Leisure Organization who were about to go live with a new appointment booking system across their forty retail locations (Crisis 9). The project team predicted that the new system may experience problems once it went live as the system had to be redesigned at short notice and the time for testing was reduced as a result. They suggested taking a phased implementation approach in which they would go live at one site first, then at a further five sites, then ten further sites and finally the remaining sites. They spoke to the senior managers to voice their concerns and proposed the phased implementation approach. However the view of senior management was that the booking system had to go live as planned as the future of the organization depended on it. The booking system went live as scheduled, but within days

there were performance degradation issues. The system slowed down when it tried to handle the volume of calls that were being received. The project team predicted that the system would crash and be unavailable for all forty retail locations, so they agreed with management to remove individual locations from the booking system one at a time until the system stabilized. Fortunately, the members of staff who were being made redundant due to the implementation of the appointment booking system had not left the organization so they were available to take manual bookings.

A final example is that of a team who were working in a remote location when they were taken hostage by tribesmen from a local community who had misunderstood why they were in the area of the tribe's land (Crisis 10). "It was a very dangerous situation that could easily get out of hand" (Interviewee 12). The hostage takers were upset, with emotions running high, and the project team feared for their lives. They had a contingency plan, but in this crisis there were added complications of the misunderstanding and the suspicion of the involvement of a rival tribe. The team were in a difficult position where there was little they could do, but they agreed that they would seek an audience with someone who could understand their position and help them to secure their release. "*We were really in a helpless position in that situation, there was really very little we could do. We could only just pray that we would be able to speak to someone that would be stable enough to understand what we were about and hopefully plead our case and get them to release us*" (Interviewee 12). They did manage to get an audience with a chief elder and pleaded their case which eventually led to their captors reluctantly releasing them. The following section presents the interpretive analysis of the twenty-two crises. During this interpretive analysis visual maps were prepared that depicted the sensemaking process during each unfolding crisis. These sensemaking processes were then compared and categorised.

Table 12 – The twenty-two crises

Crisis	Crisis Title	Crisis Description	Threat
1	Hotel basement flood	A sprinkler mains pipe burst in the hotel staff canteen causing a flood. Thousands of gallons of water flowed into the basement area of the hotel. The flood activated the alarms and the fire crew were called. The hotel was evacuated, and the electricity was turned off.	The flood threatened damage to the hotel premises, and posed a reputational, financial and operational risk if the team needed to invoke the contingency option and evacuate guests and staff to another hotel.
2	Costly delay to shutdown of an oil storage facility	A programme of work to shut down an oil storage facility was delayed by a petrochemical company. This was a large time constrained programme with multiple interlinked projects.	Financial risk as the cost of continuing to run the oil storage facility was over $1million per day.
3	Fire in client's building.	A global IT company was installing a system for a client organization, when overnight the client's office was damaged by fire. The company were drafted in to help the client to establish the contingency location and to recover equipment from the fire damaged building.	Risk to client's business as they were unable to operate from the office in the fire damaged building.
4	Failing billion dollar oil rig decommissioning project	The project to decommission an oil rig was experiencing costly delays due to failure to decommission an oil rig. The project team members faced a final attempt to save the project and achieve the project goals. This multi-billion dollar project was experiencing critical issues on many fronts.	Financial risk as it cost over $1m for every day of delay.
5	Project team held hostage	Project team were working in a remote location when they were taken hostage by tribesmen from a local community as a result of a misunderstanding of their intentions.	This situation posed a threat to the safety and lives of the project team members.
6	Wireless receiver performance issues	A technology organization had developed a receiver as part of a new high profile service for a client. The product was due to be trialled by customers. However on final testing the receiver failed to work.	Reputational, commercial and financial risk to both the organization and the client business that was dependent on the receiver for the launch of their new business service.

Table 12 – The twenty-two crises (continued)

Crisis	Crisis Title	Crisis Description	Threat
7	Alarms that could not be deactivated	The hotel's new fire alarms were activated, but then could not be turned off. Guests and staff were waiting over an hour in the evacuation areas and could not return to the hotel until the alarms were deactivated.	The crisis threatened reputational, financial and operational risk. If the alarms could not be turned off then the team would need to invoke the contingency option and evacuate guests and staff to another hotel.
8	Community threaten retaliation	Two communities were in dispute over boundaries. A team member from one community was assaulted by members of the other community. The team prevented the community from retaliating.	The crisis posed a threat to safety and life for both communities.
9	24 hour telephone outage at hotel.	5-star hotel's telephone system failed, so that there were no internal, in-coming or out-going calls.	Reputational, financial and operational risk to the hotel. Guests could not make or receive telephone calls. Orders could not be made for room service.
10	Failure of a new appointment booking system	Leisure organization went live on a new booking system across 40 locations, but the new system could not handle the volume of calls received. The organization was not able to take bookings as a result.	This crisis threatened both reputational risk and financial loss to the extent that it was thought that it could lead to the collapse of the business.
11	Presentation of new network technology	The CEO of the global technology company was due to present a new technology on a European stage to politicians, journalists and industry experts. However the new technology was only working intermittently minutes before the demonstration.	Embarrassment, reputational and financial risk resulting from failure to demonstrate and launch the new technology.

Table 12 – The twenty-two crises (continued)

Crisis	Crisis Title	Crisis Description	Threat
12	Fire at adjacent hotel.	Thick smoke filled the street outside the 5-star hotel. The smoke was coming from a fire in an adjacent hotel, but it was unclear whether there was also a fire in the street. 5-star hotel and the adjacent hotel had a reciprocal agreement to act as contingency locations for each other.	The smoke from the street could activate the alarms which would result in the staff and guests from the 5-star hotel being evacuated into a smoke filled street which presented a higher risk to staff and guests. As the guests from the adjacent hotel were evacuated to 5-star hotel, this meant that 5-star hotel had no contingency option.
13	Power outage and back-up generator fails	Builders working locally had accidentally severed the mains electrical supply for the whole district of the city including the power supply to 5-star hotel. The hotel's back-up generator failed to start, and so the generator did not provide the minimum required electrical power for the hotel.	Reputational, financial and operational risk to 5-star hotel. Without power for a sustained period of time the hotel may need to invoke contingency plans and evacuate staff and guests.
14	Burst pipe causes major flood in 5-star hotel	Smoke or steam was seen rising from the hotel boiler room. The cause was first thought to be a fire, then a steam leak and finally identified as a burst hot water pipe. All the hot water had drained away so there was no hot water for guest bedrooms, the kitchens or the heating system.	Reputational and financial risk to the 5-star hotel as there was no hot water for guest bathroom, the kitchens or the heating system. The crisis happened in the middle of the night, but guests would soon be waking up expecting the hotel to be heated and have hot water.
15	Insufficient coolant for power generator	During the re-commissioning of a generator at a utility company, an issue occurred where coolant started to drain away from the two generators which are in operation.	If the leak of coolant was not stopped it threatened "many billions of pounds" (Interviewee 9) due to damage to the generator which would need to be taken out of commission resulting in both reputational damage and financial loss.

Table 12 – The twenty-two crises (continued)

Crisis	Crisis Title	Crisis Description	Threat
16	Contamination of the public water system	Following an explosion and fire, the utility company needed to prevent the chemicals used to put out the fire from leaking into the water system as this could contaminate the public water supply.	This crisis posed a threat to life and health of the public. It was also a reputational and financial risk if injury to a member of the public occurred, or parts of the water system were contaminated.
17	Gas leak that could lead to fire and/or explosion	A loud hissing noise was heard at the utility company. The team realised that there was gas leaking from a generator. If the gas caught fire it could cause an explosion.	Risk of explosion, threat to life and risk of injury to staff and/or fire crew. Risk of damage to property. Reputational and financial risk resulting from failure to provide a service if the generator had to be taken out of commission and repaired.
18	Failure to develop a new mobile device component	An innovative technology company were developing a mobile device for a client but just before the device was due to be delivered to the client for testing, it was found to not be functioning correctly.	Reputational, financial and commercial risk to the business from failure to provide the key business product as contracted.
19	Plan to be collapsed from 4 to 2.5 months	Construction Organization were contracted to install a sewage treatment plant for a client. They had engaged a sub-contractor who gave a timescale of six months for the installation. However two months into the project, the sub-contractor admitted that the procurement was running two months late. Construction Organization tried to buy more time from the client, but the client refused and insisted on achieving the original deadline	Reputational, commercial and financial risk to both the organization and the client business which was dependent on the completion of the sewage plant on time.
20	Threatened cancellation of a £ multi-billion project	A £multi-billion multi-organization project was discovered to have insufficient risk information to pass an external gate review. Failure to pass the review would result in the project being cancelled.	Reputational, commercial and financial risk for the organization, partners and the suppliers if the high profile £multi-million project was cancelled as a result of failing the external project gate review.

Table 12 – The twenty-two crises (continued)

Crisis	Crisis Title	Crisis Description	Threat
21	Heavy snow throughout the UK	Heavy snow across the UK impacted this investment organization as staff could not travel into the company's offices, or needed to leave early to get home safely. The team needed to ensure continuity of the business systems, fulfilment of the financial commitments, and safety of staff.	Financial and reputational risk due to the multi-million dollar trades not being completed on time. Risk to safety of staff either stranded in the office or trying to make their way home but public transport had stopped running.
22	Suspended manager who poses a threat	A manager was suspended as the organization suspected that the manager had stolen IT equipment from the organization over a sustained period of time.	Reputational and financial risk as the manager was taking IT equipment and reselling it online. There was a risk that this equipment could contain sensitive customer data. The manager also obtained new IT equipment from one of the company's suppliers.

3.7 Interpretive Analysis

The fifth and final step in the critical incident technique involves the interpretation of the data and reporting of the findings. This section describes the interpretive analysis carried out in this study, while chapter 4 details the findings from this research. One of the hallmarks of using the critical incident technique is the interpretation of the data to form categories (Flanagan, 1954; Butterfield *et al*., 2005), which Flanagan considered as the most challenging aspect of the technique since it depends on the "insight, experience and judgment" of the researcher (1954, p. 344). To construct the categories involves several steps (Flanagan, 1954; Hughes, Williamson and Lloyd, 2007):

a) Sorting a small sample of critical incidents into main categories.
b) Creating tentative names and brief definitions for each main category.
c) Sorting the remaining incidents into these main categories, but creating additional main categories and definitions, or modify existing ones as necessary.
d) Dividing the main categories into sub-categories as finer similarities and differences become apparent.
e) Continuously re-examining the main categories and sub-categories, and reallocating critical incidents as necessary.
f) Continuing this process until all critical incidents have been appropriately classified.

The purpose of this categorisation process is to produce a comprehensive, clear-cut and logical organization of the critical incidents. The headings for categories and sub-categories should be meaningful and not need accompanying definitions. The headings should be expressed in active terms, and be of same level/size in terms of what they describe (Flanagan, 1954; Hughes, Williamson and Lloyd, 2007). The interpretive analysis carried out in this study, first involved a visual mapping technique to clarify the forms of sensemaking processes that were described in each crisis. Then the mapped processes for the twenty-two crises were compared to identify the discernible

patterns of sensemaking processes. Finally, the twenty-two crises were categorised based on these patterns of sensemaking processes. The following section describes how the visual mapping technique was carried out in this study, while section 3.7.2 presents the categories of sensemaking processes that were identified for the twenty-two crises.

3.7.1 Visual Mapping and Sensemaking Process Identification

Flanagan (1954) states that there are countless ways in which the critical incidents can be categorised but that "the principal consideration should usually be that of the uses to be made of the data" (p. 346). The frame of reference in this study is the collective sensemaking processes during unfolding crises, and so the categorisation was based on the different discernible patterns of sensemaking processes. As previously stated in section 2.2 organizational crises can be viewed as temporally evolving phenomena that are characterised by fluidity, process and movement (Langley and Tsoukas, 2010; Langley, Smallman, Tsoukas and Van de Ven, 2013; Dawson, 2014). Viewed as processes, organizational crises can be studied in a variety of ways including through the mapping of the activities that are involved in the sensemaking processes that emerge and interact during crises.

A visual mapping strategy was adopted to identify the sensemaking processes involved in each unfolding crisis so that these processes could be compared and categorised. Visual mapping (Langley, 1999) can be used to generate process patterns based on several cases described in moderate detail. The theory produced through a visual mapping strategy provides moderate levels of accuracy, simplicity and generality. The visual mapping of processes has several advantages over narrative approaches: it enables a large quantity of information to be presented in relatively little space; it enables many observations of similar processes to be compared, contrasted and categorised; and it can be a useful tool for the development and verification of theoretical ideas (Miles and Huberman, 1994; Langley, 1999).

The sensemaking processes involved in each of the twenty-two crises were visually mapped using the sub-processes in the model of anticipatory and

retrospective sensemaking (see Figure 2, page 33). These six sub-processes are: prediction, preparation, environment change, enactment, selection, and retention. The narratives and related sections of the interviews were read, and collective processes were inferred from the data where the interviewee referred to themselves and more than one other person being involved, e.g. “we” or “me and my team”. For example as highlighted in the following two quotes:

> *“It was a very dangerous situation for **me and my team**, and **we** had to think very fast, **we** had to act very promptly, **we** had to be very careful. It was a situation, one that could easily go out of control if it wasn’t properly managed” (Interviewee 12).*

> *“**We** decided that **we** were going to speak with one of their chiefs, who eventually **we** got his audience. **We** decided to, **we** appointed just one person to do the speaking. **We** all just kept quiet and allowed him to explain and all of that. But apart from that there was very little that **we** could do, **we** were just waiting and hoping that eventually **we** were to reach a mutual compromise.” (Interviewee 12)*

Retrospective sensemaking was inferred from the empirical data where the interviewee referred to the actors trying to interpret and make sense of something that had happened, for example in the following two quotes:

> *“… and that smoke came down so thick and so fast, when I walked out into the lobby with the hotel manager we were just like oh my God what the bloody hell has happened” (Interviewee 1).*

> *“… we debated where we thought the problems were so probably for an hour or two, we got a list of things, very quickly rose to the top of the list that most likely was the antennae…” (Interviewee 5).*

Weick (1988, p. 314) described how to identify enactment when he wrote:

> *“To look for enactment themes in crises, for example, is to listen for verbs of enactment, words like manual control, intervene, cope, probe, alter, design, solve, decouple, try, peek and poke (Perrow,*

1984, p. 333), talk, disregard, and improvise. These verbs may signify actions that have the potential to construct or limit later stages in an unfolding crisis".

Enactment was inferred from the narratives and associated empirical data when the interviewee described that the actors took action to notice or change the environment during the unfolding crisis, as highlighted in the following two quotes:

*"… so we **did** a second test at the test range **to try and confirm** that and so we **took** some other antennae systems that we had for other products and devices ..." (Interviewee 5).*

*"So it was **pulling** people in, **shutting down** the front door and then if people want to go out we've got an emergency exit in this corner, **forcing** them in and out of that to make sure that we weren't bringing people into the path [of the smoke]" (Interviewee 1).*

Environment change was inferred when the interviewee described a change arising from the action of something or someone external to the actors, such as a power cut, fire, flood, alarms sounding, smoke, an IT system, doorman or tribesmen. Examples identified in the empirical data are:

"There's a muffled bang and all of a sudden we've got a huge amount of water just pouring out of the ceiling, sprinkler mains has burst, six inch mains, four bar pressure, it's a lot of water" (Interviewee 3).

"…one of the doormen comes in and goes there's some smoke coming down the street" (Interviewee 1).

Anticipatory sensemaking was inferred when the interviewee described a threat that the actors identified could happen in the future, and the actors focused on identifying actions they could take to avert the threat, for example:

*"So it was engineering shut down the air conditioning because they would suck in the extract into the building and **we would just be***

***filled with smoke and it would cause the alarms to go off <predicted future threat>**, and **so isolate the alarms basically <course of action>**."*

*"We also felt we didn't have any assurance that they would not **attack the community that took us <predicted future threat>**. One of their community in our team and he was badly beaten and **we knew that something might just happen, was a situation that we felt might escalate <predicted future threat>** and **we decided that we were going to demobilise <course of action>**. Also, we tried as much as possible to the extent that we could to try and **get some representative from the other community to discourage an attack from the second community, that there was no sense in that the issue was already resolved, and that we thought there was a better way of dealing with it <course of action>**." (Interviewee 12)*

As an example of how a narrative was analysed to identify the types of sensemaking processes that were involved in an unfolding crisis, the analysis of narrative for the crisis where Investment Org were impacted by heavy snow throughout the UK (Crisis 21) is shown below. The types of sensemaking processes were identified based on the six sub-processes from the integrated model of anticipatory and retrospective sensemaking in unfolding organizational crises (Figure 3, page 40). These sub-processes are: prediction, preparation, environment change, enactment, selection, and retention. Table 13 shows the instances of the six sub-processes that are identified in the narrative, along with the supporting quotes from the interview data, while Figure 5 then shows the visual mapping of these sensemaking processes based on the sub-processes that were identified. The sensemaking processes that unfolded during this crisis are detailed further in section 4.3.3.5 (page 169).

*There was heavy snow throughout the UK **<environment change>**. While this was not the first time that Investment Org had been impacted by heavy snow this situation was unpredictable because*

the impact of the snow was varied around the country. Investment Org knew that snow was coming but they didn't know how hard it was going to hit, where and at what time it was going to happen. They suspected that some of their sites might be closed down throughout the day and that was about as accurate as they could have foretold what would happen. The head office team set up conference calls with the regional managers ***<enactment>*** *to get a view of what was happening, what the local information was, had all their staff turned up for work today and what the issues were* ***<retrospective sensemaking – selection>****. One site was already looking to close down almost immediately because the snow had hit them first* ***<retrospective sensemaking – selection>****. The head office team focused on obtaining up to date information on what was happening* ***<retrospective sensemaking – retention>****. Local councils were making decisions to close offices which could cause gridlock on the roads* ***<environment change>****. Transport companies were making decisions to stop running trains and buses* ***<environment change>****, and this was impacting on the decisions that head office team made as it changed decisions because then their staff needed to get home as well. Staff members were providing information based on what was being said by clients, family, on the radio or internet which was providing a different picture in different locations across the UK* ***<environment change>****. The head office team focused on gathering information on the evolving situation in the different regions* ***<enactment>****. The situation was evolving differently across the regions. It was almost a case of managing a number of incidents at the same time because the snow had different impacts at different times around the country* ***<retrospective sensemaking – selection>****. The head office team focused on obtaining reliable information to base decisions on* ***<enactment>****. However, there was an issue in controlling the flow of information, and the head office team recognised that they were not in control of*

how the situation was evolving ***<enactment>****. They predicted that they would become swamped by the amount of information available and be unable to make decision for the local regions* ***<anticipatory sensemaking – prediction>****. The head office team agreed not to micro manage but to allow regional managers to make local decisions based on local information as the regional managers made the call every single day about local decisions, they could see what the issues were and they knew best how to run their local business* ***<anticipatory sensemaking – preparation>****. The head office team would focus at the higher level on what needed to be done to keep the business going* ***<anticipatory sensemaking – preparation>****. The head office team focused on gathering information on what was happening* ***<enactment>****, to identify where work needed to be moved from one office to another* ***<retrospective sensemaking – selection>*** *and to obtain up to date information on what decisions they needed to make* ***<retrospective sensemaking – retention>****. After five working days, the snow was no longer causing transport and business disruption* ***<environment change>****, so the head office team stopped gathering and monitoring the information on what was happening* ***<enactment>****.*

Table 13 – Narrative analysis: sub-processes and supporting quotes (Crisis 21)

Narrative extract	Supporting quotes *(from interview with Interviewee 8)*	Sensemaking sub-process
Heavy snow throughout the UK.	*"Most recent example that threw a spanner in the works was the recent heavy snow throughout the UK."*	Environment change
Head office team set up conference calls with regional managers to get a view of what was happening.	*"… we had multiple conference calls with all our regional managers around the country..."*	Enactment
Head office team identified that one office was already looking to close down.	*"… just to get a feel for what the issues were."* *"Already at that point we had one site that was looking to close down almost immediately because the snow had hit them first"*	Retrospective sensemaking – selection.
Head office team focused on obtaining up to date information on what was happening.	*"During the first meeting we decided - what are the actions? What are we going to do now? When are we going to regroup? So we set that up as a formal invitation to the next conference call."*	Retrospective sensemaking – retention
Local councils were making decisions to close offices which could cause gridlock on the roads.	*"…and then they hear on the radio that their local council sent everybody home so immediately there is gridlock …"*	Environment change
Transport companies were making decisions to stop running trains and buses.	*"… the buses aren't running so it changes your decision process because you've got people that you've got to get home as well."*	Environment change
Staff were providing information based on what was being said by clients, family, on the radio or internet.	*"Everybody starts looking at the internet and starts hearing stories from their friends and colleagues and brokers around the country etc."*	Environment change
Head office team focused on gathering information on the evolving situation.	*"So it was just really double checking that we were covering everything as a business. And just the coordinating. Liaising with all these people and understanding that we've got the best information."*	Enactment
Situation was evolving differently across the regions.	*"… it was varied around the country it was a question of almost managing a number of incidents at the same time because it had different impacts at different times around the country."*	Retrospective sensemaking – selection
Head office team focused on obtaining reliable information for decision making.	*"… so then we set up an on-going call during the day just to track what was happening".* *"So it was just having the right people in the room to make the right decisions at the right time and know where to find information. And there are some proactive things that you can do but sometimes you just have to be prepared to respond to the way the incident unfolds".*	Retrospective sensemaking – retention

Table 13 - Narrative analysis: sub-processes and supporting quotes (continued)

Narrative extract	Supporting quotes *(from interview with Interviewee 8)*	Sensemaking sub-process
Head office team recognized that they were not in control of how the situation was evolving.	*"So it was about local managers trying to keep on top of that local information, which is not always issues, always a degree of panic around and often sounds worse than it actually is and trying to get accurate information is not always easy."* *"The bigger issue was what transport companies, what other organizations were going to do about it. So if the roads become gridlocked because everybody else has sent their staff home then you end up with only your staff who can't get home then you kind of have to go with the flow to some extent and if you have an advance announcement that busses are going to be stopped in an hour, in some areas where people rely on busses then it's prudent to let them go home while they can still get there really. So those sorts of things were outside of our control".*	Enactment
Head office team predicted that they would become swamped by the amount of information available and be unable to make decision for the local regions.	*"And there was a bit of an issue about controlling everybody because everybody wanted to throw bits of information in. Everybody starts looking at the internet and starts hearing stories from their friends and colleagues and brokers around the country etc. so trying to keep it consistent in how we got to manage that flow."* *"And how the situation develops, because it not just what you do and what happens, it's how other people react to it as well which then moved the landscape on as well."* *"So it's an unfolding situation you're not in control of really, which was fairly unusual."*	Anticipatory sensemaking - prediction
Head office team agreed to allow regional managers to make local decisions based on local information. They would focus on what needed to be done to keep the business going.	*"It was basically decided to let local managers make the call – they make the call every single day about local decisions so it made sense for them, they can see what the issues are and we took the view that actually we shouldn't try to micro manage what they do. They know best how to run their business really."*	Anticipatory sensemaking – preparation
Head office team gathered information on what was happening.	*"In that situation it was mostly liaising with the different areas of the business to understand are there any critical things that need to get done today?"*	Enactment
Head office team identified where work needed to be moved from one office to another.	*"If we close that office do we need to move some work from A to B?"*	Retrospective sensemaking – selection

Table 13 - Narrative analysis: sensemaking process and supporting quotes (continued)

Narrative extract	**Supporting quotes** *(from interview with Interviewee 8)*	**Sensemaking sub-process**
Head office team focused on obtaining up to date information on what decisions they needed to make.	*"We had to do that check first of all - are there any things that we are going to miss out on that we need to get done that we can't do if we send everybody home? And certainly some sites there were people that stayed behind if they had critical things to do: systems people in some cases. "*	Retrospective sensemaking – retention
After five working days, the snow was no longer causing transport and business disruption.	*"…the prognosis was for most of our locations anyway it wasn't something that was going to keep us out of business for a week or so, it was only likely to be a day or so for most sites. Some had it a bit worse and some had it a bit later in the week."*	Environmental change
Head office team stopped gathering and monitoring the information on what was happening.	*Implied. The incident had occurred in the past and was not referred to as on-going "Most recent example that threw a spanner in the works was the recent heavy snow throughout the UK."*	Enactment

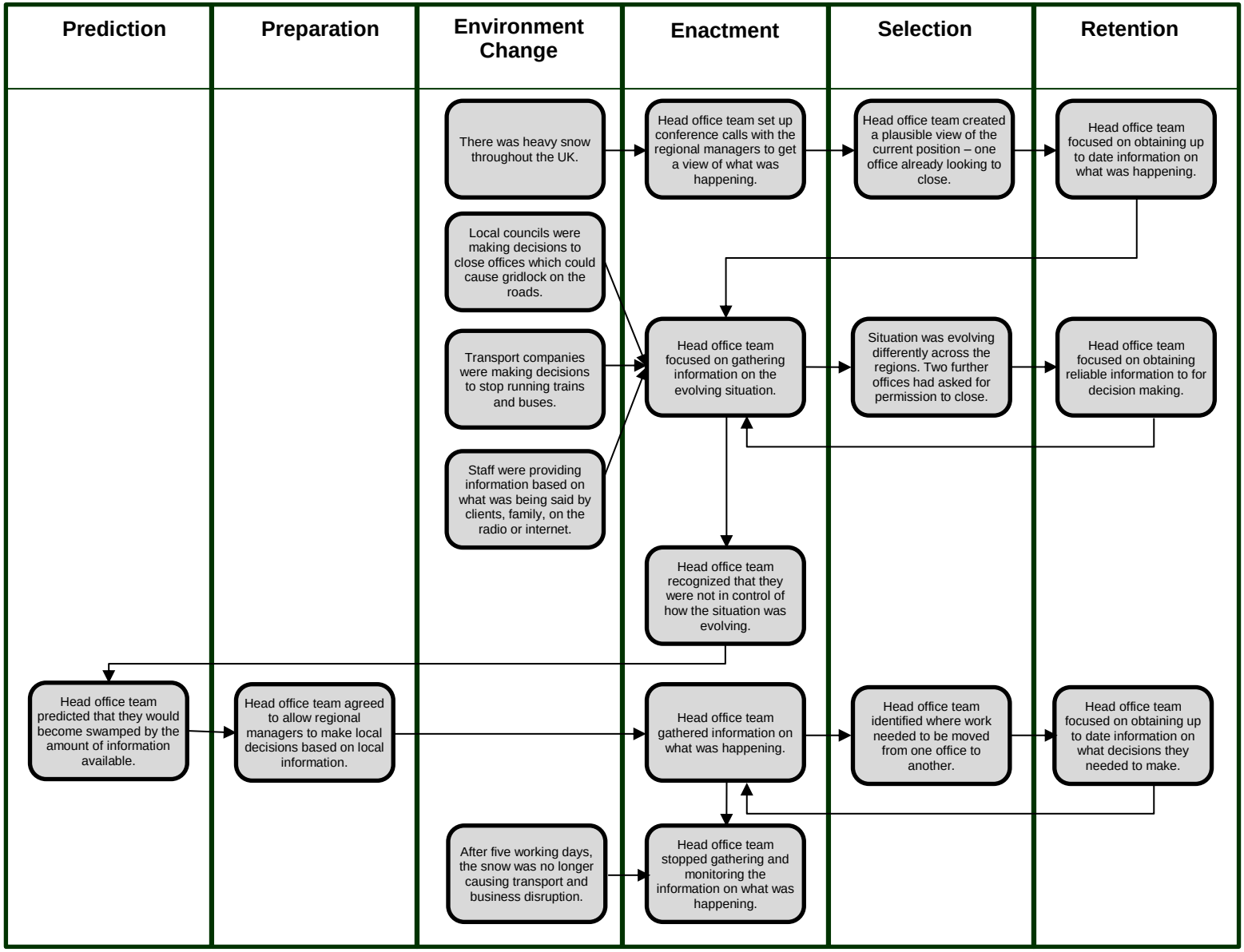

Figure 5 – Visual mapping of the sensemaking sub-processes: Heavy snow throughout the UK (Crisis 21)

3.7.2 Categories of Sensemaking Processes

The visual maps were created with the aim of providing a simplified visual view of the sensemaking processes involved in each of the twenty-two crises. The visual maps were inspected to identify the patterns of sensemaking processes within the unfolding crises. This involved identifying whether the sensemaking processes unfolded as a form of retrospective and/or anticipatory sensemaking and where there was anticipatory sensemaking whether this took a pattern matching, trajectory tracking, convergent sensemaking or a new form of anticipatory sensemaking. Two categories and three sub-categories of sensemaking processes were identified as shown in Table 14. The first category is the reactive processes that unfolded as iterative cycles of retrospective sensemaking (Crises 1-4). The second category is the proactive sensemaking processes that unfolded as cycles of retrospective sensemaking interspersed with cycles of anticipatory sensemaking (Crises 5-22). These proactive sensemaking processes are divided into three sub-categories based on the form of anticipatory sensemaking involved; pattern matching (Crises 5-11), trajectory tracking (Crises 12-16), and convergent sensemaking (Crises 17-22). No new forms of anticipatory sensemaking were identified.

Table 14 – Categories and sub-categories of sensemaking processes

Category 1: Reactive sensemaking process - cycles of retrospective sensemaking only	
Crisis 1	Hotel basement flood
Crisis 2	Costly delay to shutdown of an oil storage facility
Crisis 3	Fire in client's building
Crisis 4	Failing billion dollar oil rig decommissioning project
Category 2: Proactive sensemaking process - cycles of retrospective sensemaking interspersed with cycles of anticipatory sensemaking	
Sub-category 2.1: Pattern matching	
Crisis 5	Project team held hostage
Crisis 6	Wireless receiver performance issues
Crisis 7	Alarms that could not be deactivated
Crisis 8	Community threaten retaliation
Crisis 9	24 hour telephone outage at hotel
Crisis 10	Failure of a new appointment booking system
Crisis 11	Presentation of new network technology
Sub-category 2.2: Trajectory tracking	
Crisis 12	Fire at adjacent hotel
Crisis 13	Power outage and backup generator fails
Crisis 14	Burst pipe causes major flood in 5-star hotel
Crisis 15	Insufficient coolant for power generator
Crisis 16	Contamination of the public water system
Sub-category 2.3: Convergent sensemaking	
Crisis 17	Gas leak that could lead to fire and/or explosion
Crisis 18	Failure to develop a new mobile device component
Crisis 19	Plan to be collapsed from 4 to 2.5 months
Crisis 20	Threatened cancellation of a £multi-billion project
Crisis 21	Heavy snow throughout the UK
Crisis 22	Suspended manager who poses a threat

3.8 Chapter Summary

The first two chapters of this thesis introduced the research problem and identified the specific research gap and question for this study. This chapter presented the rationale for the qualitative study that adopts a retroductive research strategy based on a critical incident technique. Next, the data collection approach was presented, which involved semi-structured interviews as the collection method. Following this, the descriptive and interpretive analysis processes were detailed which involved narrative analysis, visual mapping and process categorisation. Finally, this chapter has presented the categorisation of the twenty-two crisis that were selected from the incidents identified in the empirical data. Chapter 4 will now present the findings of this research study.

4 FINDINGS

4.1 Chapter Overview

Chapter 2.9 detailed the methodology, methods and research design used to address the research question. It provided both the descriptive and interpretive analysis of the empirical data and presented the categories and sub-categories of sensemaking processes that were identified in the data. This chapter makes use of the categorisation of the sensemaking processes to structure the presentation of the research findings. First, section 4.2 details the findings in relation to the reactive sensemaking processes, while section 4.3 then provides the findings relating to the proactive sensemaking processes. Next section 4.4 describes an underlying generative mechanism for the sensemaking processes. Finally, section 4.5 presents a summary of the findings.

4.2 Reactive Sensemaking Processes: Crises 1-4

Four crises (1-4) exhibited a reactive process that unfolded as cycles of retrospective sensemaking. During these reactive processes, the organizational actors engaged retrospective sensemaking when they acted to gather information to diagnose the cause of the crisis or explain either what was happening during the crisis. Using this information, they created plausible explanations for what had occurred, and they focused their actions based on these plausible explanations. These reactive processes involved iterative cycles in which the actors observed what was happening and based on this decided on the actions they would take, before looking again to see what was happening: “so it was quite a look at what’s happening, make a decision, look what’s happening, make a decision kind of process” (Interviewee 1). There was no overall plan or course of action which the actors sought to implement, but they reacted based on the plausible sense that they made about what had happened in their environment. The four crises (1-4) that exemplified a reactive process are detailed in the following sections (4.2.1 to 4.2.5) which provide extracts from the interview data to support the findings in relation to each crisis. In addition, a visual map is presented for each crisis with the aim of providing a simplified

view of the reactive retrospective sensemaking processes that unfolded during each crisis. The visual maps also enable the sensemaking processes for each crisis to be compared and contrasted. This visual mapping approach (see section 3.7.1) employed the six sub-processes (prediction, preparation, environment change, enactment, selection, and retention) from the integrative model of sensemaking processes (Figure 3, page 40) in analysing the sensemaking processes described in the empirical data.

4.2.1 Crisis 1: Hotel basement flood

Crisis 1 (see the visual map shown in Figure 6) began when a muffled bang was heard and suddenly a huge amount of water started pouring from the ceiling into the hotel staff restaurant. The hotel staff engaged in retrospective sensemaking when they tried to make sense of what was happening and what had caused the pouring water. Their first plausible explanation was that a sprinkler mains pipe had burst, so they focused their actions on trying to stop the water pouring from the mains pipe. They ran upstairs to the location of the mains sprinkler chamber to turn the sprinkler off.

> *"There's a muffled bang and all of a sudden we've got a huge amount of water just pouring out of the ceiling, sprinkler mains has burst, six inch mains, four bar pressure, it's a lot of water. So we all think we know what we're doing, we all run up to the sprinkler chamber to turn the sprinkler off, it's not that" (Interviewee 3).*

However this did not stop the pouring water. The staff then engaged in a further cycle of retrospective sensemaking to try to identify other plausible causes for the pouring water. They remember about a second isolation valve that they had all forgotten. They ran to turn the water off using this isolation valve and this time they managed to stop the water pouring from the staff restaurant ceiling.

> *"I think everybody forgot where the isolation valves were because nobody had ever had to turn them off, ever. It was not a scenario that had ever happened. So we put a huge amount of water into the basement and the sub-basement before we could actually, I mean*

you're talking three, four, five minutes probably less but the size of the pipe and the amount of water." (Interviewee 3)

The hotel staff then engaged in further cycles of retrospective sensemaking in which they focused their attention on the vast amount of water that had flooded into the hotel's basement. They started to bail out the water by hand. However, they considered the amount of flood water and the slow progress they were making. So they then tried to identify a plausible way to dispose of the flood water more quickly. The hotel staff remembered that the boiler house was a meter lower than the basement, so to speed up the process they decided to push all the flood water into a machine room where the water would slowly drain away. It took them 24 hours to drain away the flood water.

"Now luckily our boiler house is a meter lower than the basement so they pushed all the water into the boiler house knowing that all the machines, the plant is off the floor and then that naturally drained away. It took us 24 hours." (Interviewee 3)

Crisis 1 exemplifies the iterative nature of the reactive sensemaking processes during an unfolding crisis. The hotel staff engaged in cycles of retrospective sensemaking through which they took action and created plausible meaning about what was happening during the unfolding crisis. There are three further crises (2-4) that exemplify the iterative nature of the reactive processes during an unfolding crisis. These crises also involve the creation of organizing structures that emerged over time to enable the actors to carry out and coordinate their retrospective sensemaking. These organizing structures were temporal structures based on clock-time, and they took the form of a repeated pattern of meetings or gatherings. The first of these crises, which is Crisis 2, is presented in the following section.

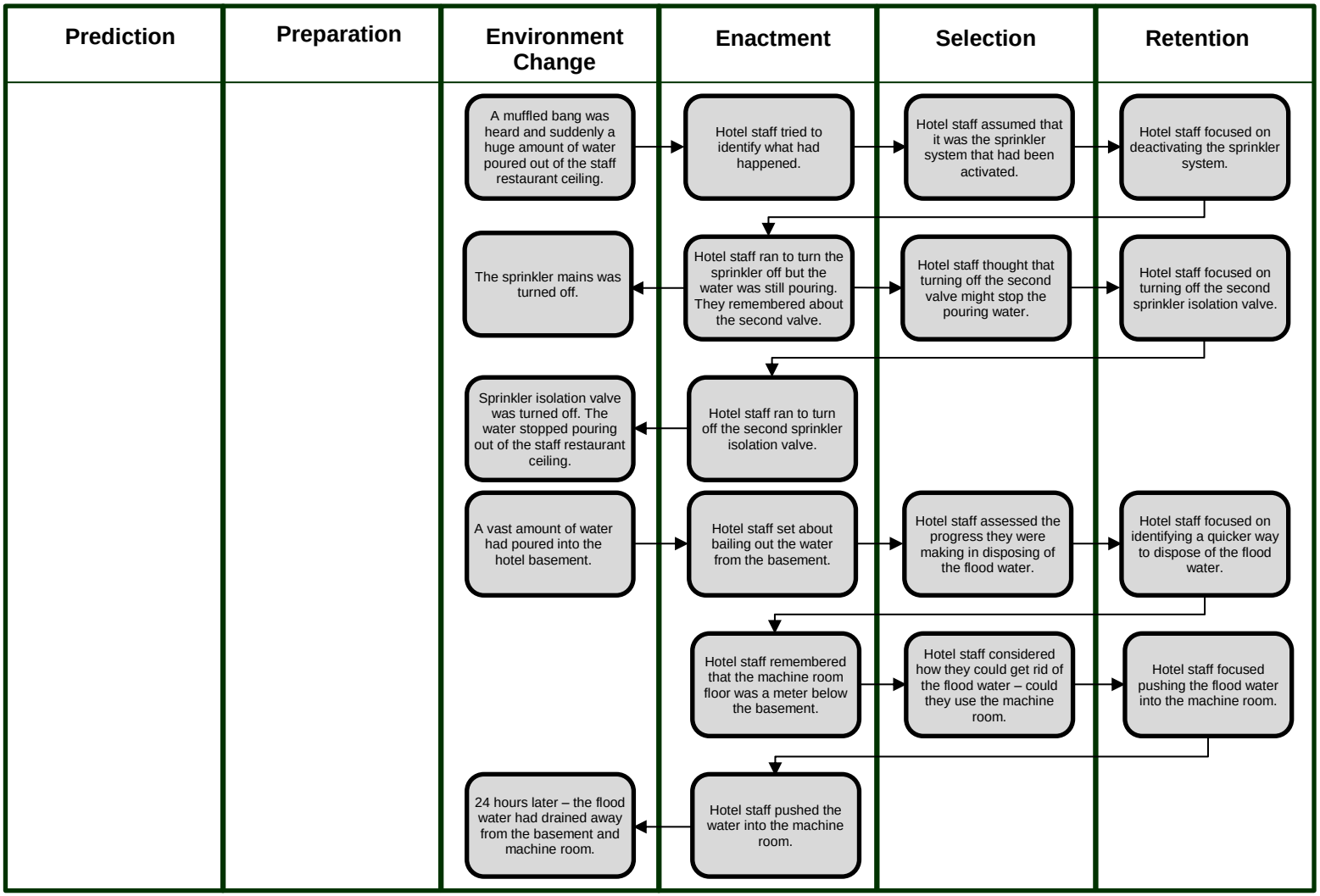

Figure 6 – Reactive Sensemaking Process: Hotel basement flood (Crisis 1)

4.2.2 Crisis 2: Costly delay to shutdown of an oil storage facility

Crisis 2 (see visual map shown in Figure 7) involved a petrochemical company that was experiencing delays during the shutdown of an oil storage facility. It was costing the company over $1million for every day that the shutdown project was delayed. In addition, there was no option to cancel the project as the oil storage facility had to be shutdown in order to then be re-commissioned. A project management team were sent in to assess the project and make the necessary changes to deliver it. They engaged in a cycle of retrospective sensemaking in which they sought to make sense of what was happening on the project and why it was slipping day-by-day. These cycles of retrospective sensemaking are indicated in the visual map by the thick arrows (Figure 7). The project managers recognised that the project plan did not detail the work that needed to be done; it was 'worthless' (Interviewee 17). They also identified that the workers carrying out the activities to shut-down the oil storage facility did not know what work they needed to do on a daily basis.

> *"We would go into a morning call. So we would have morning call with a whole pile of people off shore. There would be a pile of maybe 15 people. I would be hosting a meeting with about 15 people in it and then we would have some contractors on the line, so you had like 20 to 30 people on a morning call. And nobody knew, when you would ask what had been done, often not a lot had been done. People couldn't quite say why it hadn't been done, and they couldn't explain what the problems were and what the blockers were. I mean you tried to say will it be achieved for the next day and they just didn't really know what they were planning to achieve for the next day either." (Interviewee 17)*

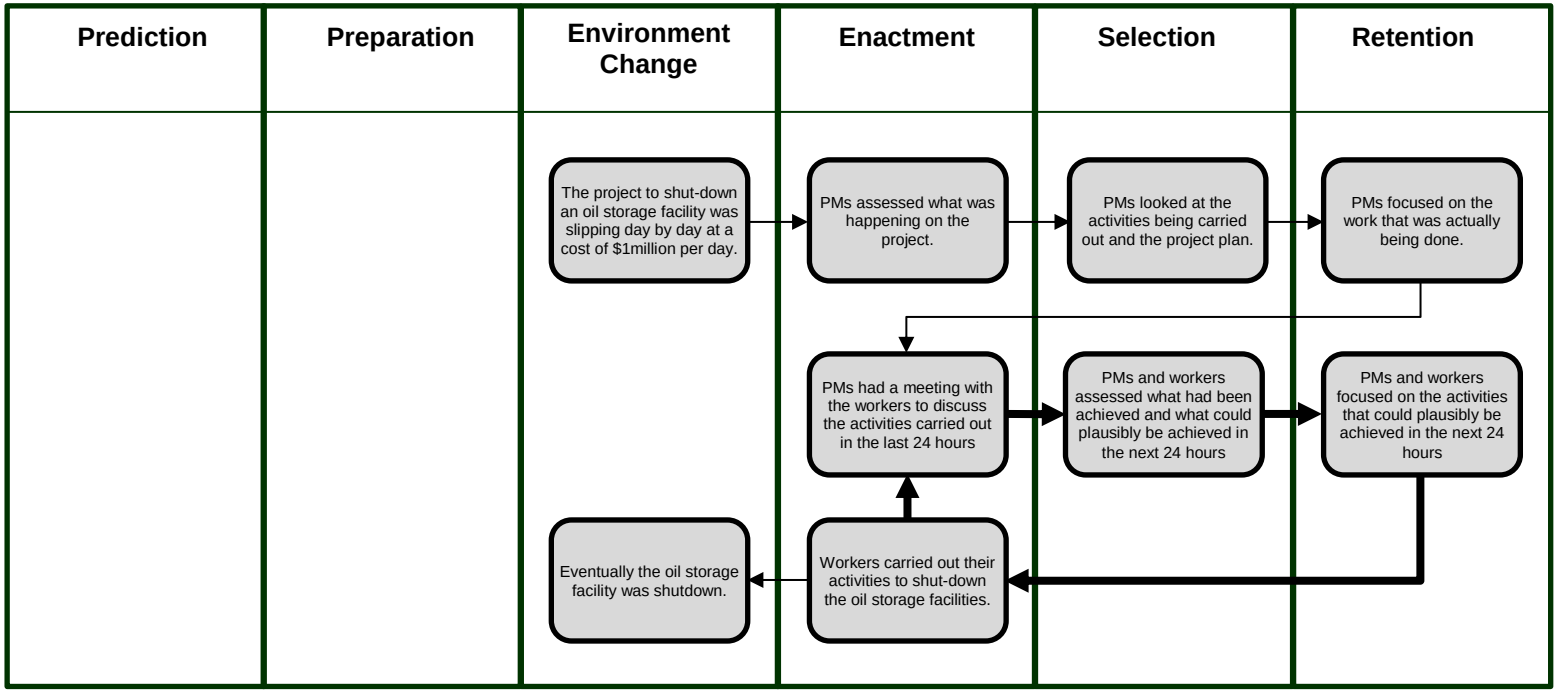

Figure 7 – Reactive Sensemaking Process: Costly delay to shutdown of an oil storage facility (Crisis 2)

The project managers arranged a meeting with the workers to make sense of what had been achieved and what they could plausible do in the next 24 hours. The following day the project managers and the workers met again to assess what had actually been achieved and to make sense of what they could then plausibly do in the next 24 hours. Over time, this series of daily meetings emerged as the organizing structure through which the project was managed. This approach involved iterative cycles of retrospective sensemaking in which the project managers and the workers assessed the work that they had achieved in the previous 24 hours and agreed the work that they would seek to achieve in the next 24 hours. In this way they reacted to what had happened on the project in order to make sense of their current situation so they could agree their next actions. They had no overall detailed plan, but they incrementally took action through these action-meaning creation cycles of retrospective sensemaking in which they made sense of what was happening on the project and what they could do next.

> *"So rather than try to generate this plan that took us to the end of the turnaround to give everyone a roadmap, we went into this last 24/ next 24 hours structure again. And we basically brought the guys into a routine of guys what do you think you can do the next day. What do you think you can get after? And we just, we gradually started to loosen things up. We just tried to make incremental change and we tried to press on as much as we could each day. And because we were getting them to commit to something in the next 24 hours, when they came in the next day we were able to look back and say we you were hoping to do this, how did you get on? Now none of this was measured relative to any benchmark, because we had no benchmark because our plan that we would have used for that was worthless. So we just kept doing that." (Interviewee 17)*

> *"Actually it ran its course. It felt like a. There was no key intervention. Fundamentally it was what it was and it played out, and that was it. The event was done to us. I liken it, even now, I liken it to a group of*

us pushing this thing, it is like a roller coaster carriage, pushing [it] up to the top of a roller coaster. And this was just before it started. And when we defined the releases we were ready to start, and we pushed the carriage over the hill, and then we realised that actually we were all attached to it. It then dragged us up and down all these bumps until eventually it came to a stop, and that is literally what it felt like." (Interviewee 17)

Crisis 2 is an example of a crisis that involved the creation of organizing structures which emerged over time to enable the actors to carry out and coordinate their retrospective sensemaking. While the actors did not have a clear course of action to follow, they created temporal organizing structures in the form of a series of meetings at set times during the day and night when they would come together to share information, to try to give meaning to what was happening, and to agree what their immediate short-term response actions would be. The two further crises that exhibited reactive sensemaking processes also involved the creation of a temporal organizing structure that emerged over time. These two crises (3 and 4) are detailed in the following two sections.

4.2.3 Crisis 3: Fire in client's building

Crisis 3 (see visual map shown in Figure 8) involved a global technology company who were installing a system for a client. However, the night before the system installation was completed the client's office was badly damaged by a fire. The technology company contacted the client to offer their assistance.

"[W]e were finishing up a transition, so it was going to go to steady state, and the night before our final meeting, there was a massive fire in their building. And so from an IT perspective, we basically had to put the whole close down on hold and help quickly address their IT problems due to the fire, which was a major crisis for the client. So we helped them." (Interviewee 19)

"So we contacted their, the leader of their IT department and also their CEO that night and basically said we are here, we are on

standby, let us know anything you need. And we were meeting with them immediately the next morning. We helped to get someone in to go in and assess the environmental impact of not just the fire, but the smoke, the water damage etc. We got approved to go in with the, there were limited people approved to go into the building before their insurance company had approved that the building was safe for people to go into. So we teamed with them to go in to assess what could be saved etc." (Interviewee 19)

The client arranged a meeting in which they briefed their staff and the technology company on what they knew about the cause of the fire. Based on this information, through a process of retrospective sensemaking the technology company tried to make sense of what they had been told and what as a result they could plausibly do to assist the client.

"They had a meeting and they pulled a lot of people in. We basically worked around the clock to be supportive of any needs that they had. The first thing was they briefed us on what happened, with information that was not in the media, with what their thoughts were with regard to, for instance their first indications of where the fire might have actually started." (Interviewee 19)

Over time the client set up a series of three daily meetings, one every eight hours, which acted as a temporal organizing structure that enabled collective sensemaking. In these meetings the attendees assessed what had been achieved in the last eight hours and the client made requests that they wanted the various meeting attendees to achieve for them within the next eight hours. The technology company then went away to assess the current situation and identify what they could plausibly do to achieve the client's request within the deadline. Through these cycles of retrospective sensemaking, the technology company created meaning about what was happening and what they could plausibly do to provide the assistance that the client had requested from them.

“The client had a war room type environment that they set up and they identified key individuals to meet and we met three times a day.” (Interviewee 19)

“[W]e met as a total group to review the status of what we had accomplished in the last few hours and what were the next steps.” (Interviewee 19)

“They would brief us on what decisions had been made by the client. They would also give us their priority as well as their timeline. You know in that scenario the timeline becomes an ‘ask’. Because they didn’t know how quickly, they hadn’t been through it before either, right. So they are saying: here is what I think I need, and can you get it to me by this time? What was interesting in this type of scenario is that because of the disaster situation most organizations would say yes, and when they would come prepared, let’s say can you have it for me in 8 hours, they would come to the next 8 hour meeting, or whatever, not only would they have that but traditionally they would have gone above and beyond. So you know from their perspective the client would come in and would basically give us a scenario and they would ask and they set from their timeline, because of their commitments, their PR commitments, their corporate commitments etc. they basically set the timeline for us and we had to go out and figure how we could make it happen within that timeline.” (Interviewee 19)

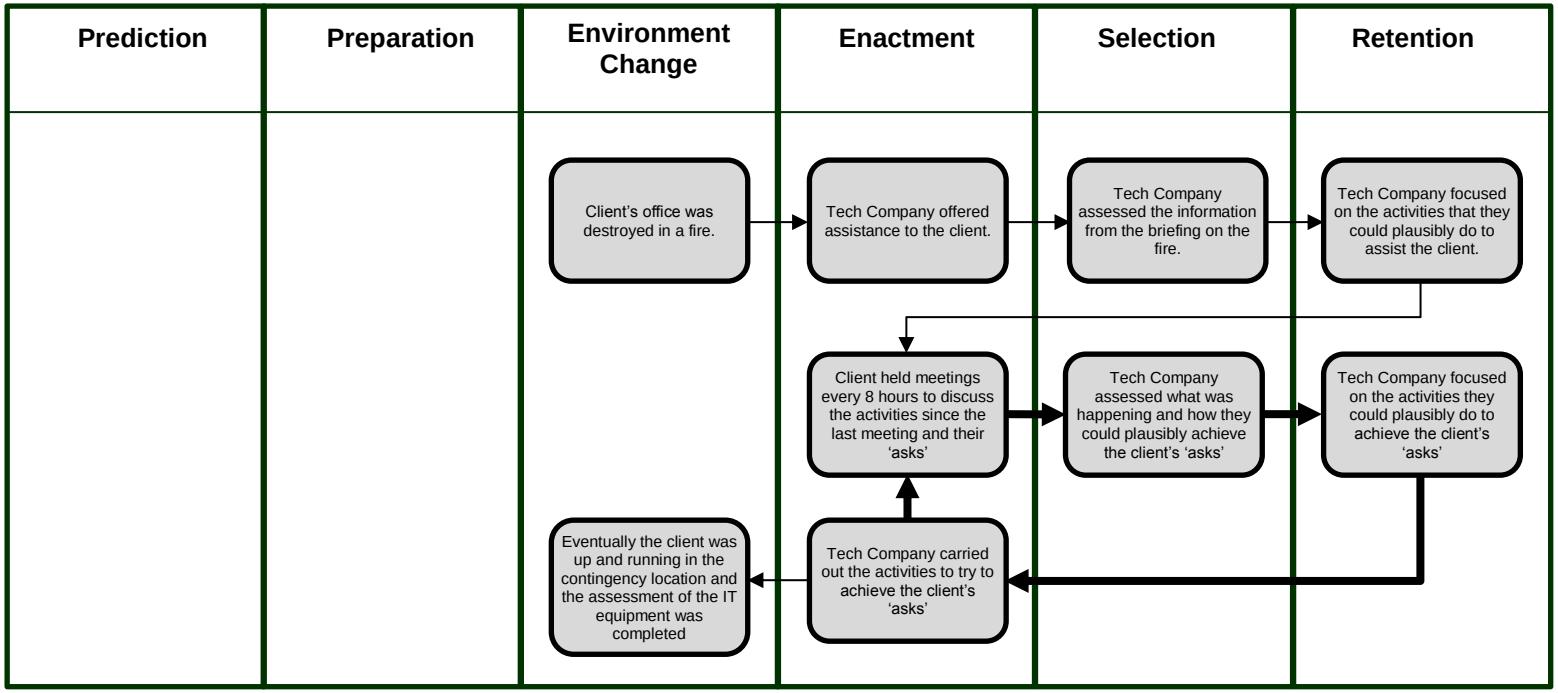

Figure 8 – Reactive Sensemaking Process: Fire in client's building (Crisis 3)

4.2.4 Crisis 4: Failing billion dollar oil rig decommissioning project

During Crisis 4 (see visual map shown in Figure 9) a project was experiencing costly delays due to failure to decommission an oil rig. The project team members faced a final attempt to save the project and achieve the project goals. This multi-billion dollar project was experiencing critical issues on many fronts. During this crisis an organizing structure emerged as a repeated pattern of daily meetings in which the project team members focused on the detail of what was happening, what the immediate issues were, and they set their priorities, coordinated their activities and agreed what had to be done for that day. Through this series of daily meetings a rhythm or 'drum beat' (Interviewee 14) was established for their activities. While the organizing structure did not provide the overall detail of what needed to be done, it enabled the project team members to take action and then make sense of the emerging situation to then identify what further actions they could take.

> *"So effectively it was a last ditch effort. We had daily meetings. What we did was, a nice phrase I heard was, if you imagine a drum beating, we got the drum beat to go louder and faster, is how the team sort of arranged itself. Now at the same time as that was happening on-shore some pre-requisite activity, work that had to be done off-shore to allow this big phase of scope to start was all going horribly wrong. Modifications had been carried out on very, very critical equipment that basically were designed wrong, were fabricated wrong. We had contractors who were not performing off-shore, so we were also fighting a front there, dealing with an emergent scope of work off-shore. And again the same approach was taken which was urgent mobilisation of personnel from other parts of the project." (Interviewee 14)*

> *"We would come in in the morning. Start time for us is just after 7 o'clock. There would be a half past 7 marine call because we had a number of ships in the off-shore in the field. That would be led by our marine construction manager. We would all hear what was going on*

what were they all doing. We would feed in any issues we were aware of that would impact their scope of work. At 8 o'clock we would then have a call with the main off-shore installation that we were trying to remove. Again it was a coordinating type call. It was setting the priorities; it was understanding what we were doing off-shore, and any emergent issues off-shore that needed to be tackled. After that one we moved into the 9 o'clock last 24 next 24 hour on-shore preparation meeting that was designed to keep the machine fed that would drive off-shore activity and ensure it was ready. So what we were doing there was. We had basically identified everything that had to be done in terms of work areas. We did a work breakdown structure. We did a single point of accountability [SPA] for each one. And in that meeting each SPA gave a summary of what we had achieved. What we still had to do. As a team we all fed into giving advice and endorsing the decisions that were being made, flagging up anything else that we could think of and really set what had to be done for that day." (Interviewee 14)

As such the series of daily meetings provided the project team members with a "sense structure around the things that people had to do". It enabled them to engage in action-meaning cycles involving collective retrospective sensemaking in order to continue "firefighting" and so that they "muddled through".

"[W]e tried to break down the scale of a task into little bit size pieces that people could manage and that was really important because people couldn't really see the end game, they couldn't see how we were going to get out of the mess we were in but what we tried to do was create a bit of sense structure around the things that people had to do, and we sort of muddled through while at the same time refining the bigger picture" (Interviewee 14).

"We continued firefighting" (Interviewee 14).

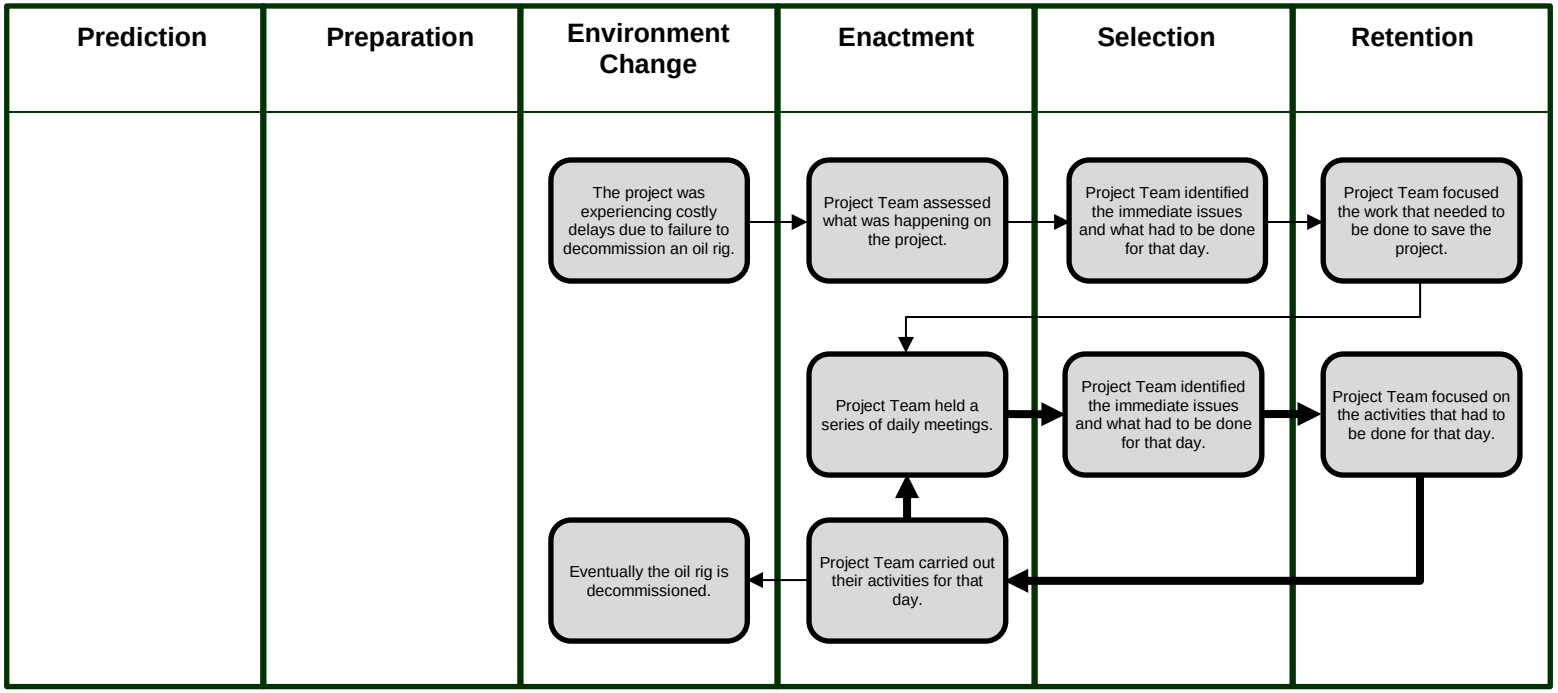

Figure 9 – Reactive Sensemaking Process: Failing billion dollar oil rig decommissioning project (Crisis 4)

4.2.5 Summary of Findings on Reactive Sensemaking Processes

In summary, there are two findings in relation to the reactive sensemaking processes. Firstly, these reactive processes involved iterative cycles of retrospective sensemaking through which the actors reacted after the fact to what had happened in their environment. Secondly, over time the actors engaged in a series of meetings which provided a temporal structure through which they organized their activities. They agreed when they would come together to share information, to try to give meaning to what was happening, and to agree their immediate short-term actions. These temporal organizing structures provided a 'routine' (Interviewee 17) or 'drum beat' (Interviewee 14) to their activities that enabled their collective retrospective sensemaking. The following section presents the findings in relation to the second category of sensemaking process; the proactive processes.

4.3 Proactive Sensemaking Processes: Crises 5-22

Eighteen crises exhibited a proactive sensemaking process whereby they initially unfolded as cycles of retrospective sensemaking when actors gathered information to explain either the cause of the crisis or what was happening during the crisis. Using this information, they created plausible explanations for what had occurred and focused their actions based on these plausible explanations. However, the proactive processes differed from the reactive processes when the actors engaged in a cycle of anticipatory sensemaking in which a future threat was predicted and a course of action prepared to avert this threat. Through enactment the actors noticed cues from their organizational environment. Based on how the actors interpreted these cues, whether or not the cues led the actors to recognise and predict a future threat, this gave rise to the form of sensemaking process that then unfolded; either as anticipatory or retrospective sensemaking. In this way, enactment formed a pivotal interaction point between the cycles of retrospective and anticipatory sensemaking during the proactive processes, and this is evident in the visual maps for each of the proactive sensemaking processes where the enactment processes are situated in the intersection between the retrospective and anticipatory processes

(detailed further in section 4.3.1). The cycle of anticipatory sensemaking was then followed by further cycles of retrospective sensemaking that were focused on assessing the on-going activities against the agreed course of action and the collective goal to avert the predicted threat. In section 4.2 three crises (2-4) were presented that unfolded as reactive processes involving retrospective sensemaking. During the iterative cycles of retrospective sensemaking, the actors created temporal structures which emerged over time to enable the actors to carry out and coordinate their sensemaking. These organizing structures took the form of a series of daily meetings that provided a means for the actors to engage in retrospective sensemaking. The eighteen crises (5-22) that unfolded as proactive processes, which are presented in this section, also involved the creation of organizing structures. The organizing structures during the proactive processes provided a means of taking action in the form of the agreed course of action, but in addition, the collective goal to avert the predicted threat also functioned as an organizing structure. Although the majority of the proactive sensemaking processes involved one cycle of anticipatory sensemaking, as will be described in section 4.3.1, three of the proactive processes involved double cycles of anticipatory sensemaking. The cycles of anticipatory sensemaking involved in the proactive processes took one of three forms; pattern matching, trajectory tracking and convergent sensemaking. Each of these three forms is considered in the following sections, starting with proactive processes that involved pattern matching.

4.3.1 Pattern Matching and Retrospective Sensemaking: Crises 5-11

Seven of the proactive crises (5-11) unfolded as cycles of retrospective sensemaking followed by a cycle of pattern matching and then further cycles of retrospective sensemaking. Initially the actors engaged in cycles of retrospective sensemaking in which they acted to gather information to diagnose the cause of the crisis or to explain what was happening during the unfolding crisis. Then, based on this information, they created plausible explanations for what had occurred, and focused their next actions based on these plausible explanations. The actors then engaged in a cycle of pattern

matching sensemaking which took the form: “The situation is A, this is likely to lead to B, so we need to do X” (McLennan, Elliot and Holgate, 2009, p. 92). The anticipatory sensemaking occurred when the organizational actors noticed cues in their environment (situation is A) that they recognised and predicted would lead to a threat (likely to lead to B) which they needed to do something to try to avert. The actors then prepared and implemented a course of action through which they would try to avert the future threat (need to do X). Following the cycle of pattern matching sensemaking, the organizational actors continued to engage in cycles of retrospective sensemaking which were focused on assessing progress against the course of action to avert the predicted threat.

The seven proactive sensemaking processes which involved pattern matching are described in the following sections (4.3.1.1 to 4.3.1.7), starting with Crisis 5. The visual maps for the crises (5-11) are provided to show the sensemaking processes that unfolded during each crisis. These visual maps are annotated (using the oval text boxes) to highlighted the activities that form the pattern matching sensemaking process (i.e. the situation is A, this is likely to lead to B, so we need to do X).

4.3.1.1 Crisis 5: Project team held hostage

During Crisis 5 a project team were taken hostage by a group of tribesmen (see the visual map shown in Figure 10). The project team first tried to retrospectively make sense of what had happened and how their captors were acting. The plausible explanation they created was that the tribesmen had misunderstood why the project team had been on their tribal lands. The project team identified that this was causing a great deal of upset to the tribesmen so that the situation was very volatile. As such the project team recognised that they needed to be careful about how they responded to the tribesmen’s actions (situation is A).

> *“Because they were upset and they misunderstood our intent” (Interviewee 12).*

"It was a very dangerous situation for me and my team, and we had to think very fast, we had to act very promptly, we had to be very careful. It was a situation, one that could easily go out of control if it wasn't properly managed" (Interviewee 12).

The project team had an existing emergency response plan that had been prepared prior to the crisis based on the different envisioned scenarios that might occur. Initially they followed the emergency response plan, however they realised that the situation was not going to proceed as per the plan, that it was unpredictable and evolving, and they feared that they were going to be killed.

"Prior to those kinds of projects we normally have an emergency response plan that already all are aware of, and you know you have different kinds of scenarios played out, prior to the start of the project: what would happen in this kind of situation, what would happen if we had this kind of a situation, what kind of process, who would be the focal point and all of that. So when we found ourselves in that situation, the first thing response triggered the emergency response plan that was appropriate for that kind of situation. And also so ensure that everybody follows through. So first you are going to be calm, as much as possible, surrender everything that you have on you, don't refuse to release whatever it is they ask of you, release them and remain very clam. So generally we followed that process, and for those who were having that experience for the first time, it was important for me, it was important for the senior members of my team to help them to remain clam, because there was a fear that we were going to be killed" (Interviewee 12).

"Yes the scenario itself was very unpredictable. You are dealing with unpredictable human beings. It was not easy for us at the initial stage to ascertain whether the plan was going to give us the results that we hoped. All we did was to try and stick with the plan and watch how the situation evolved" (Interviewee 12).

The project team then engaged in a cycle of pattern matching sensemaking which took the form: “The situation is A, this is likely to lead to B, so we need to do X” (McLennan, Elliot and Holgate, 2009, p. 92) as shown in Table 15 (page 115) and indicated by the oval text boxes in Figure 10. They thought that it was likely that they would be harmed, and they feared for their lives (likely to lead to B). It was a situation in which there was very little that they could do. However they did what they could, and agreed a course of action which was to try to alert people outside the camp so that there would be an external intervention, and they would request an audience with a tribal chief, who they could speak to in order to explain their situation (need to do X). Eventually they were granted the audience with a tribal chief and this helped to secure their release.

> *“Somewhere along the line we realised that it wasn’t going to be as easy as we had planned it on paper” (Interviewee 12).*

> *“We decided that we were going to speak with one of their chiefs, who eventually we got his audience. We decided to, we appointed just one person to do the speaking. We all just kept quiet and allowed him to explain and all of that. But apart from that there was very little that we could do, we were just waiting and hoping that eventually we were to reach a mutual compromise” (Interviewee 12).*

> *“We were really, it was to be honest with you, we were really helpless in that situation, there was really very little we could do. We could only just pray that we would be able to speak to someone that would be stable enough to understand what we were about and hopefully plead our case and get them to release us” (Interviewee 12).*

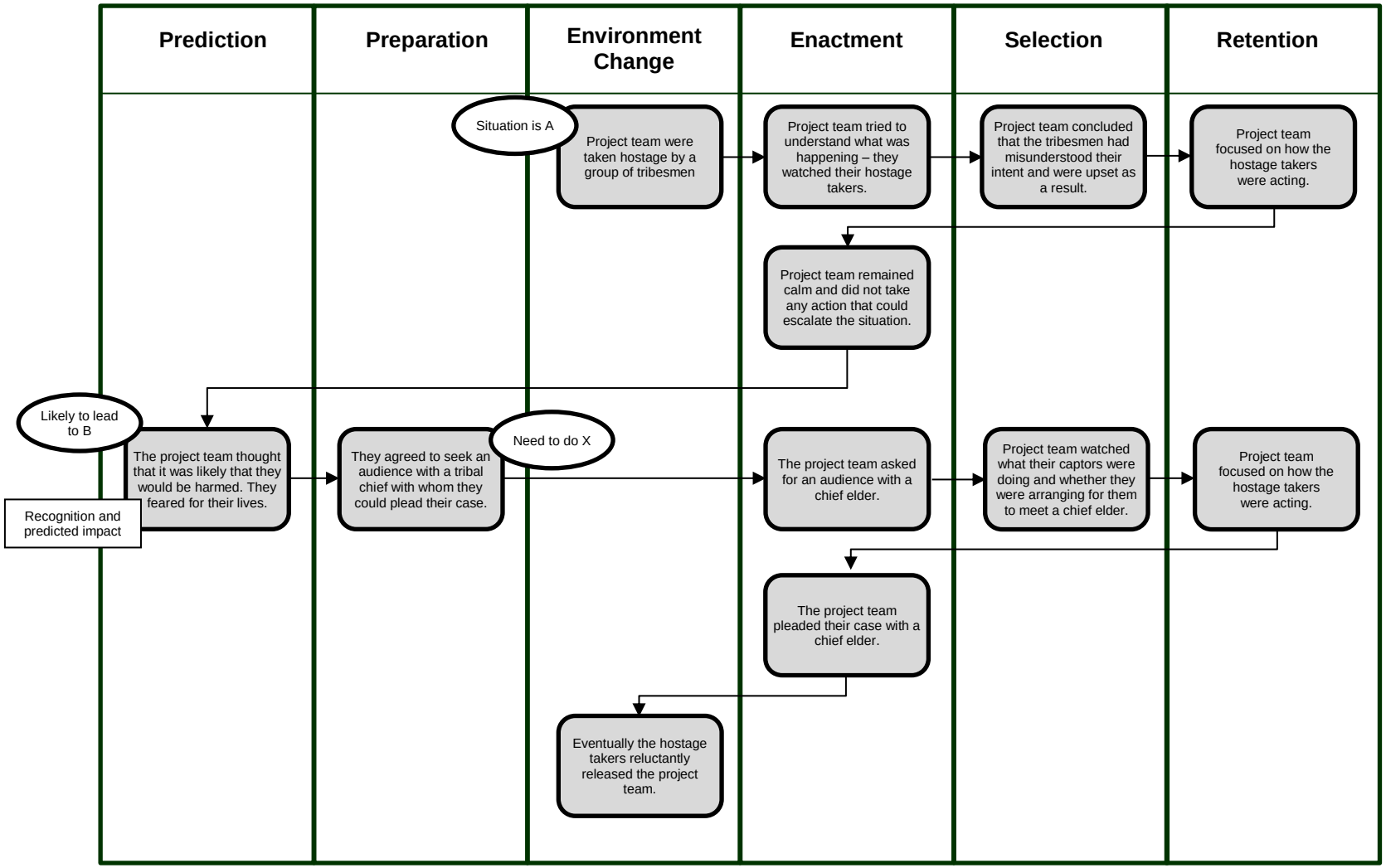

Figure 10 – Pattern Matching and Retrospective Sensemaking: Project team held hostage (Crisis 5)

The visual map in Figure 10 shows the enactment processes situated in the intersection between the cycles of retrospective and anticipatory sensemaking. The project team first engaged in retrospective sensemaking to make sense of what had happened and how their captors were acting. They remained calm and did not take any action that could escalate the situation (enactment). They then engaged in anticipatory sensemaking when they thought that it was likely that they would be harmed and they feared for their lives. They agreed a course of action to ask for an audience with a tribal chief and to then plead their case by explaining why they had been working on the tribe's lands. The project team implemented the first part of this course of action by asking for an audience with a tribal chief (enactment). They then engaged in further cycles of retrospective sensemaking in which they watched what their captors were doing and whether their captors were arranging for them to meet with a chief elder. When the team were granted an audience, they implemented the second part of the course of action which was to plead their case to the tribal chief (enactment). In this way, the enactment processes formed the interaction point between the cycles of retrospective and anticipatory sensemaking.

Table 15 – Pattern matching sensemaking process: Crises 5

Crisis title: Project team are held hostage
Threat: The project team feared for their lives.
Situation is A: Project team were taken hostage by a group of tribesmen
Likely to lead to B: The project team thought that it was likely that they would be harmed. They feared for their lives.
Need to do X: They agreed to seek an audience with a tribal chief with whom they could plead their case.

4.3.1.2 Crisis 6: Wireless receiver performance issues

Crisis 6 (see the visual map shown in Figure 11) occurred when performance issues were identified during the development of a wireless receiver that was due to be used in a customer trial of a new wireless data service. When Tech Org staff first noticed the performance issues during testing, they tried to retrospectively make sense of what was causing the performance problems. While they could not prove the cause, their plausible explanation was that the existing device which had been used as part of the prototype was interfering with the wireless receiver.

> *"[W]e debated where we thought the problems were so probably for an hour or two, we got a list of things, very quickly rose to the top of the list that most likely was the antennae and it was radiating from there so we did a second test at the test range to try and confirm that and so we took some other antennae systems that we had for other products and devices and you weren't able to definitively say that but that seemed to back up that conclusion" (Interviewee 5).*

> *"We had another follow up meeting to say right this is where we think the problem lies, what can we do about it in our control." (Interviewee 5)*

Tech Org staff engaged in a cycle of pattern matching as shown in Table 16, and indicated by the oval text boxes in Figure 11. They tried but could not improve the performance of the receiver and they had very little time available before the customer service trial was scheduled to start (situation is A). They engaged in pattern matching sensemaking (see Table 16) when they realised that the overall project would be cancelled if they could not resolve the performance issue (likely to lead to B). So they had to do something within their control, and they agreed a course of action in which they would build a customised receiver to see if it would work with the wireless device (needed to do X). The customer trial of the new data wireless service went ahead using the customised receiver.

"[W]e could potentially use this other antennae design which meant actually rather than just using, turning an off the shelf piece of equipment into the antennae, we would have to design a custom one so we did some calculations based on what we'd done before and the kind of design that we could come up with and worked out what we thought it would cost and how long it would take." (Interviewee 5)

Table 16 – Pattern matching sensemaking process: Crises 6

Crisis title: Wireless receiver performance issues
Threat: Threat that the customer trial of the new data wireless service would not go ahead or would be compromised by using a poorly performing product.
Situation is A: Tech Org could not improve the performance of the receiver and there was little time before the customer service trial.
Likely to lead to B: Tech Org realised that the overall project would be cancelled if they could resolve the performance issue.
Need to do X: Tech Org agreed to quickly customise another receiver to see if it would work with the wireless device.

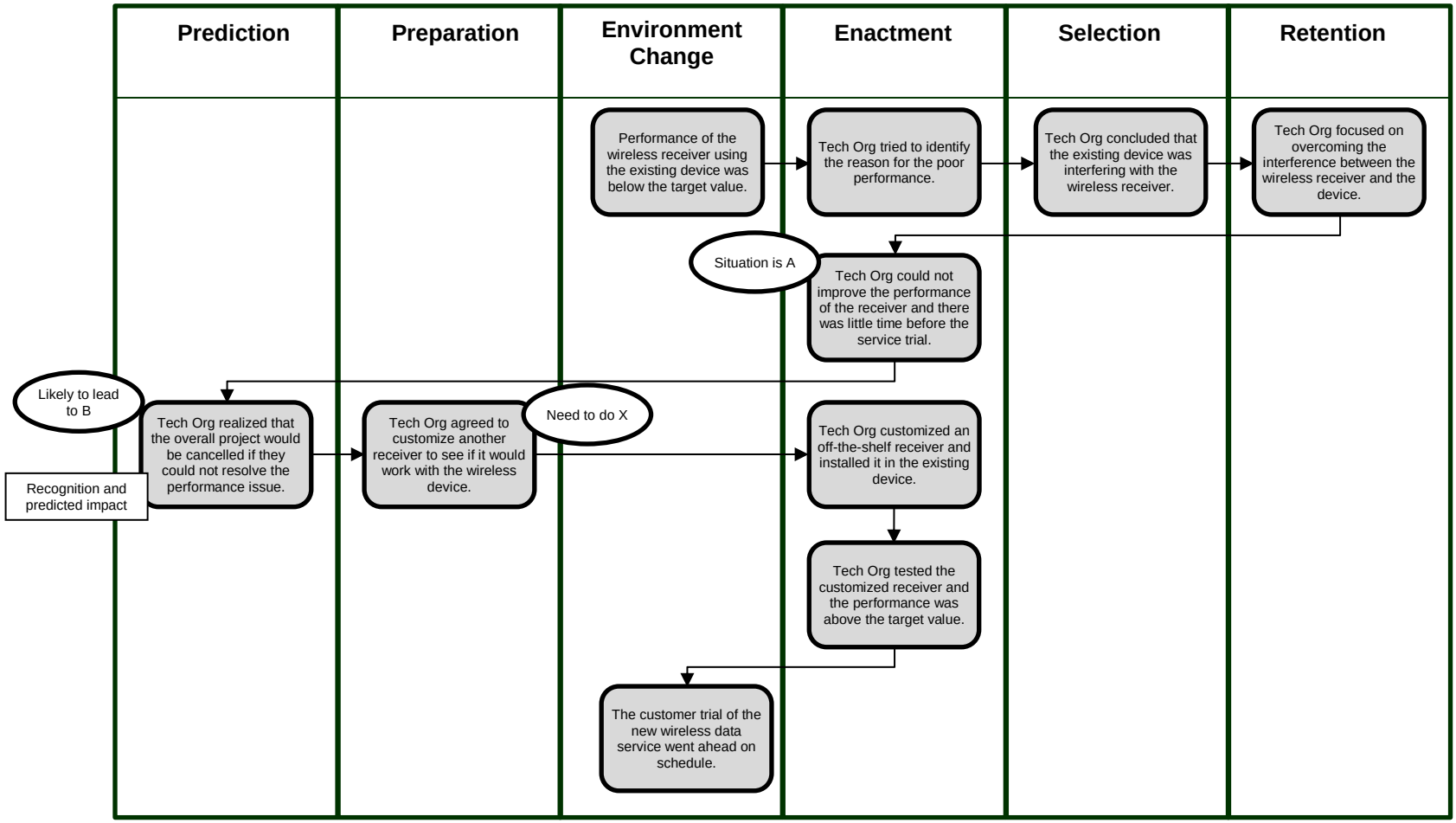

Figure 11 – Pattern Matching and Retrospective Sensemaking: Wireless receiver performance issues (Crisis 6)

4.3.1.3 Crisis 7: Alarms that could not be deactivated

Crisis 7 involved a hotel's new alarm system that had recently been installed (see the visual map shown in Figure 12). When the alarms were activated the hotel staff took action to evacuate the hotel. They engaged in a cycle of retrospective sensemaking in which they tried to ascertain what had caused the alarm activation. They identified a plausible cause for the alarm activation and took action to resolve the problem.

> *"We had an issue with the fire alarm system where once it activated we couldn't switch it off, so again fortunately it was not too late in the evening. We had a fire alarm, the hotel went into evacuation." (Interviewee 2)*

However, when the staff members tried to turn the alarms off so that guests and staff could re-enter the hotel, they are unable to deactivate the alarms. Through a cycle of anticipatory sensemaking which unfolded as pattern matching (see Table 17 and as indicated in Figure 12 by the oval text boxes), the staff realised that they did not know how the new alarm system worked (situation is A) and recognised that if they could not find a way to deactivate the new fire alarms that guests and staff would be unable to re-enter the hotel. If this situation continued it was likely to cause a full evacuation of the hotel guests and staff to a contingency location (likely to lead to B). The hotel staff discussed what they could do to deactivate the alarms, and they identified that their only option as a short-term fix was to "pull the plugs" (Interviewee 2) from the alarm sounder system which meant that they would have to invoke a manual fire watch until they could resolve the problem with the alarms (need to do X). So the hotel staff agreed this course of action and pulled the plugs on the alarm sounder system, which meant that guests and staff could return to the hotel.

> *"So we had the alarms going off, we had guests outside, we had hotel managers screaming because they wanted the alarm switching off, we couldn't switch the alarms off, so the decision was taken by myself in conjunction with the director of security that we'd pull the plugs." (Interviewee 2)*

"[T]he fire alarm just wouldn't switch off and we didn't have enough knowledge on site, it was a new system to account for this kind of a failure and it was a case of you had to do something at the time to stop the alarms to bring people in [evacuated guests in from evacuation points outside the building] so the only way we could do it was to pull the plugs on the sounder system and that's again that's a short-term fix." (Interviewee 2)

Table 17 – Pattern matching sensemaking process: Crises 7

Crisis title: Alarms that could not be deactivated
Threat: A full evacuation would be invoked if they could not find out how to deactivate the new fire alarms.
Situation is A: Hotel staff members failed to deactivate the alarms. They did not know how the new alarms worked.
Likely to lead to B: Hotel managers realised that if they did not turn off the alarms, then guests and staff could not re-enter the hotel. This was likely to cause a full evacuation to the contingency location.
Need to do X: Hotel staff members agreed that only option was to pull the plug on the alarm sounder system.

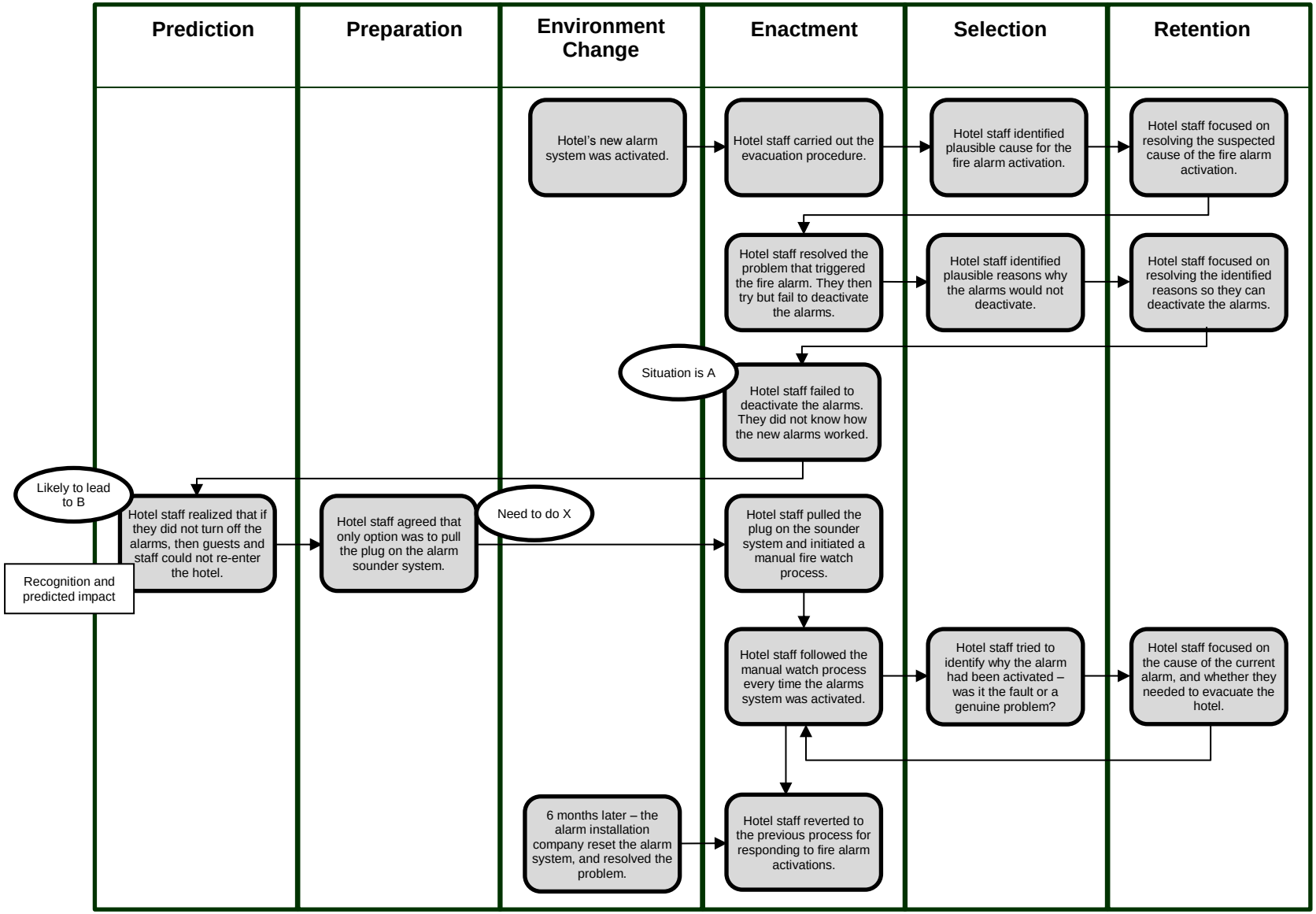

Figure 12 – Pattern Matching and Retrospective Sensemaking: Alarms that could not be deactivated (Crisis 7)

The hotel staff then engaged in cycles of retrospective sensemaking in which they implemented a “manual fire watch” (Interviewee 2) process. When an alarm was activated, the hotel staff members assessed whether it was a genuine fire alarm or if not then they implemented the “short-term fix” (Interviewee 2) of pulling the alarm sounder plugs. This situation lasted for over six months, as it took this length of time to find the fault with the alarm system and resolve the problem.

> *“But then you had a sounder system that wasn’t working so then you have to go into a manual fire watch until you can get hold of the incompetent person that [installed the alarms] to identify the problem, reset the system and then find the fault. Finding the fault took six months, a lot of time, a lot of effort, in that six month period we operated a higher level of fire alert, we operated a higher level of crisis management team. What I mean by a higher level is that when we went into fire alarm alert we then went into the mode of if we can’t stop it we sent a team up to the area where it could be stopped. So we knew how to stop it by pulling the plugs and that was the only way for six to eight months where we had to manage the fire alarm” (Interviewee 2)*

> *“Needless to say now it’s back. It’s the same fire alarm system but the fault has been resolved and tested. So six months afterwards, me giving the green light it’s fixed. We eventually calmed down, relaxed because every time we heard the fire alert we thought oh no, but now we’re confident in the panel and it doesn’t even appear in my radar anymore as a defect” (Interviewee 2)*

Crisis 7 is a crisis where the proactive sensemaking processes unfolded in cycles of retrospective sensemaking, followed by a cycle of pattern matching and then further cycles of retrospective sensemaking. A further example of a crisis that involved pattern matching sensemaking is Crisis 8, which is detailed in the following section.

4.3.1.4 Crisis 8: Community threaten retaliation

During Crisis 8 (see visual map in Figure 13), a project team took action to prevent one community taking retaliation on a second community. These two communities were in dispute over boundaries, and while the project team were being held hostage by community A one of the project team members who was from community B had been "badly beaten" (Interviewee 12) (situation is A). When the project team were released they gathered in their hotel to discuss their ordeal. Their discussion unfolded in cycles of retrospective sensemaking in which they sought to make sense of their ordeal. During the discussion the project team engaged in anticipatory sensemaking which took the form: "The situation is A, this is likely to lead to B, so we need to do X" (McLennan, Elliot and Holgate, 2009, p. 92) as shown in Table 18. They predicted that community B may attack community A in retaliation for the beating (likely to lead to B). The project team felt they had to act to avoid this, so they devised a course of action they could take (need to do X). This was to speak to the elders form community B and "let them know that further there was no sense in their trying to retaliate and all of that" (Interviewee 12). So the project team departed from their hotel and flew back to the city to make arrangements to meet with the elders from community B.

> *"We also felt we didn't have any assurance that they would not attack the community that took us. One of their community in our team and he was badly beaten and we knew that something might just happen, was a situation that we felt might escalate and we decided that we were going to demobilise. Also, we tried as much as possible to the extent that we could to try and get some representative from the other community to discourage an attack from the second community, that there was no sense in that the issue was already resolved, and that we thought there was a better way of dealing with it. So some representatives from the company spoke to the representatives from the community to address those further, and also part of our responsibility to let them know that further there was no sense in their trying to retaliate and all of that." (Interviewee 12)*

"… for the next like 48 hours we were in a state where we were making quite a lot of decisions quite quickly. And also to de-escalate the situation with the other community who we felt were already feeling agitated and were going to, were planning to launch an attack on the community that took us hostage. So the next 48 hours after that encounter was a series of decisions that needed to be taken on what meetings had to be held and for those types of meetings we didn't have a plan if you know what I mean. There was no plan for that." (Interviewee 12)

Table 18 – Pattern matching sensemaking process: Crises 8

Crisis title: Community threaten retaliation
Threat: Threat to safety and life for both communities.
Situation is A: Community A took the project team hostage. They attached one of the project team members as he was from community B.
Likely to lead to B: Project team predicted that community B may attack community A in retaliation.
Need to do X: They needed to prevent community B from taking revenge, so they needed to speak to the elders from community B.

While four of the crises (Crises 5-8) that exhibited pattern matching sensemaking processes unfolded with one cycle of pattern matching, three of the crises involved two cycles of pattern matching (Crises 9-11) and the details of these crises are provided in the following three sections.

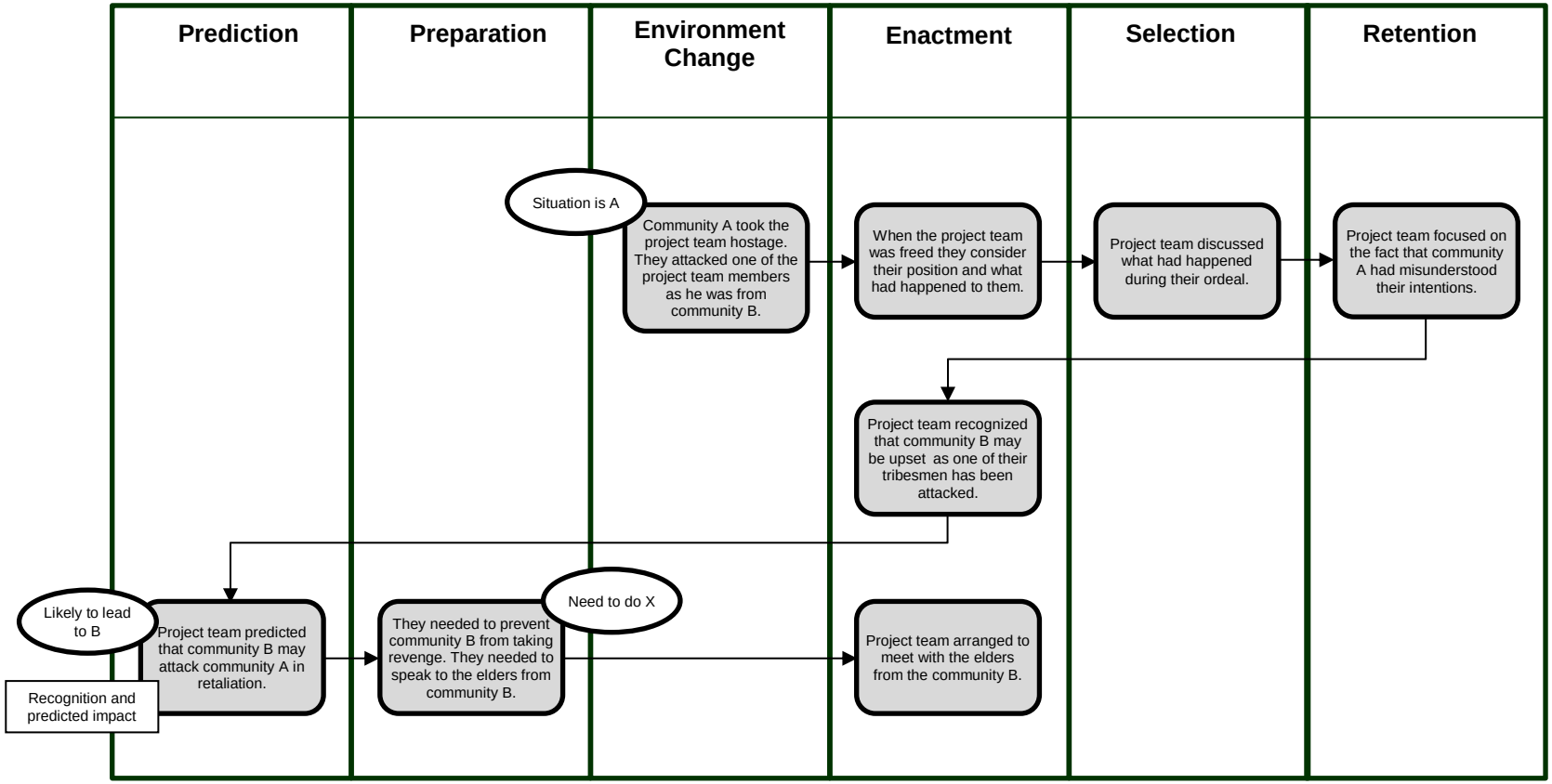

Figure 13 – Pattern Matching and Retrospective Sensemaking: Community threaten retaliation (Crisis 8)

4.3.1.5 Crisis 9: 24 hour telephone outage at hotel

Crisis 9 (see visual map in Figure 14) involved the 24 hour telephone outage at a 5-star hotel, where the hotel staff needed to find alternative ways to continue to provide services for their guests. The crisis occurred when the hotel's telephone system completely failed so there were no incoming or outgoing calls, and guests could not order room service (situation is A). The hotel management and engineering staff engaged in retrospective sensemaking when they tried to identify the cause of the problem and to understand whether they could reboot the system to get it working again (see the visual map shown in Figure 14). When they realised that they could not reboot the system, the senior managers recognised that the hotel would stop functioning so they needed to take action to "make the hotel function" (Interviewee 1) despite the problems with the telephone system. The hotel staff engaged in a cycle of anticipatory sensemaking which unfolded as a pattern matching process (see Table 19), when they predicted that there would be guest complaints (likely to lead to B) so they needed to manage guests reaction by putting processes in place to provide them with telephone facilities and room services. They agreed to place staff on each guest floor with information on what was happening, and a mobile phone which could be used to make outgoing calls and place orders for room service (need to do X).

> *"[O]k we need to put signage and at least two members of staff on every floor who are going to sit at the lift landing with a communication in terms of yes our phones are out of order, are you ok, what do you need, we could use mobiles. Obviously it was then it was everybody in the hotel so at that point sales people came off selling because they can't phone anybody. The events people can't take requests so it was using those people who are used to talking to people and putting them on the guest floors with their mobile phones. Here's two chairs, here's a room service menu, if the guest wants to order room service, this is the mobile phone for room service so you*

can still phone. How do we still make the hotel function and then do that" (Interviewee 1).

The hotel staff members then engaged in cycles of retrospective sensemaking in which they assessed the temporary process they had implemented so that guests could make outgoing calls and place orders for room service. They also assessed what was happening in the hotel reception area and the feedback they were receiving from guests. Then later the staff members engaged in a second cycle of pattern matching when the external IT team provided a timeline of around 24 hours to fix the switchboard problems (situation is A). The senior managers predicted that people would be trying to contact the guests but would not be getting through and this would cause concern or "fears" (likely to lead to B). So they agreed to send staff to a contingency location to take calls and send emails which could be relayed to the guests (need to do X). This second cycle of pattern matching (Table 19) was then followed by further cycles of retrospective sensemaking in which the hotel staff assessed the two processes they had implemented, what was happening in the hotel reception area and the feedback they were receiving from guests.

"[O]nce we started to get a timeline it was ok this isn't great, this is going to be a lot longer than we thought. What can we do? Right we can actually put a divert on our telephone line so that we can at least take incoming calls into the main hotel number. We can't transfer them to a guest room but at least if somebody is phoning the hotel they're not just getting this dead signal, which was what was happening, and we can way lay anybody's fears if they can't get through to somebody. So we had to divert our telephones to [contingency location]. So then it was ok put three members of staff in a taxi to [contingency location] with the information they need and then it was send them out and then obviously they can log onto email and then you've got your messaging system. So effectively your switchboard team at the hotel who are now effectively redundant because there's no phones, they are going to be the messaging people, the kind of the organization team in terms of messages,

taking them to the room, taking things back down, getting that whole communication flow in place and yes that wasn't far off a 24 hour failure outage in the hotel" (Interviewee 1).

Table 19 – Pattern matching sensemaking process: Crises 9

Crisis title: 24 hour telephone outage at hotel
Pattern matching – cycle 1
Threat: Financial and reputational damage due to the failure to provide guests with hotel services.
Situation is A: The hotel switchboard completely failed causing a full telephone outage in the hotel. There were no incoming or outgoing calls, and guests could not order room service.
Likely to lead to B: Senior Managers predicted that the hotel would not function and that there would be guest complaints if guests could not place outgoing calls or order room service.
Need to do X: Senior Managers agreed to place staff members on each guest floor with information on what was happening and a mobile phone.
Pattern matching – cycle 2
Threat: Concern and 'fear' among guests' friends and relatives if they could not contact the guests.
Situation is A: External IT team provided a timeline of around 24 hours to fix the switchboard.
Likely to lead to B: Senior Managers predicted that relatives may be concerned if they could not contact the guests.
Need to do X: Senior Managers agreed to send staff to contingency location to take calls and send emails to be relayed to guests.

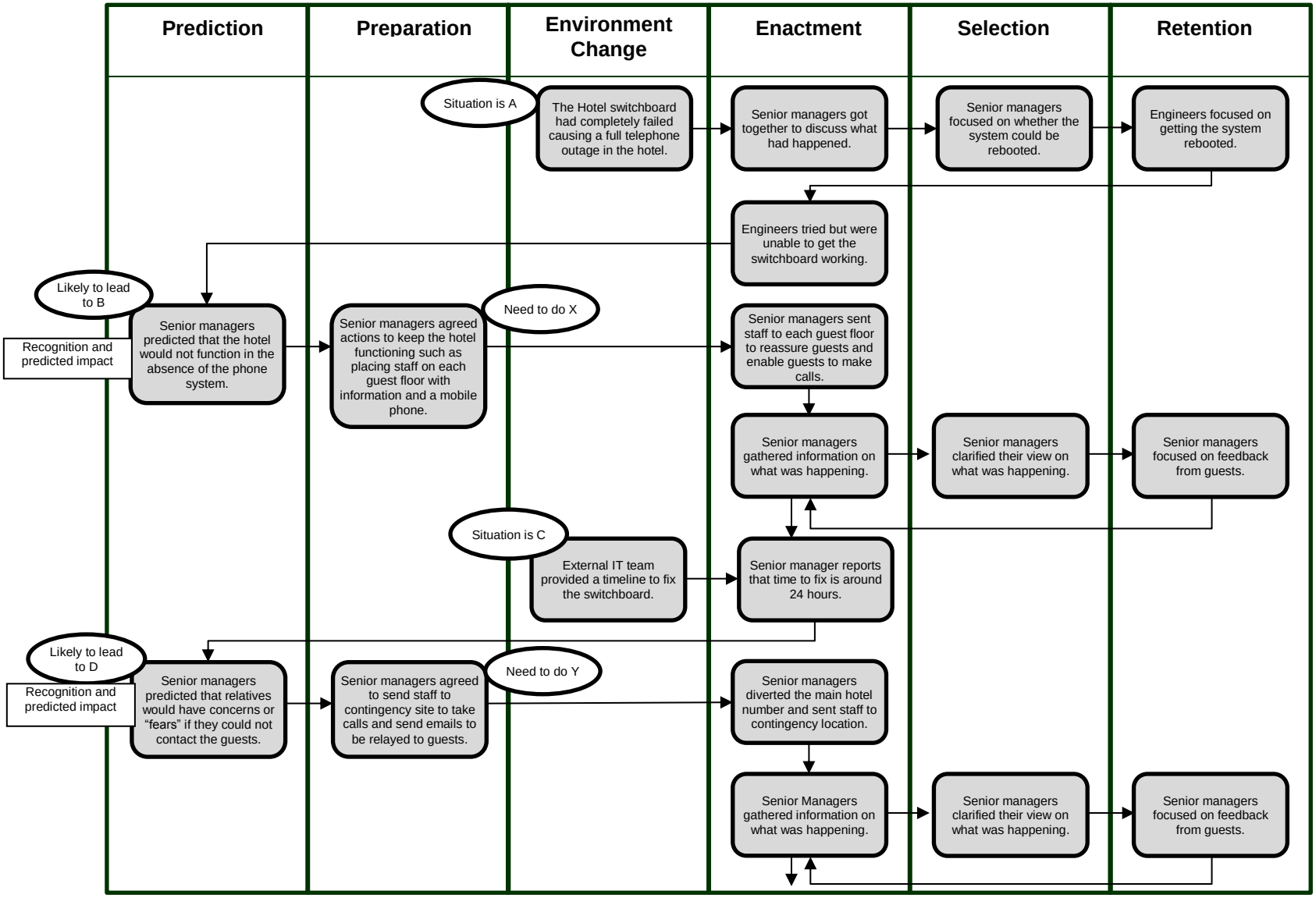

Figure 14 – Pattern Matching and Retrospective Sensemaking: 24 hour telephone outage at hotel (Crisis 9)

4.3.1.6 Crisis 10: Failure of a new appointment booking system

Leisure Organization (Crisis 10, Figure 15) were about to go live with a new appointment booking system. The project team were requested to make a design change, and this meant that the time available for testing was reduced. They tested the new appointments booking system in the time available. However they anticipated that there would be issues with the system due to a late design change and reduced testing. The project team agreed to ask senior management to phase the implementation of the new system, but the senior management took the view that the system had to go live as planned as the future of the organization depended on it. The booking system went live on schedule, but within days the organization started to experience issues in handling the volume of calls it was receiving. The project team predicted that within a short time the system would crash so they agreed with the senior management that they would remove individual locations from the booking system one at a time until the system stabilised.

> *"By the time of the go live, go live went through on a Sunday night quiet period. By the Tuesday they realised, or we realised that the performance degradation we have got to do something. And we pulled each one down until we got to a performance level which was acceptable. But it was warned before, bring on 1, bring on 5, bring on 10, bring on 20 and then go big bang, but the management team said no." (Interviewee 10)*

> *"Software couldn't cope with 40 locations; it could cope with about 20 – 25. Therefore it had to be pulled out, 20 had to be pulled out straight away, to allow 20 to run in the new target operating model until the new software got altered." (Interviewee 10)*

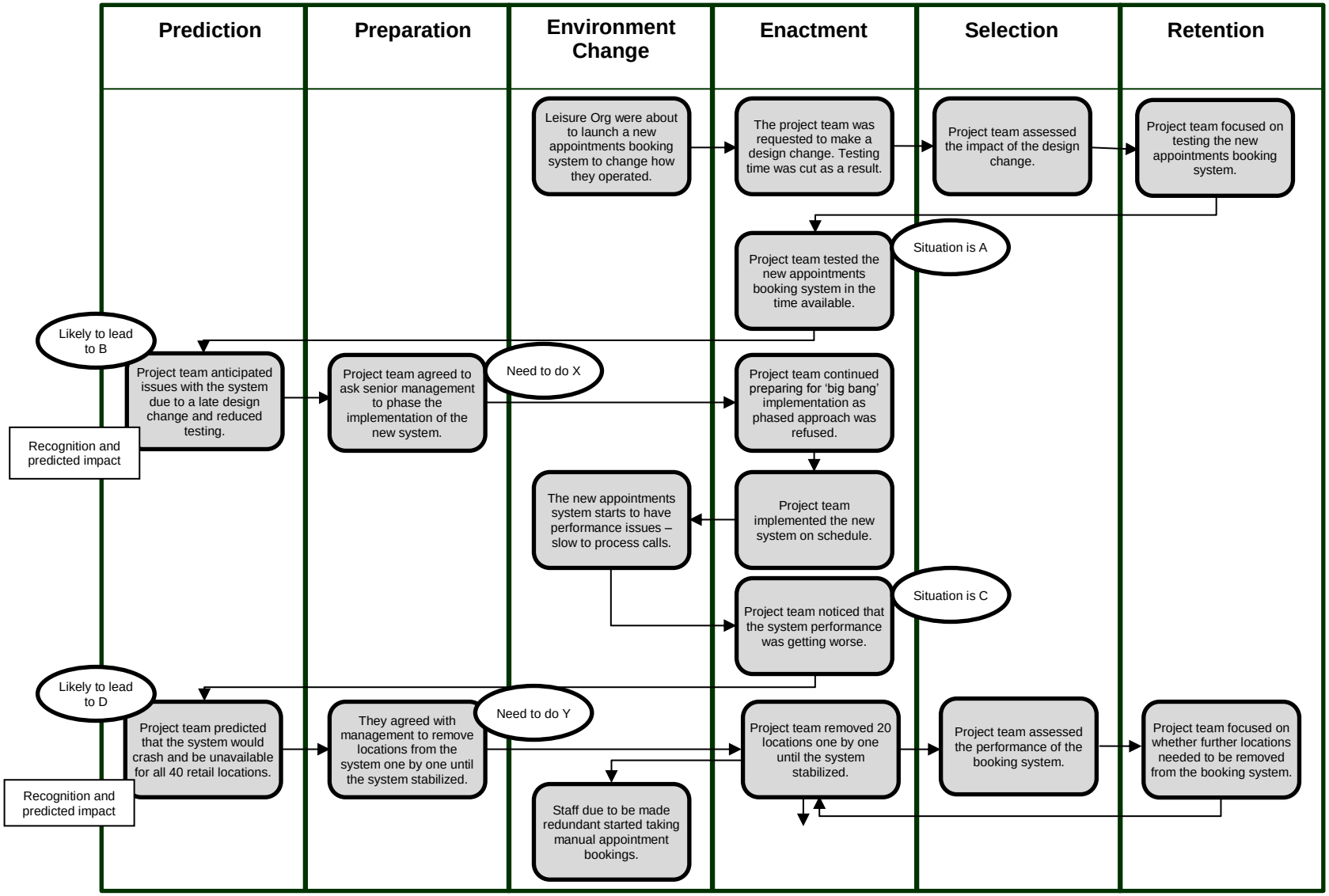

Figure 15 – Pattern Matching and Retrospective Sensemaking: Failure of a new appointment booking system (Crisis 10)

Table 20 – Pattern matching sensemaking process: Crises 10

Crisis title: Failure of a new appointment booking system
Threat: Threat of both reputational risk and financial loss to the extent that it was thought that it could lead to the collapse of the business.
Pattern matching – cycle 1
Situation is A: Project team implemented a late design change as requested. Testing time was cut as a result.
Likely to lead to B: Project team anticipated that there would be issues with the system due to a late design change and reduced testing time.
Need to do X: Project team agreed to ask senior management to phase the implementation of the new system.
Pattern matching – cycle 2
Situation is A: Project team noticed that the system performance was getting worse.
Likely to lead to B: Project team predicted that the system would crash and be unavailable for all 40 retail locations.
Need to do X: They agreed with senior management to remove locations from the system one by one until the system stabilized.

4.3.1.7 Crisis 11: Presentation of new network technology

Crisis 11 (see Figure 16 and Table 21) involved a new innovative network technology was being deployed for the first time anywhere in the world. The deployment team did not think that the network solution was ready as they predicted that it would not function correctly when it was deployed. They agreed to speak to management to request a two week delay to the start of the deployment, but this was refused. Two weeks into the four week deployment period, the team was informed that a presentation had been arranged for the following week when the CEO would give a live televised demonstration of the new technology to an audience of 800 people that included politicians, industry experts and the media across Europe. However, two days before this

presentation the network solution started to work inconsistently. If the technology did not work at the moment when it was demonstrated, it risked major reputational and financial damage to the organization. The night before the presentation the project team predicted that the technology may not work when it was demonstrated, and that they needed to do something.

> *"We could well fail here, what are we going to do about it? So it was talking to the architects and the design people and again the trusting thing. What are we going to do if it fails? We are too late to actually call off the day." (Interviewee 10)*

The deployment team agreed a plan which they told no one about. They would give the CEO two devices (one new and one old technology) with the instruction to use whichever device he was directed to use at the point when the new technology was demonstrated. They would monitor the technology right up to the point of demonstration and make a decision at that point on which device they would instruct the CEO to use. In the end, the technology worked so the demonstration went ahead using the new technology.

> *"The frightening bit is that minutes before you get a call from the engineer to say it's failed." (Interviewee 10)*

> *"I trusted my engineers to fix it within the 5 minutes." (Interviewee 10)*

> *"That's right yeh, and it worked. But I was on the call to the network centre right up to 10 seconds before with the engineers." (Interviewee 10)*

Table 21 – Pattern matching sensemaking process: Crises 11

Crisis title: Presentation of new network technology

Pattern matching – cycle 1

Threat: Technology would not work when it was deployed - financial and reputational risk to the organization.

Situation is A: Deployment team do not think that the technology is ready to deploy.

Likely to lead to B: The deployment team predict that the technology was not stable and it would have problems once it was deployed.

Need to do X: They agree to ask for a two week delay to the start of the deployments.

Pattern matching – cycle 2

Threat: Technology will not work when it was demonstrated - financial and reputational risk to the organization.

Situation is A: Deployment team noticed that the new technology was now only working intermittently.

Likely to lead to B: Night before the deployment team predict that the technology may fail when CEO tried to demonstrate it.

Need to do X: They gave the CEO two devices with the instruction to use whichever device they directed him to use.

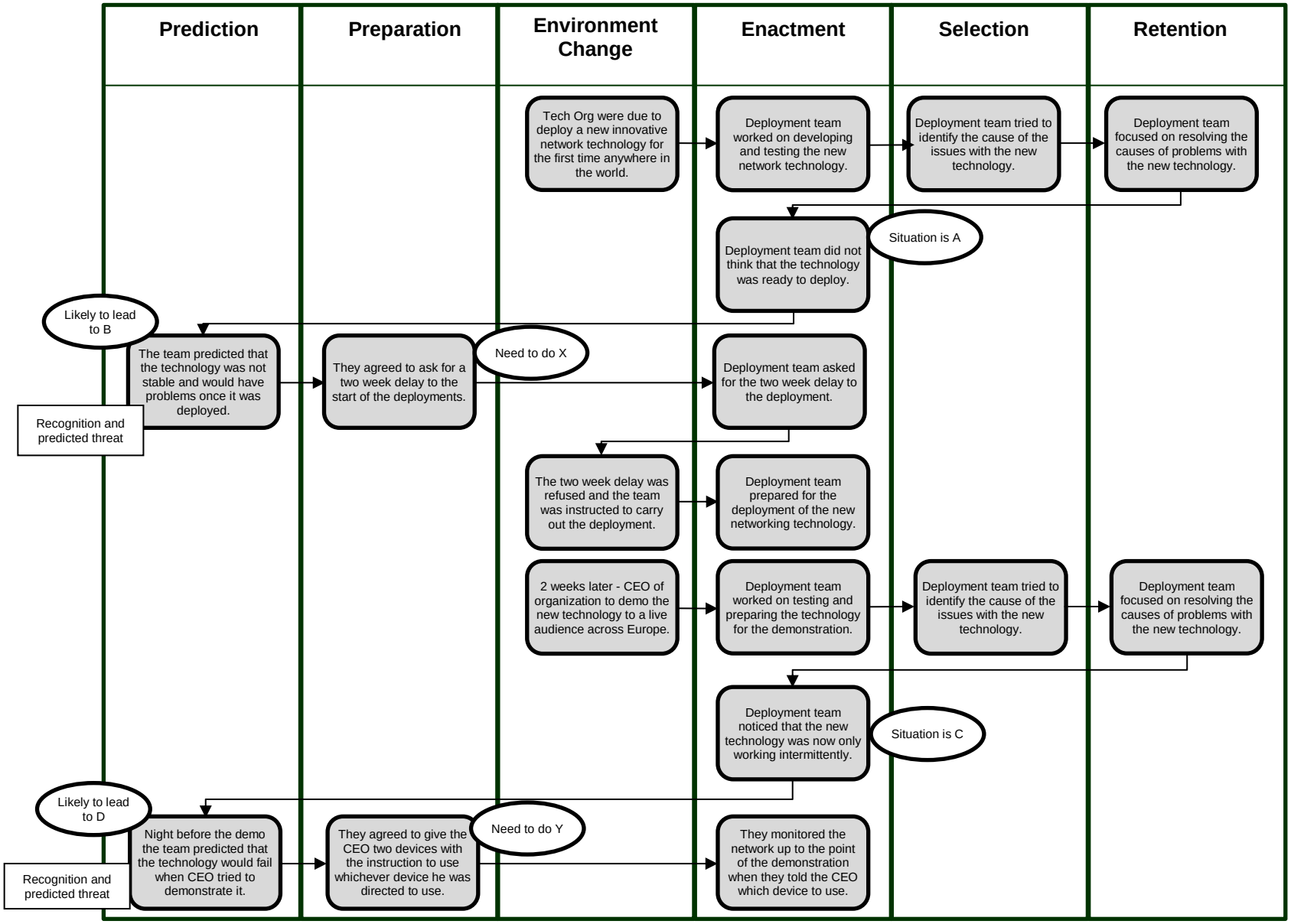

Figure 16 – Pattern Matching and Retrospective Sensemaking: Presentation of new network technology (Crisis 11)

4.3.2 Trajectory Tracking and Retrospective Sensemaking: Crises 12-16

Five of the proactive processes (Crises 12-16) unfold as cycles of retrospective sensemaking followed by a cycle of trajectory tracking, and then further cycles of retrospective sensemaking. Similar to the sensemaking processes involving pattern matching, the organizational actors initially engaged in cycles of retrospective sensemaking in which they sought to explain either the cause of the crisis or what was happening during the crisis. They created plausible explanations for what had occurred and focused their next actions based on their explanations. These cycles of retrospective sensemaking were then followed by a cycle of trajectory tracking which took the form: “The situation is one of A, over time this is likely to entail B, which may lead to C, so we need to do X” (McLennan, Elliot and Holgate, 2009, p. 93). This trajectory tracking occurred when the organizational actors noticed cues in their environment (situation is A) which through trajectory tracking they extrapolated that this was likely over time to lead to a future impact (likely to lead to B) that may entail a predicted threat (which may entail C) and that they need to do something to avert this predicted threat. The organizational actors then agreed a course of action through which they could try to avert the future threat (need to do X), and they then implement this newly prepared course of action. Following the cycle of pattern matching, the actors continued to engage in cycles of retrospective sensemaking in which they focused on assessing progress against the course of action to avert the predicted threat. The details of the five proactive processes that exhibited trajectory tracking (i.e. Crises 12-16) are provided in the following sections (4.3.2.1 to 4.3.2.5). The visual maps for the crises (12-16) show the sensemaking processes that unfolded during each crisis. These visual maps are annotated (using the oval shaped text boxes) to highlighted the activities that form the trajectory tracking sensemaking process (i.e. the situation is A, over time this is likely to entail B, which may lead to C, so we need to do X).

4.3.2.1 Crisis 12: Fire at an adjacent hotel

In Crisis 12 when a doorman saw thick smoke filling the street outside the hotel, he alerted the hotel management (see the visual map shown in Figure 17). The hotel managers were initially shocked by what was happening, but they tried to make sense of the situation and focused their attention on the smoke that they could see coming down the street outside the hotel (situation is A). The managers predicted, "we knew" (Interviewee 1), that this smoke was likely to enter their hotel via the air conditioning system (over time likely to entail B) and that this was likely to activate the hotel alarms (likely to lead to C). This would cause the hotel to go into an evacuation thus sending guests and staff outside into the smoke filled street. The hotel managers were not going to evacuate the hotel so they agreed to turn off the air conditioning and isolate their alarms to prevent any evacuation (need to do X). Table 22 shows this trajectory tracking process.

> *"We just, from the minute you know one of the doorman comes in and goes there's some smoke coming down the street and that smoke came down so thick and so fast. When I walked out into the lobby with the hotel manager we were just like oh my God what the bloody hell has happened, crap I need to shut down the fire alarm. That was the first immediate thing was I am not evacuating because I'm evacuating my hotel, I'm going to walk guests out into this and we knew. So it was engineering shut down the air conditioning because they would suck in the extract into the building and we would just be filled with smoke and it would cause the alarms to go off, and to isolate the alarms basically. So if then somebody set fire to our building it wasn't going to then not have the alarms go off, we would still be aware of it but make sure that we were in a controlled environment in terms of our alarms" (Interviewee 1).*

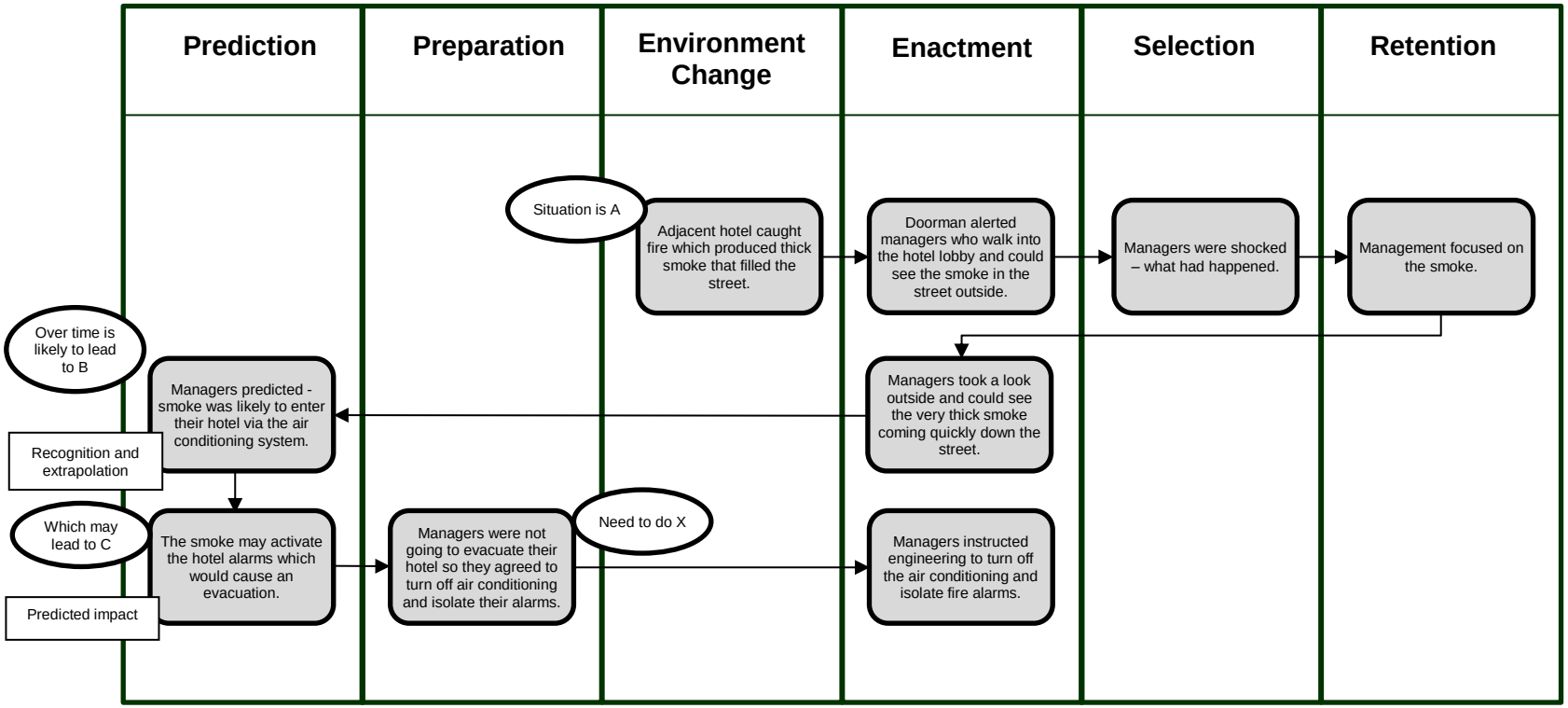

Figure 17 – Trajectory and Retrospective Sensemaking: Fire at an adjacent hotel (Crisis 12)

Table 22 – Trajectory tracking sensemaking process: Crises 12

Crisis title: Fire at adjacent hotel **Threat:** The hotel may be forced to evacuate their guests and staff into the smoke filled street that was an area of higher danger due to the smoke and the uncertainty as to whether there was a fire in the street. **Situation is A:** Adjacent hotel caught fire and produced thick smoke that filled the street. It was unclear whether there was also a fire in the street. **Over time this is likely to entail B:** Managers predicted that the smoke was likely to enter their hotel via the air conditioning system. **Which may lead to C:** This may activate their alarms and led to the guests and staff being evacuated into the smoke filled street. **Need to do X:** Managers needed to prevent the evacuation so they agreed to turn off air conditioning and isolate their alarms.

4.3.2.2 Crisis 13: Power outage and emergency back-up generator fails

A further example of a crisis that exhibits trajectory tracking sensemaking is Crisis 13. This crisis occurred one evening when builders who were working locally, accidentally severed the mains electrical supply for the whole district of the city and this included the power supply to 5-star hotel (see visual map shown in Figure 18). At the same time, the hotel's backup generator failed to automatically start to provide backup power to the hotel (situation is A).

> *"[B]ut that's unexpected, the amount of testing we do and the amount of looking after, the money that we spend on these systems, the last thing you expect that it's the main primary back up to fail, that was a shock" (Interviewee 3).*

The shift engineer and the senior managers (via phone) engaged in cycles of retrospective sensemaking (Table 23) in an attempt to identify the cause of the problem with the backup generator so they could get the generator started. Meanwhile the hotel had very limited power from an auxiliary power source which provided lighting in the public areas and power for the emergency signage, but there was no power for guest rooms, the lifts or the kitchens. The senior managers drove to the hotel to try to get the backup generator started. They engaged in trajectory tracking of the form: “The situation is one of A, over time this is likely to entail B, which may lead to C, so we need to do X” (McLennan, Elliot and Holgate, 2009, p. 93) as shown in Table 23. The senior managers predicted that the fuel for the auxiliary lights would soon run out as it would only last for around three hours (over time likely to entail B), and this would lead to the emergency lights failing (which may led to C).

> *“There were emergency lights because we have an auxiliary emergency back-up but that only gives you a three hour back up with the emergency lights in public areas which worked but after three hours that will just fade away because there’s no power coming into it” (Interviewee 3).*

They had to do something to get the generator working, so senior managers agree to try “bleeding” (Interviewee 3) the fuel line from the diesel storeroom to the generator (need to do X) which was on the roof of the hotel. This was to attempt to clear any air lock or blockage in case this was what is causing the problem. The senior managers carried out this course of action by bleeding the fuel line and then manually tried to start the generator. This time the generator started so it began to provide a power supply for the hotel.

> *“[W]e bled the fuel from the diesel line, started it up on manual and low and behold within about three minutes for us getting the lights on with the generator.” (Interviewee 3)*

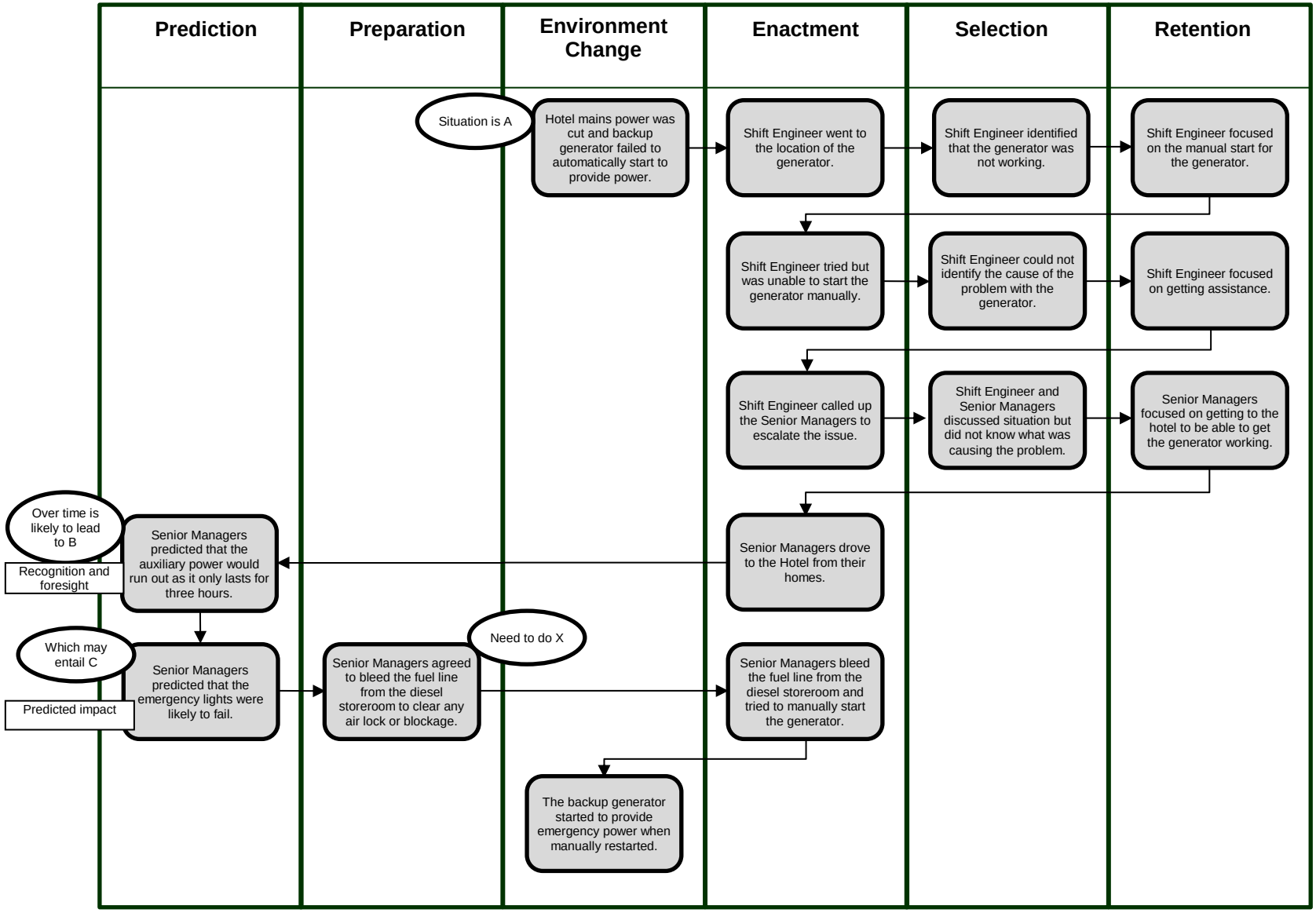

Figure 18 – Trajectory and Retrospective Sensemaking: Power outage and emergency back-up generator fails (Crisis 13)

Table 23 – Trajectory tracking sensemaking process: Crises 13

Crisis title: Power outage and emergency back-up generator fails
Threat: It was night time and the hotel had no power. The emergency lighting would soon fail and the hotel would be plunged into darkness.
Situation is A: Hotel mains power was cut and the backup generator failed to automatically start to provide power.
Over time this is likely to entail B: Senior managers predicted that the emergency lights were likely to use all the auxiliary power as it would only last for three hours.
Which may lead to C: The emergency lights were likely to fail - "will just fade away because there's no power coming into it" (Interviewee 3)
Need to do X: Senior managers agreed to bleed the backup generator fuel line from the diesel storeroom to clear any air lock or blockage.

4.3.2.3 Crisis 14: Burst pipe causes major flood in 5-star hotel

Crisis 14 (see the visual map in Figure 19) unfolded when a burst pipe caused a major flood in the boiler room of a 5-star hotel. A passer-by on the street outside the 5-star hotel saw what they thought was smoke coming out of the hotel basement and reported a fire. The shift engineer went to location of fire and noticed that there was steam rather than smoke. Through retrospective sensemaking he tried to make sense of the situation and identified that it was not a fire, but that there was a lot of steam in the boiler room. He realised that the steam could activate the fire alarms and cause the building to be evacuated. So the shift engineer took action to stop the fire alarms being activated and he then investigated what was causing the steam. However, he was unable to establish a plausible cause for the steam. He called the hotel senior managers and they discussed the situation. By the time senior managers arrived at the hotel there was a major flood in the boiler room (situation is A).

The senior managers engaged in cycles of retrospective sensemaking in which they identified that the cause was a connector on the heating pipe which had unexpectedly burst, “a one in a million chance” (Interviewee 3) and because the water was at a very high temperature it had created a lot of steam. The senior managers made a temporary fix to stop the water leak. Then the senior managers engaged in a cycle of trajectory tracking sensemaking (see Table 24 and as indicated by the oval text boxes in Figure 19) when they noticed there was no hot water and while this situation “wasn’t life threatening, it was more business failing” (Interviewee 3) as the entire building’s primary heating water was lost down the drain, so there was no heating in the building and there was no hot water for the kitchens and bathrooms (situation is A). Senior managers knew that it would take several hours to get the water system filled and the water heated (over time this is likely to entail B). They predicted that guest would wake at around 07:30 and there may be no heating and hot water (which may lead to C). The senior managers agreed a course of action in which they would prioritise getting the hot water back on rather than the heating, as they thought that the hot water was more critical from the point of view of the guests (need to do X). So the senior managers refilled and re-commissioned the water systems. They managed to get the water back on by around 07.30, and there wasn’t one guest complaint as guests were completely unaware of the situation.

> *“I think that may have been the saving grace because that extra half an hour or hour in bed for most people on a Saturday. Otherwise they wouldn’t have had any hot water.” (Interviewee 3)*

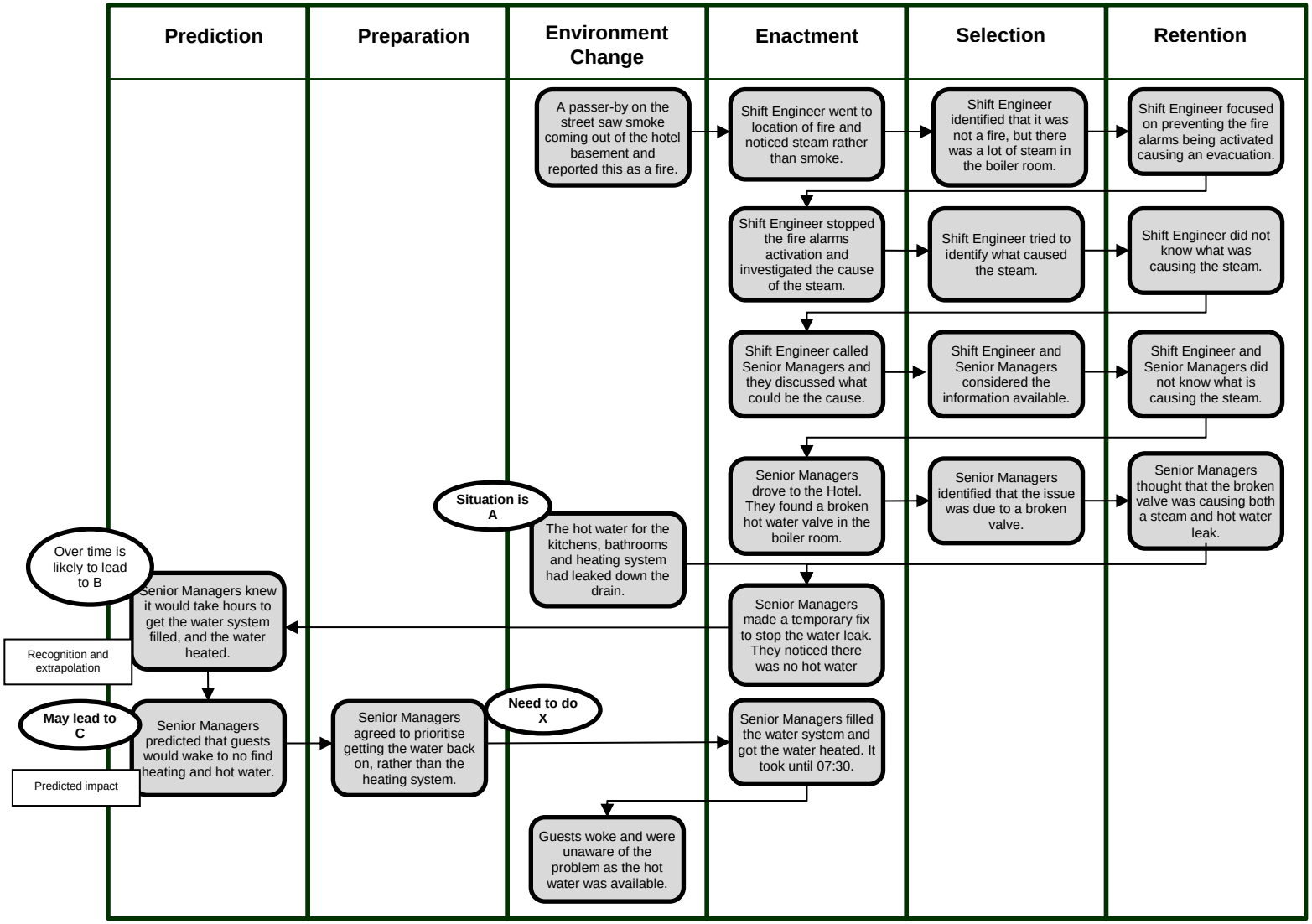

Figure 19 – Trajectory and Retrospective Sensemaking: Burst pipe causes major flood in boiler house (Crisis 14)

Table 24 – Trajectory tracking sensemaking process: Crises 14

Crisis title: Burst pipe causes major flood in boiler house
Threat: Guest will wake at around 07:30 and there will be no heating and hot water which will lead to guest complaints and not a 5-star experience.
Situation is A: All the hot water for the hotel kitchens, bathrooms and heating system has leaked away flooding the boiler house.
Over time this is likely to entail B: Senior Managers recognised that it would take several hours to get the water system filled, and the water heated.
Which may lead to C: Senior Managers predicted that guests would wake at around 07:30 and there would be no heating and hot water.
Need to do X: Senior Managers agreed to prioritise getting the water back on before getting the heating system to work.

4.3.2.4 Crisis 15: Insufficient coolant for power generator

During Crisis 15 (see visual map in Figure 20) an operational team were re-commissioning one of their three generators when they identified that one of the valves for the generator could not be opened automatically. They engaged in retrospective sensemaking as they tried to identify a plausible cause of the problem and what they could do minimise the impact. As they could not find a way to automatically open the valve, it would need to be opened manually, and this would take approximately 45 minutes to complete. 25 minutes into the process of manually opening the valve, the operational team engaged in a further cycle of retrospective sensemaking when they noticed that the levels of water coolant were dropping. They tried to make sense of why the water levels were dropping and what a plausible cause could be. They identified that the coolant water which was shared between the three generators was flowing away through the overflow. This meant that the water to cool the two operational generators was draining away. The operational team realised that it would take 25 minutes to re-close the valve that had been partially opened, in order to stop the coolant water draining away. Through further cycles of

retrospective sensemaking, the operational team monitored the system and noticed the water levels continuing to drop. The operational team recognised that they would run out of coolant water before the valves are shut. They dispatched staff members to close the valves as quickly as they could.

> *"I got a phone call from my boss who said we're in trouble we're running out of water. I went to the control room and people were gathering around assessing the situation and established what the facts were. What are the facts? We're opening the inlet valves to unit 2 which is on outage but the inlet thin boards are still in place so this is losing all the water out of the cooling system, it's taken us 25 minutes to get these valves open, it will take us 25 minutes to get them shut, we haven't got that long before we run out of water and so were just monitoring the system and watching the levels go down. We dispatched people to get the valves closed as quickly as they could." (Interviewee 9)*

Then the pumps that were used to move the coolant water around the two operational generators started to "fight each other" (Interviewee 9) as they struggled to pump the water as the levels were so low (situation is A). Through a cycle of trajectory tracking sensemaking (see Table 25 and as indicated by the oval text boxes in Figure 20), the managers recognised that this could very easily rupture pipework (over time entail B) and if the pipework ruptured they would have to shut down for a couple of weeks which "would be a disaster" (Interviewee 9) as it would cost "many billions of pounds" (Interviewee 9) and mean a loss of service (which may led to C). The managers considered the consequences of rupturing the pipework against what the loss would be if they totally shut down the systems including the two operational generators. They decided on a radical untested course of action which was to shut down one of the pumps and run the two operational generators on one pump which might slow down the rate of loss of water (need to do X). They implemented this course of action and then carried out further cycles of retrospective sensemaking in which they monitored the water levels and the progress being

made in re-closing the valves, until the valves were fully closed and the levels of coolant water began to rise again.

> *"[T]hen the suction level for the two remaining pumps that were feeding the two running units got so low that the pumps started to capitate, started to fight each other but these pumps are pumping 195 thousand gallons a minute, these are huge pumps and when those systems start to swing, you can very easily rupture pipework and if we ruptured the pipework we could be shut down for a couple of weeks so to shut down two units for two weeks would be a disaster, it would be many billions of pounds. So anyway we considered the consequences of rupturing the pipework against what the loss would be if we just shut down the systems and tripped both units off, we were not prepared to risk damaging the pipework and at that point I applied a little bit of logic to the situation, I said why don't we shut down just one of the pumps and the people who were in the room said we can't run on one pump for two units and I said we can run on one pump for two units because this has happened previously, if you have three pumps in for two units, when one of them trips its outlet valve remains open and so you're effectively pumping in through one pump and back out through the other pump so the net solution is you've only one pump supplying two units. So I explained the logic in this and my boss was unsure whether it would work, I felt it would but I'd never proved it before, I could see the logic in it." (Interviewee 9)*

> *"So I rang them up explained the situation to them, told them I didn't have an alternative and we took one of the pumps out of service … by dropping one of the pumps down it actually gave the water more time and it brought the level up enough to stop the pumps sucking in air, well to stop the remaining pump sucking in air and the system settled down, it all stopped swinging and then the guys who were*

closing these valves managed to get them closed before we lost water to a level where the pumps gravitated." (Interviewee 9)

Table 25 – Trajectory tracking sensemaking process: Crises 15

Crisis title: Insufficient coolant for power generator
Threat: The organization might have to shut down for a couple of weeks which "would be a disaster" (Interviewee 9); it would "cost many billions of pounds" (Interviewee 9) and cause a loss of service.
Situation is A: While waiting for the valves to be closed, they noticed that the water levels for the pumps that were feeding the two running units had gone so low that the pumps started to "fight each other" (Interviewee 9).
Over time this is likely to entail B: This "could very easily rupture the pipework" (Interviewee 9).
Which may lead to C: They might have to shut down for a couple of weeks which would be a disaster; it would cost many billions of pounds, and cause a loss of service.
Need to do X: The management team decided to try a radical untested approach which was to shut down just one of the pumps and run the two operational units on one pump as this might slow down the rate of water loss.

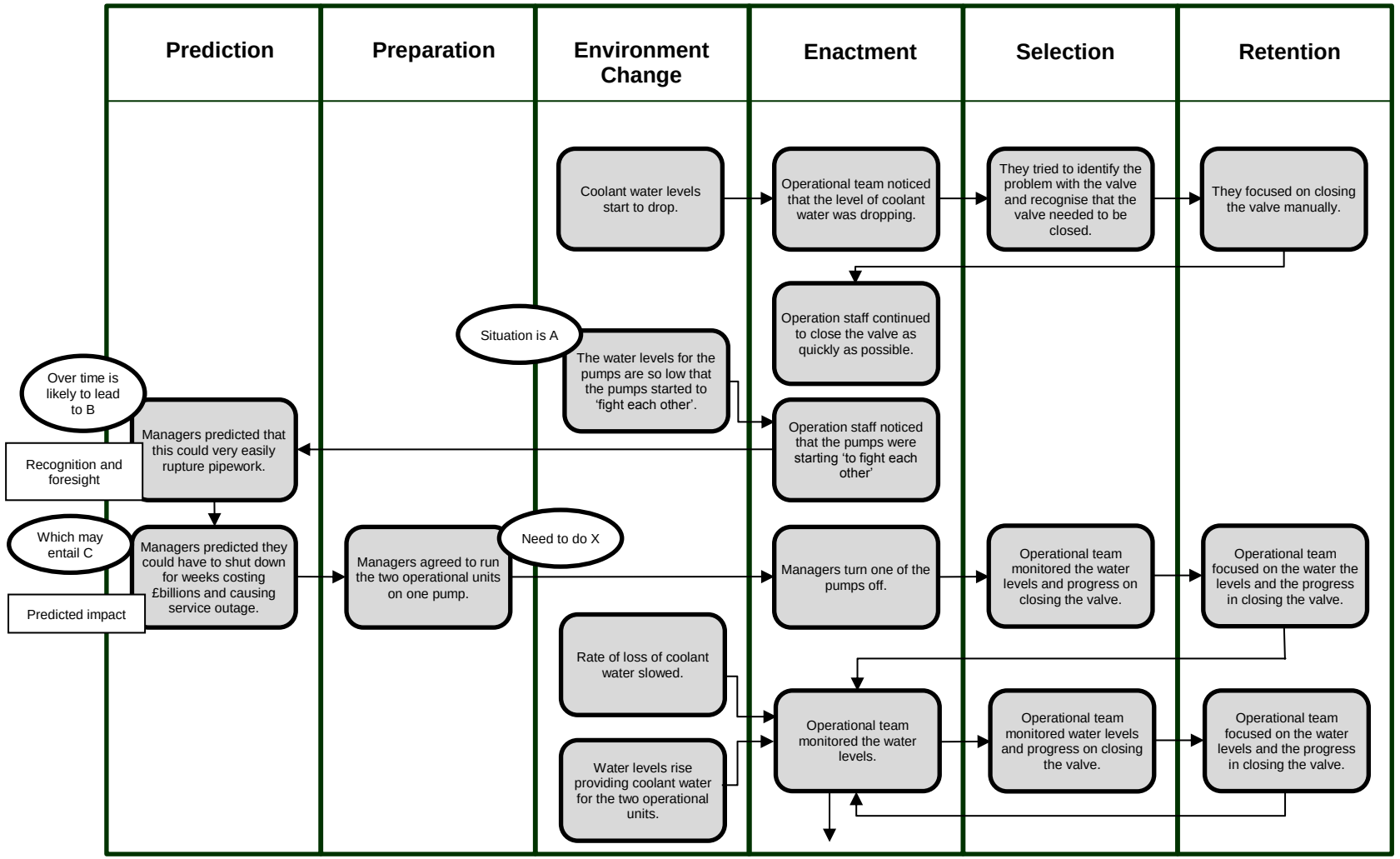

Figure 20 – Trajectory and Retrospective Sensemaking: Insufficient coolant for power generator (Crisis 15)

4.3.2.5 Crisis 16: Contamination of the public water system

Crisis 16 is the final crisis that unfolded in cycles of retrospective sensemaking interspersed by a cycle of trajectory tracking (see visual map in Figure 21). This crisis involved an explosion and fire leading to potential chemical contamination of the public water system. The utility company were called in as part of the responding services. They had "a responsibility to make sure we could supply them with water to fight the fire" (Interviewee 11). However through a cycle of retrospective sensemaking the staff from the utility company assessed what was happening and identified that they did not need to provide water to fight the fire, but rather to provide drinking water for the emergency services who were responding to the fire.

> *"[I]t turns out the water isn't needed to fight the fire, only to supply to the fire-fighters and other resources who are responding to the explosion and fire, whose numbers equated to 'a small town'" (Interviewee 11).*

The utility company realised that the hydrocarbon chemicals at the site of the fire were soaking into the ground (situation is A). The utility company obtained the drawings of their pipework under the site to check whether there was any impact and realised that due to the nature of the pipework these hydrocarbons could seep through into the water mains pipes (over time this is likely to entail B) which could contaminate the public water system. They realised that they needed to do something quickly to prevent this from happening. They couldn't shut off the water supply as it was needed to provide drinking water for the emergency services who are responding to the fire.

> *"So we couldn't shut that water off, not that it was needed for the firefighting but it might have been needed, but it was needed certainly for the welfare of the fireman that were up there. It was like a small town up there". (Interviewee 11).*

They decided to ask to be given access to the exclusion zone to quickly fit non-return valves that would permanently isolate the water in the exclusion zone

and thus prevent the water flowing into the public mains supply (which was likely to lead to C). They carried out this course of action and were given access to the exclusion zone, and by fitting the non-return valves they permanently isolated the pipework from the main public supply (need to do X). Table 26 and Figure 21 show the trajectory tracking sensemaking processes that unfolded in this crisis.

> *"So what we managed through meeting with the gold command and the silver command, was to get our guys up there to put in non-return valves". (Interviewee 11)*

Table 26 – Trajectory tracking sensemaking process: Crises 16

Crisis title: Contamination of the public water system
Threat: Chemical contamination of the public mains water supply.
Situation is A: Hydrocarbon chemicals within the exclusion zone were soaking into the ground.
Over time this is likely to entail B: They identified that these hydrocarbons could seep through into the water mains pipes.
Which may lead to C: If the hydrocarbons entered the mains pipes this could contaminate the public mains supply.
Need to do X: The decided to fit non-return valves to permanently isolate the site and prevent the contamination of the public mains supply.

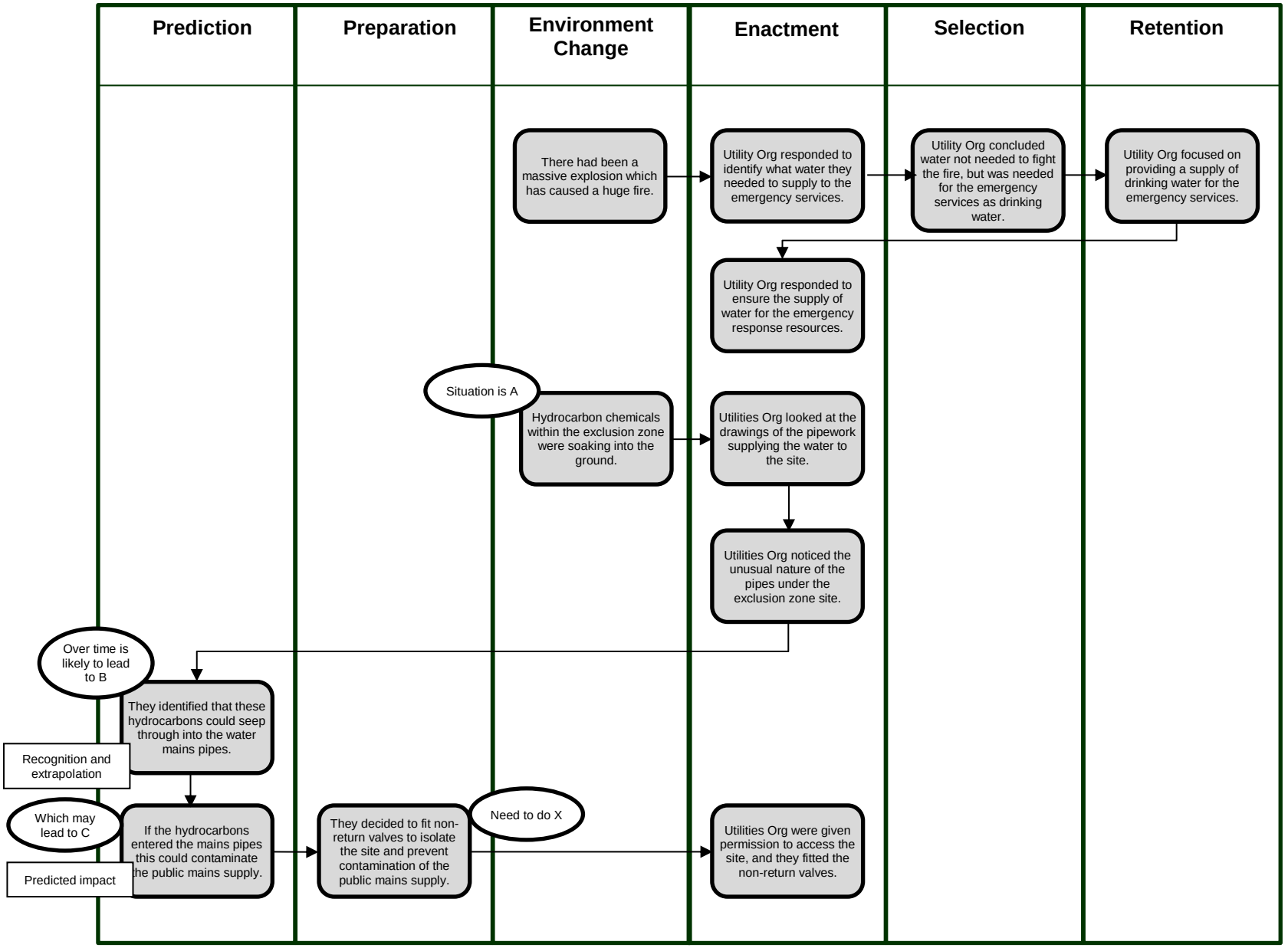

Figure 21 – Trajectory and Retrospective Sensemaking: Contamination of the public water system (Crisis 16)

Crisis 16 is one of five crises (12-16) that unfolded as proactive processes involving cycles of retrospective sensemaking followed by a cycle of trajectory tracking, and then further cycles of retrospective sensemaking. Six further crises (17-22) unfolded as proactive processes but these crises included a cycle of convergent sensemaking. These six crises are presented in the following sections (4.3.3 to 4.3.3.6).

4.3.3 Convergent and Retrospective Sensemaking: Crises 17-22

During the six crises (17-22) that involved convergent sensemaking, similar to the proactive sensemaking processes involving pattern matching or trajectory tracking, the organizational actors initially engaged in retrospective sensemaking through which they created plausible explanations for what had occurred and focused their next actions based on their explanations. The cycles of retrospective sensemaking were then followed by a cycle of convergent sensemaking which took the form: “The situation is characterised by A, by B, and by C. Taken together, D is likely, so we need to do X” (McLennan, Elliot and Holgate, 2009, p. 92). The organizational actors noticed a set of cues in their environment (situation is characterised by A, by B, and by C) and taking these cues together they could foresee a likely future threat (likely to lead to D). The actors perceived that they needed to do something, so they agreed and implemented a course of action to try to avert the predicted threat (need to do X). Following the cycle of anticipatory sensemaking, the organizational actors continued to engage in cycles of retrospective sensemaking which were focused on assessing their progress in averting the predicted threat. This section now presents each of the crises (17-22) that exhibited convergent sensemaking. The visual maps for the crises (17-22) are provided in the following sections to show the sensemaking processes that unfolded during each crisis. These visual maps are annotated (using the oval shaped text boxes) to highlight the activities which form the convergent sensemaking process (i.e. the situation is characterised by A, by B, and by C. Taken together, D is likely, so we need to do X).

4.3.3.1 Crisis 17: Gas leak that could lead to fire and/or explosion

The first crisis that involved the convergent form of anticipatory sensemaking is Crisis 17 (see visual map shown in Figure 22). This crisis occurred as a result of a gas leak that had the potential to cause a fire and/or explosion. When the management team at Power Org received a phone call to tell them that there was a hydrogen gas leak, the team engaged in cycles of retrospective sensemaking to try to understand what had happened and what had caused the gas leak. Their first plausible explanation was that the gas had been released due to human error. In over 30 years of operations, on the rare occasion when there had been a loss of hydrogen pressure, it had been due to human error rather than a genuine gas leak.

> *"I was a shift manager on a site and myself and a couple of the guys who worked with me took a phone call from one of the operators saying that there was a large hydrogen leak on plant. Initially because of our experience we thought that this was very unlikely, so during 30 years of experience we've lost hydrogen pressure several times but it has always been down to somebody operating the wrong valves or a relief valve lifting so we were not expecting this to be a genuine leak" (Interviewee 9).*

Table 27 shows the details of the convergent sensemaking process that then unfolded. A team member was dispatched to the site of the gas leak to find out what was happening, and he confirmed that it was a genuine gas leak (situation is A). The team then followed emergency procedures for venting the gas (de-gassing). However, in following the emergency procedure the team recognised that gas was being vented into an enclosed area so this was creating a build-up of the gas (situation is B). In addition there was florescent lighting in the enclosed area that could ignite the gas (situation is C). Taking these three cues together the team predicted that there could be a fire and/or explosion (taken together D is likely). From the sound of the gas they estimated that it would cause a fireball, "40 foot flame thrower" (Interviewee 9), but they did not know in which direction the fireball would go. The team needed to protect people and

property in case the gas ignited and caused an explosion, so they evacuated the area and kept the fire brigade away from the building although the fire brigade argued against this. They continued to de-gas until the sound of the leaking gas was reduced and the gas that had built up in the enclosed area had diffused.

> *"We were venting a lot of hydrogen into the turbine hull, well the turbine hull is huge it's the size of a football stadium but it is still enclosed in a roof and there are fluorescent lights in the ceiling so a potential source of ignition for the hydrogen, thinking about this and realising the volume of hydrogen in the machine I thought the last place that I want the fire brigade is in that building." (Interviewee 9)*

Table 27 – Convergent sensemaking processes: Crises 17

Crisis title: Gas leak that could lead to fire and/or explosion
Threat: Potential for the gas to catch fire and cause a major fire or explosion.
Situation is A: Leak of gas from the generation unit.
Situation is B: The gas was released into an enclosed area so a build-up of the gas developed.
Situation is C: There was florescent lighting in the enclosed area.
Taken together D is likely: Team predicted that the gas could catch fire and cause a fire and/or explosion.
Need to do X: Team agreed to evacuate the building and prevent fire brigade entering the building (although the fire brigade argued against this) due to potential for fire and explosion.

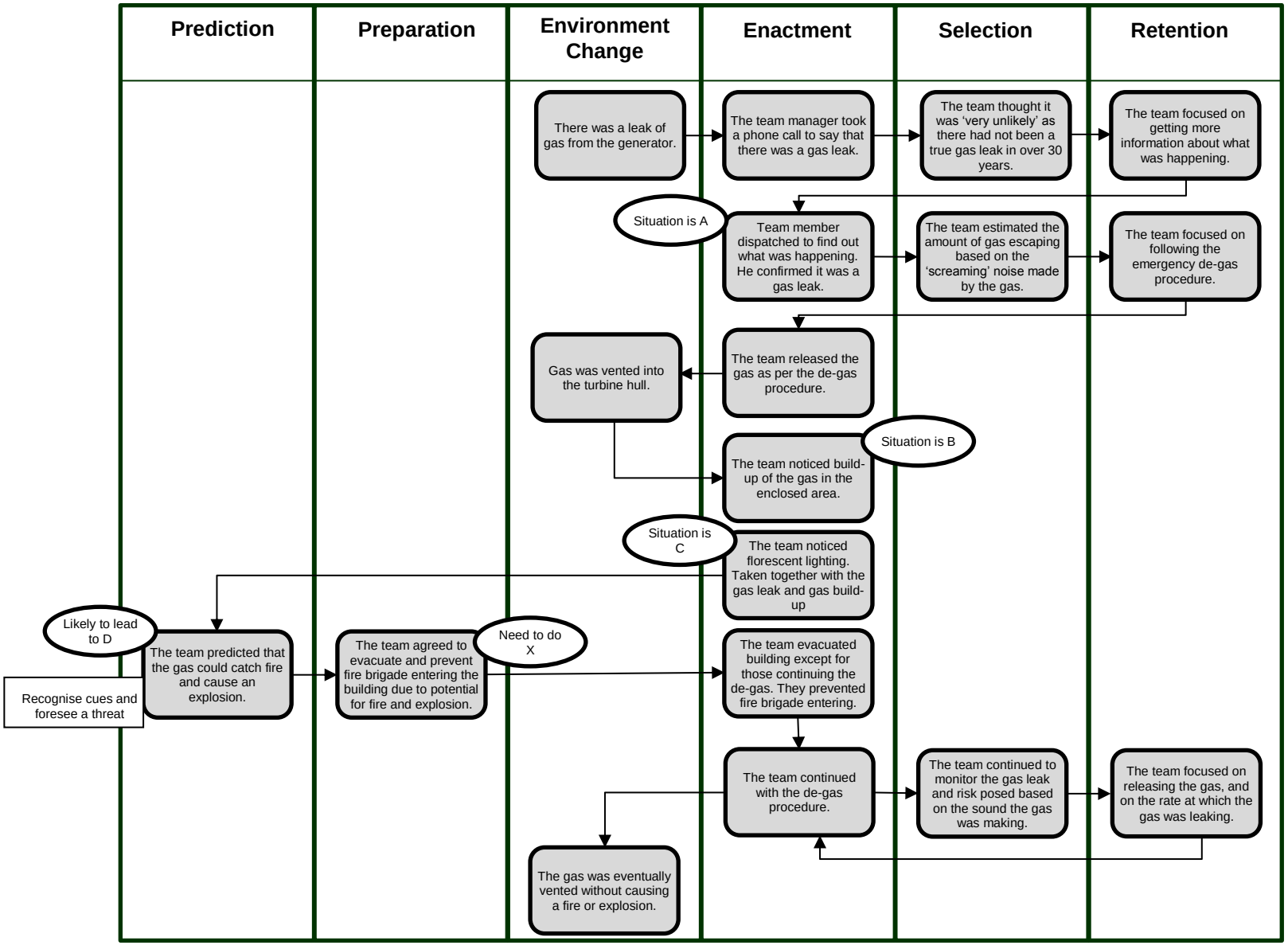

Figure 22 – Convergent and Retrospective Sensemaking: Gas leak that could lead to fire and/or explosion (Crisis 17)

"So the external fire brigade arrived and they wanted to go in to see what the issue was and I told them they had to stay outside, they were not happy with this and I told them that I'm in charge, I am keeping you out of danger and you will be in danger if you go in that building, you can't see the gas that's leaking, if it catches fire there will be a fireball like you've never seen before, you really need to stay out of that building." (Interviewee 9)

"When we first went to it the noise it could easily have been a 40 foot flame thrower and as we didn't know what direction it was leaking, that's why we needed to stay clear. So in the end it didn't catch fire but because I know the implications had it caught fire I think that's the most tested I've ever been, I was as frightened at that event as I'd ever been." (Interviewee 9)

Crisis 17 is an example of a crisis in which through convergent sensemaking, the actors noticed three cues which led them to predict a threat. There are two further examples from the empirical data of crises involving convergent sensemaking where the actors noticed three cues. These are Crisis 18 and Crisis 19 that are described in the following two sections.

4.3.3.2 Crisis 18: Failure to develop a new mobile device component

Crisis 18 is the second crisis that exemplified convergent sensemaking in which the organizational actors noticed three cues. An innovative technology organization had invested "a lot of money" (Interviewee 4) in developing a new component for mobile devices and they had been working on this for over four years. Crisis 18 (see visual map shown in Figure 23) occurred when the management team engaged in convergent sensemaking as they recognised a set of cues that led them to predict that customers would cancel their pre-orders for the new component. Table 30 shows the convergent sensemaking process that unfolded during Crisis 18.

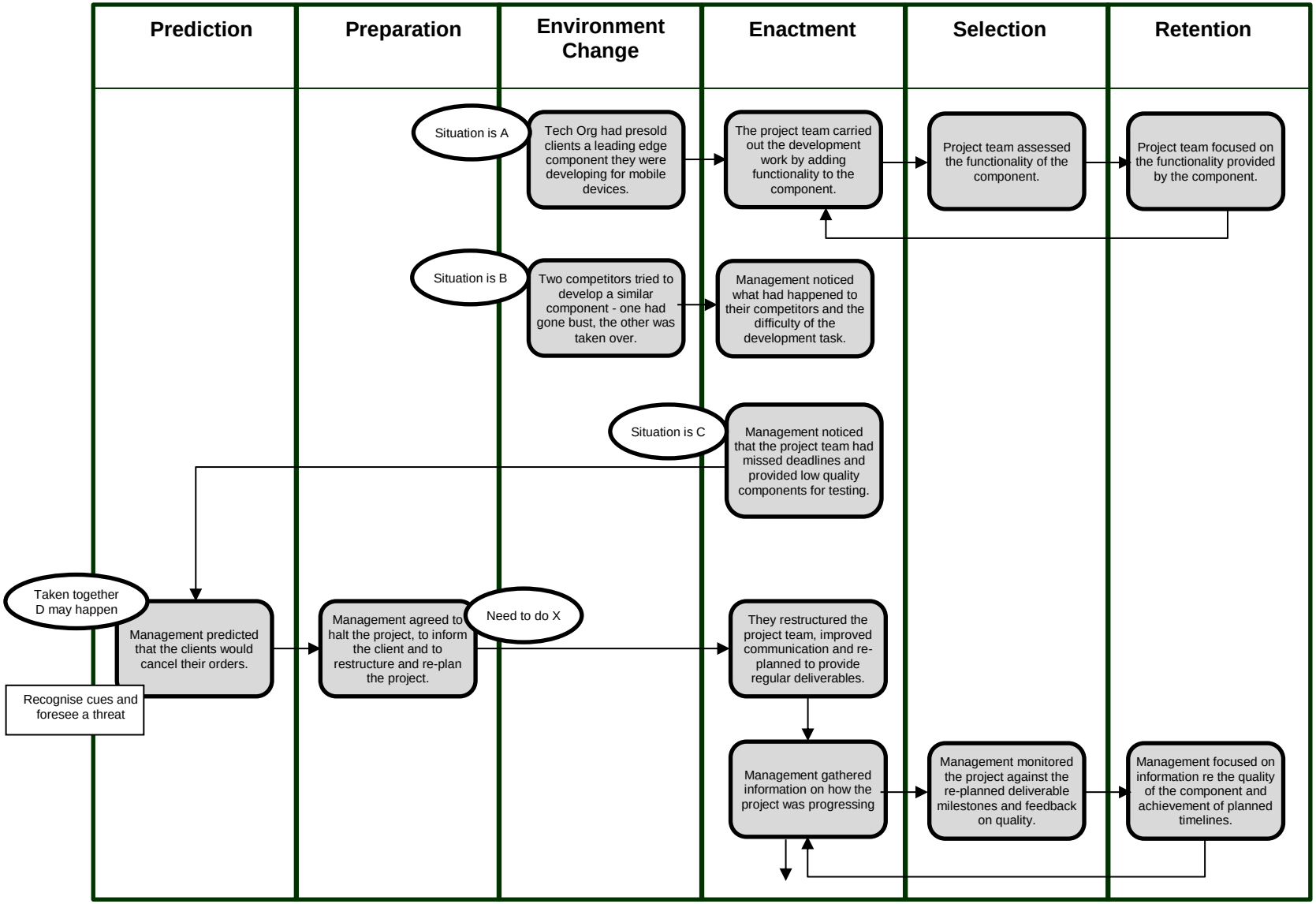

Figure 23 – Convergent and Retrospective Sensemaking: Failure to develop a new mobile device component (Crisis 18)

Table 28 – Convergent sensemaking processes: Crisis 18

Crisis title: Failure to develop a new mobile device component.
Threat: That the clients would cancel their pre-orders for the component.
Situation is A: Tech Organization had invested a lot of money in developing the component over the last four years.
Situation is B: Two competitor organizations had tried to develop a similar component but one had gone bust and the second had been taken over.
Situation is C: Recently, the project had missed deadlines and the quality of the component provided for client testing was low, with areas of functionality that had worked previously, no longer working.
Taken together D is likely: Management predicted that clients would cancel their orders if the situation was not rectified, so they needed do something to prevent this from happening.
Need to do X: They restructured the project to increase the communication between teams, to break down the team silos that had formed, and to re-plan based on providing regular visible deliverables so there was evidence of progress.

The component had already been presold to a number of client companies (situation is A). Two competitor organizations had tried to develop a similar component but one had gone bust in the process, and the second competitor had been taken over (situation is B). Recently, the project to develop the component had started to miss deadlines and the components that were provided to the clients for testing were of low quality, with areas of functionality that worked previously no longer working (situation is C).

> *"The company have spent quite a lot of money on it and we had a number of customers." (Interviewee 4)*

> *"[A] lot of this was learning curve because it had never been done before, in fact there were two other companies trying to do the same*

thing and I think one of them went bust and one got taken over during this, so it's hard what we're trying to do." (Interviewee 4)

"[W]hat happened I think in the run up to this was missed deadline after missed deadline and worse, on occasions when they did hit the deadline then they'd get a lot of feedback from the clients its broken, things that used to work don't work, that's when we went off on this path so they were trying to add more and more, they were adding some new stuff and breaking some old stuff." (Interviewee 4)

The management team predicted that clients would cancel their orders if the situation was not rectified (taken together likely to lead to D), so they needed to do something to prevent this from happening. They agreed on a course of action in which they would halt the project and carry out a quick review. They decided to contact the clients and inform them about what they were going to do. They halted the project in a three week "cloud period" (Interviewee 4) in which they would "throw everything up in the air" (Interviewee 4) to identify what needed to be done to get the project back on track. The management team agreed and implemented a course of action: to restructure the project to increase the communication between teams; to break down the team silos that had formed; and to re-plan based on providing regular visible deliverables so there was evidence of progress (need to do X). The management team then engaged in cycles of retrospective sensemaking in which they assessed the project and the progress being made against the agreed course of action.

"[I]t was obvious this software had grown and grown and grown and it was just getting, there was no way, this had shown that you can't keep adding stuff to it, they'd set off down a road, hit a brick wall, banged right off it and kept banging right off it, it was time to call a halt." (Interviewee 4)

"[W]e had to come up with a new plan and it had to be a plan that was credible as well and for that so what it was, was a whole bunch of these milestones. … I guess about three weeks something like that before we started off down this road so it was a cloud period if

you like with restructuring this team, breaking people up, sorting out a few issuettes and people issuettes." (Interviewee 4)

4.3.3.3 Crisis 19: Plan to be collapsed from 4 to 2.5 months

Crisis 19 is the last crisis that exhibited convergent sensemaking where the organizational actors noticed three cues. Construction Org were contracted to install a sewage treatment plant for a client (see visual map of the sensemaking processes shown in Figure 24). They had negotiated with a sub-contractor to carry out the work which the sub-contractor said would take six months. Construction Org initially engaged in cycles of retrospective sensemaking as they monitored the progress being made on the installation of the sewage treatment plant. However, two months into the project, the sub-contractor admitted that the procurement was running two months late (situation is A). Construction Org engaged in further cycles of retrospective sensemaking when they considered what they could do. They decided to try to buy more time from the client, so they discussed this with the client. The client insisted on sticking to the original deadline, and refused to pay for additional resources (situation is B). In addition, the sub-contractor indicated that they were going to declare that the delay was due to a force majeure so the client would have to pay (situation is C). Construction Org then engaged in convergent sensemaking when they predicted a threat based on these three cues (see Table 29). They recognised that the situation was likely to mean that the sewage plant would not be installed on time and this would damage their relationship with the client.

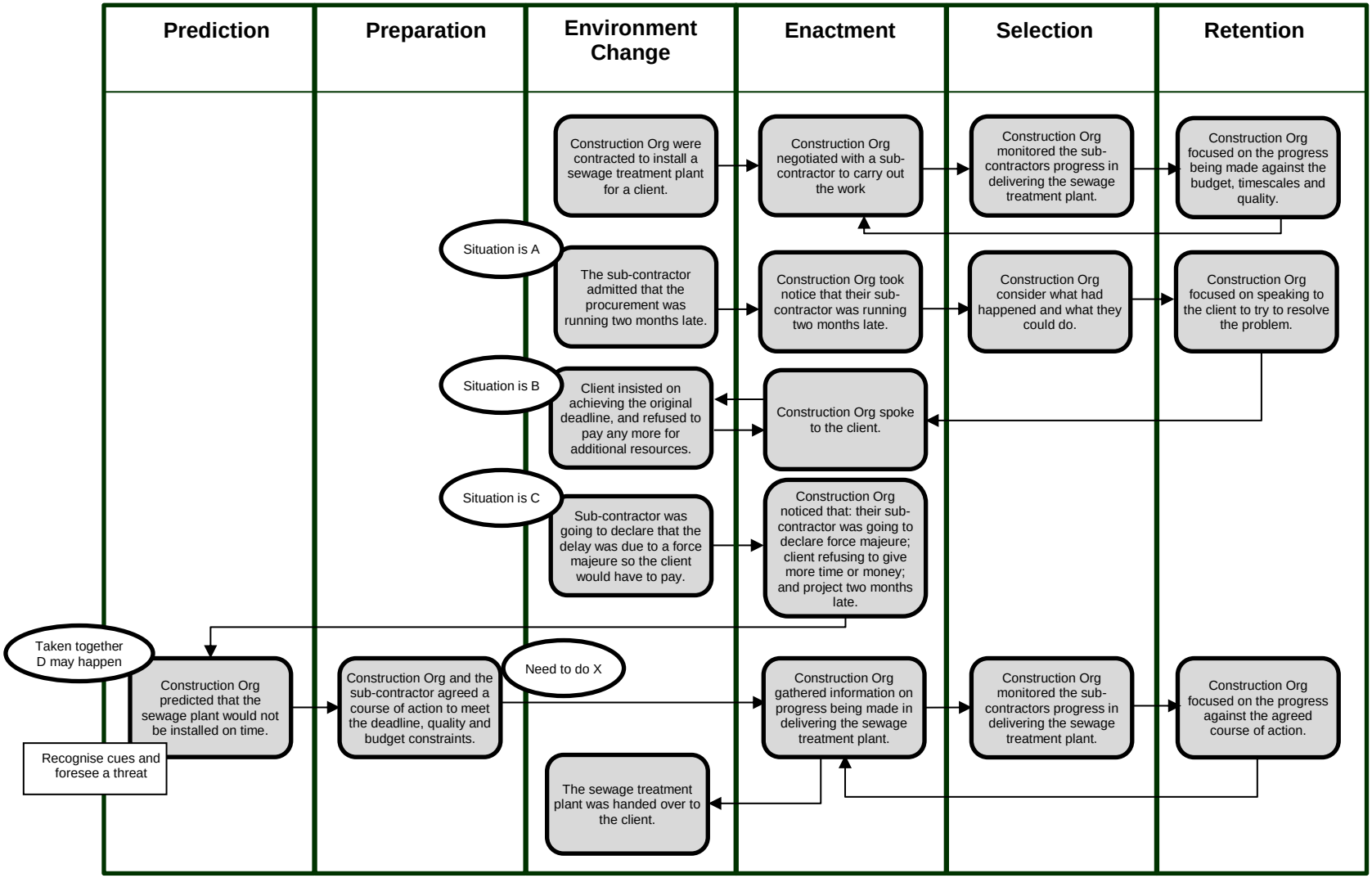

Figure 24 – Convergent and Retrospective Sensemaking: Plan to be collapsed from 4 to 2.5 months (Crisis 19)

Table 29 – Convergent sensemaking processes: Crisis 19

Crisis title: Plan to be collapsed from 4 to 2.5 months
Threat: Sewage plant will not be delivered on time, to quality and budget meeting contractual obligations.
Situation is A: Two months into the project the sub-contractor admitted that the procurement was running two months late.
Situation is B: Construction Org tried to buy more time from the client, but the client refused and insisted on achieving the original deadline. The client also refused to pay for additional resources.
Situation is C: Meanwhile the sub-contractor was going to declare that the delay was due to a force majeure so the client would have to pay.
Taken together D is likely: Likely to lead to non-delivery of the sewage treatment plant.
Need to do X: They flew in the sub-contractor from the States and convinced him that it was in all their best interest to make the sure that the sewage treatment plant was built on time and to quality requirements. Together they created a course of action to try to achieve the deadline within the quality and budget constraints.

"We had sewage treatment which we went to install for our client. The contractor was, we were not able to do it, and so we engaged with them and they gave us a programme of 6 months of installation. It had a procurement period of about 4 months, and he [the sub-contractor] of course did the procurement and the 4 months went by and for some reason he wasn't able to get the items to site, so we talk about clearing issues. But eventually he got it to site and it was over two months late, ok. And the client insisted on having the sewage treatment function at when he said it would do. And so of course we had to do, we had to see when we can close out the

programme in such a way that as against 6 months to work we had just 4 months" (Interview 20).

With this stand-off, Construction Org flew in the sub-contractor from the States and they worked together to convince him that it was in all their best interest to make sure that the sewage treatment plant was built on time, to the quality constraints. Together they created a course of action that they could implement to try to achieve the deadline. They increased the number of people working on the project, scheduled as may tasks as possible to run concurrently, and moved to 24 hour working. This increased the labour costs, in particular because of the higher labour costs for overnight working. However they needed to do all of the work within the original budget. So while they had 4 months remaining, they needed to complete the work within 2 and a half months if they were going to stick to the budget. Construction Org and the sub-contractor carried out the agreed course of action and managed to achieve the installation within budget.

"We had to fly in the chap from the States, and we had to ask him to collapse the programme and work day and night to try and meet the client's target. Because that was quite a challenge, because working day and night means that you are paying the normal wage in the day and twice the wage at night. And of course we needed to keep the budget the same, because the client wasn't willing to pay extra. Of course that was a challenge for us, so we had to try and collapse [the plan] and again doing it for 4 months which was really the time, we had to try and do it for 2 and a half months, so we could achieve the wage that was planned for that work and then of course we still need the client required quality, and of course not spend more money. If we did it for the 4 months we spend more money than we have in our budget, so we had to do it for 2 and a half, and that was quite a challenge. I can't describe all of the challenges we went through, but eventually we were able to achieve it." (Interview 20)

Crisis 19 is an example of a crisis in which through convergent sensemaking, the organizational actors noticed three cues which led them to predict a threat.

The number of cues involved in each of the convergent sensemaking processes ranged from a minimum of three to a maximum of five cues. Below are three further crises that exhibited convergent sensemaking, two that involved four cues (Crises 20 and 22) and one that involved five cues (Crisis 21).

4.3.3.4 Crisis 20: Threatened cancellation of a £multi-billion project

Crisis 20 (see visual map shown in Figure 25) involved a project costing several billion pounds that was threatened with cancellation if the project failed to pass the up-coming external gate review (situation is A). This was a large project involving four main organizations and their sub-contractors. In preparation for the up-coming gate review, the central risk team from the main commissioning organization engaged in retrospective sensemaking when they carried out a review of the risk register to assess the risk position. There were hundreds of risks on the register, so the risk team focused their review on missing and erroneous risks. The central risk team identified that the quality of the risk on the register was low. There were missing risks, as well as risks that should not have been recorded on the register (situation is B). The central risk team spoke to the 120 risk coordinators from across the different organizations. They gathered information on how these risk coordinators were assessing the risks and storing the details in the risk register (situation is C). The risk team decided to run timescale and financial analysis. However, they did not believe that the figures that were produced were correct (situation is D). The amount of risk that was on the register was not comparable with the size and complexity of the project, and based on experience and gut feeling "it didn't add up" (Interviewee 18). As such the assessment of the risk posed by the project was a "wild guess" (Interviewee 18). Based on these four cues taken together, the risk team engaged in convergent sensemaking when they predicted that the project would fail the gate review and as a result the project would be cancelled (see Table 30 which shows the convergent sensemaking process).

> *"[slightly hysterical laugh] very very significant, the whole project would have stopped, which would have meant some fairly meaty*

decisions that would have had organization wide implications, very serious". (Interviewee 18)

"Basically we, as part of the team we ran timescale risk analysis and financial risk analysis and the figures that were coming out, did not believe them. Given the information we had, didn't believe them. Felt that the amount of risk in the register was far too light, that the risk when aggregated up, which is not necessarily a great thing to do, when it aggregated up for a project that was highly complex and also very novel, the amount of risk that was on the register was not comparable with the size and complexity of the project. It didn't add up." (Interviewee 18)

"So it was literally just a wild guess." (Interviewee 18)

The central risk team perceived that they needed to do something to avoid the cancellation of the project. They agreed a course of action which was to prepare a minimum data set for the risks, to train the 120 risk coordinators on the data that was needed in order to get consistency across the organizations, and to focus the risk coordinators' attention on the top 80 per cent of risks by time and by financial implication. They prepared training materials for the risk coordinators and ran workshops in which they agreed the minimum data set with the coordinators. This changed the risk processes affecting up to 600 people across the four organizations. The central risk team then engaged in further cycles of retrospective sensemaking in which they monitored the quality of the risk data that the coordinators were providing for the minimum data set, and in this way they improved the quality of the risk information being recorded on the risk register.

"So I said we need to get a minimum data set, get people trained to what is needed at a minimum level, and then start to populate it, structure every single risk, but still continue with identifying new ones and normal business, that really. So myself and a contractor put together a presentation and a workshop to train as many people as we could in how to do this, what was expected of them, what level of

information was expected from them. Then backed up with as much information that we could give them in terms of workbook, screen-prints to tell them this is how to do it, come back and ask if you have any questions. And the other thing we did as well was prioritise which risks to look at first, with the 80/20 rule, took the top 80% by value, then took the top 80% by time as well then filtered those down and gave individuals for areas that they were responsible for, lists of what to work on first. We also set timelines on it." (Interviewee 18)

"Well basically we decided that what needed to happen was an utter scrub of the risk identified there and identification of new ones or appropriate ones. So we needed to badge it as a complete and utter risk scrub. It was four different groups of people, four different companies. So I had all the information but trying to get the whole lot to the same level and also get all the people involved in risk management from those who had only been doing it for a few months to those hardened and seasoned team members like myself who had been doing it for years. So it was big, very big, approximately, well, one hundred people who can input directly into the risk register. However it affected up to probably about 500 to 600 people because it was also up to the risk owners to do their estimating" (Interviewee 18).

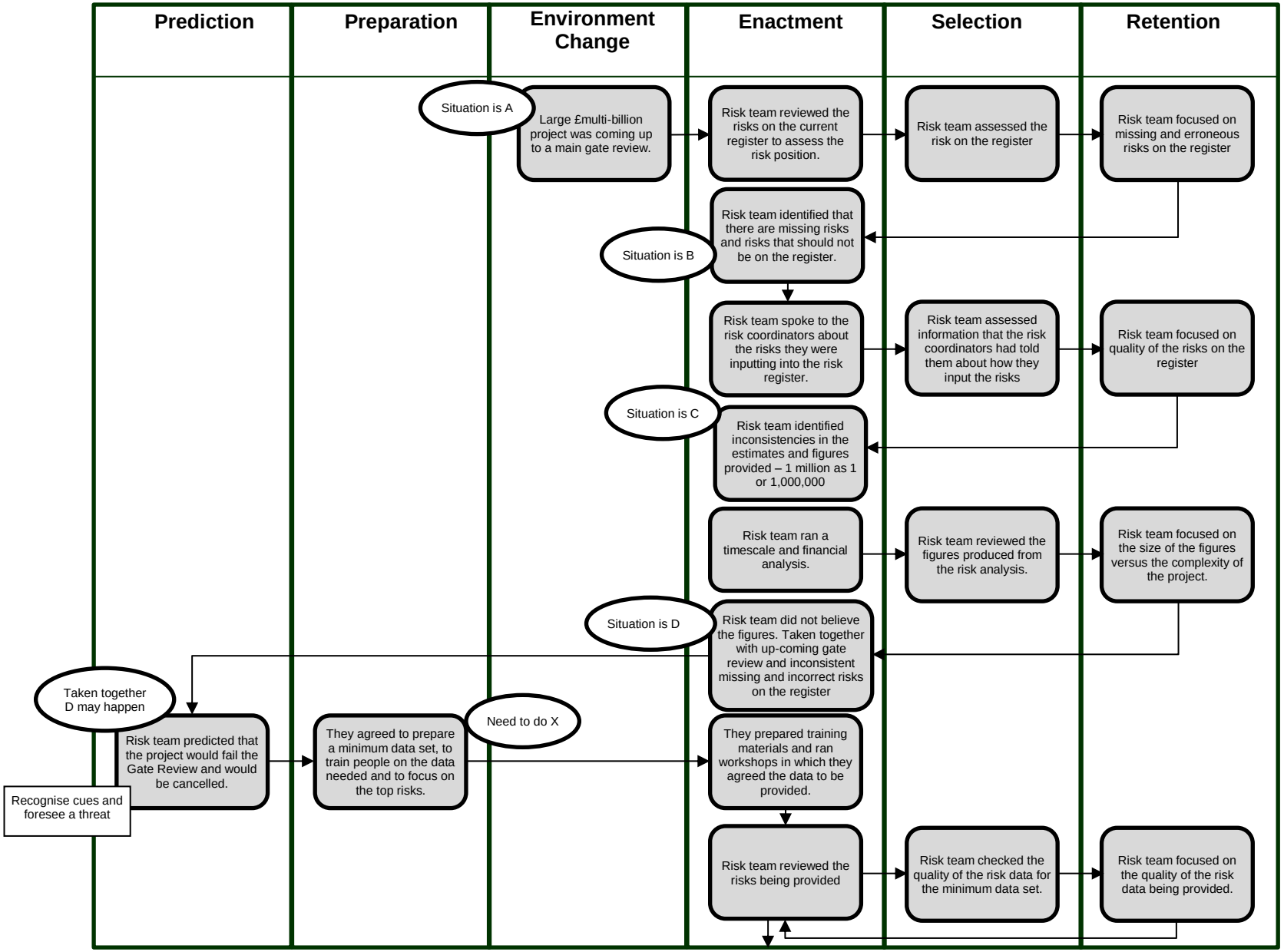

Figure 25 – Convergent and Retrospective Sensemaking: Threatened cancellation of a £multi-billion project (Crisis 20)

Table 30 – Convergent sensemaking processes: Crises 20

Crisis title: Threatened cancellation of a £multi-billion project.
Threat: The project would be cancelled
Situation is A: Project coming up to a main gate review where a go / no go decision would be made.
Situation is B: Hundreds of risks had been identified but there were still missing risks and risks that should not be on the register.
Situation is C: From talking to the 120 risk coordinator the risk team identified that there were inconsistencies in how the coordinators were estimating and recording the risks (for example millions as 1,000,000 or as 1).
Situation is D: They did not believe the figures from the timescale risk analysis and financial risk analysis – based on experience and gut feeling "it didn't add up" (Interviewee 18).
Taken together E is likely: The project would not pass the Gate Review and a no go decision would be made.
Need to do X: Needed to get consistent information from the 120 risk coordination in the four main organizations and their sub-contractors, impacting around 600 people. They needed to get the minimum data set, to train people on the risk data to be provided, and to focus on the top 80 per cent of risk by time and by financial implication.

4.3.3.5 Crisis 21: Heavy snow throughout the UK

Crisis 21 is the only crisis which exhibited convergent sensemaking involving five cues which are shown in Table 31. During Crisis 21 (see visual map shown in Figure 26) there was heavy snow throughout the UK which caused business disruption for Investment Org. The heavy snow was causing transport issues on the road and rail networks. While this was not the first occasion when Investment Org had experienced heavy snow that caused business disruption,

on this occasion the impact was very widespread and varied across the country (situation is A).

> *"Not the first time we have had snow and not the first time it has had impact but it does tend to be unpredictable because it was varied around the country. It was a question of almost managing a number of incidents at the same time because it had different impacts at different times around the country." (Interviewee 8)*

> *"So in this situation, the snow that is a good example where we didn't know what was going to happen. We suspected that some of our sites might be closed down throughout the day and that was about as accurate as we could have foretold it really." (Interviewee 8)*

The head office team at Investment Org engaged in cycles of retrospective sensemaking in which they gathered information through conference calls with regional representatives. They created a plausible view of the unfolding situation and the impact the heavy snow was having on their organization. However, there was a lot of information to process coming from different sources, and the head office team needed to check whether the information was accurate.

> *"So we started the conference call with some intelligence around the country. Already at that point we had one site that was looking to close down almost immediately because the snow had hit them first and so then we set up an on-going call during the day just to track what was happening. And there was a bit of an issue about controlling everybody because everybody wanted to throw bits of information in. Everybody starts looking at the internet and starts hearing stories from their friends and colleagues and brokers around the country etc. So trying to keep it consistent in how we got to manage that flow." (Interviewee 8)*

Local councils were making decisions to close offices which could cause gridlock on the roads and impact their staff getting home (situation is B).

Transport companies were making decisions to stop running trains and buses (situation is C). Members of staff were providing information based on what was being said by clients, their family, on the radio or on the internet (situation is D). In addition, the head office team recognized that they are not in control of how the situation was evolving in each local region (situation is E).

> *"[A]nd then they hear on the radio that their local council sent everybody home so immediately there is gridlock, the buses aren't running so it changes your decision process because you've got people that you've got to get home as well." (Interviewee 8)*

> *"So it's an unfolding situation you're not in control of really, which was fairly unusual." (Interviewee 8)*

Based on these five cues (Table 31), the head office team engaged in convergent sensemaking when they predicted that they would become swamped by the amount of information available and would not be able to make decisions. They needed to do something to avoid this happening, so they agreed not to micro-manage the activities of the local offices but to focus on covering the company wide decisions that were required.

> *"It was basically decided to let local managers make the call – they make the call every single day about local decisions so it made sense for them, they can see what the issues are and we took the view that actually we shouldn't try to micro manage what they do. They know best how to run their business really." (Interviewee 8)*

> *"The bigger issue was what transport companies, what other organizations were going to do about it. So if the roads become gridlocked because everybody else has sent their staff home then you end up with only your staff who can't get home then you kind of have to go with the flow to some extent and if you have an advance announcement that buses are going to be stopped in an hour, in some areas where people rely on buses then it's prudent to let them go home while they can still get there really. So those sorts of things*

were outside of our control. And all these organizations learn from previous examples that there were some that had been criticised for not stopping services early enough, so therefore they have done it a bit earlier. And some have taken an opposite tack and they have kept their services running a bit longer. So it was about local managers trying to keep on top of that local information, which is not always issues, always a degree of panic around and often sounds worse than it actually is and trying to get accurate information is not always easy." (Interviewee 8)

The head office team then engaged in further cycles of retrospective sensemaking in which they gathered information on what is happening so they could create a plausible view of the unfolding crisis and its impacts at an intra-office or organization-wide level. They identified where work needed to be moved from one office to another such as the close out of trades. After five working days when the snow was no longer causing transport and business disruption, the head office team stopped monitoring the information on what was happening.

"In that situation it was mostly liaising with the different areas of the business to understand are there any critical things that need to get done today? If we close that office do we need to move some work from A to B?" (Interviewee 8)

Crisis 21 involved convergent sensemaking in which five cues led to the prediction of a threat. A further crisis that exhibited convergent sensemaking is Crisis 22, which involved four cues, and this crisis is presented in the following section.

Table 31 – Convergent sensemaking processes: Crisis 21

Crisis title: Heavy snow throughout the UK.

Threat: Threat to business continuity and to safety of staff.

Situation is A: Heavy snow throughout the UK was causing transport issues on the road and rail networks.

Situation is B: Local councils were making decisions to close offices – could cause gridlock on the roads.

Situation is C: Transport companies were making decisions to stop running trains and buses.

Situation is D: Staff members were providing information based on what was being said by clients, family, on the radio or internet.

Situation is E: Head office team recognized that they are not in control of how the situation was evolving in each local region.

Taken together F is likely: Head office team predicted that they would become swamped by the amount of information available and would not be able to make decisions.

Need to do X: Head office team agreed to allow regional managers to make local decisions based on local information, while they identified where work needed to be moved from one office to another.

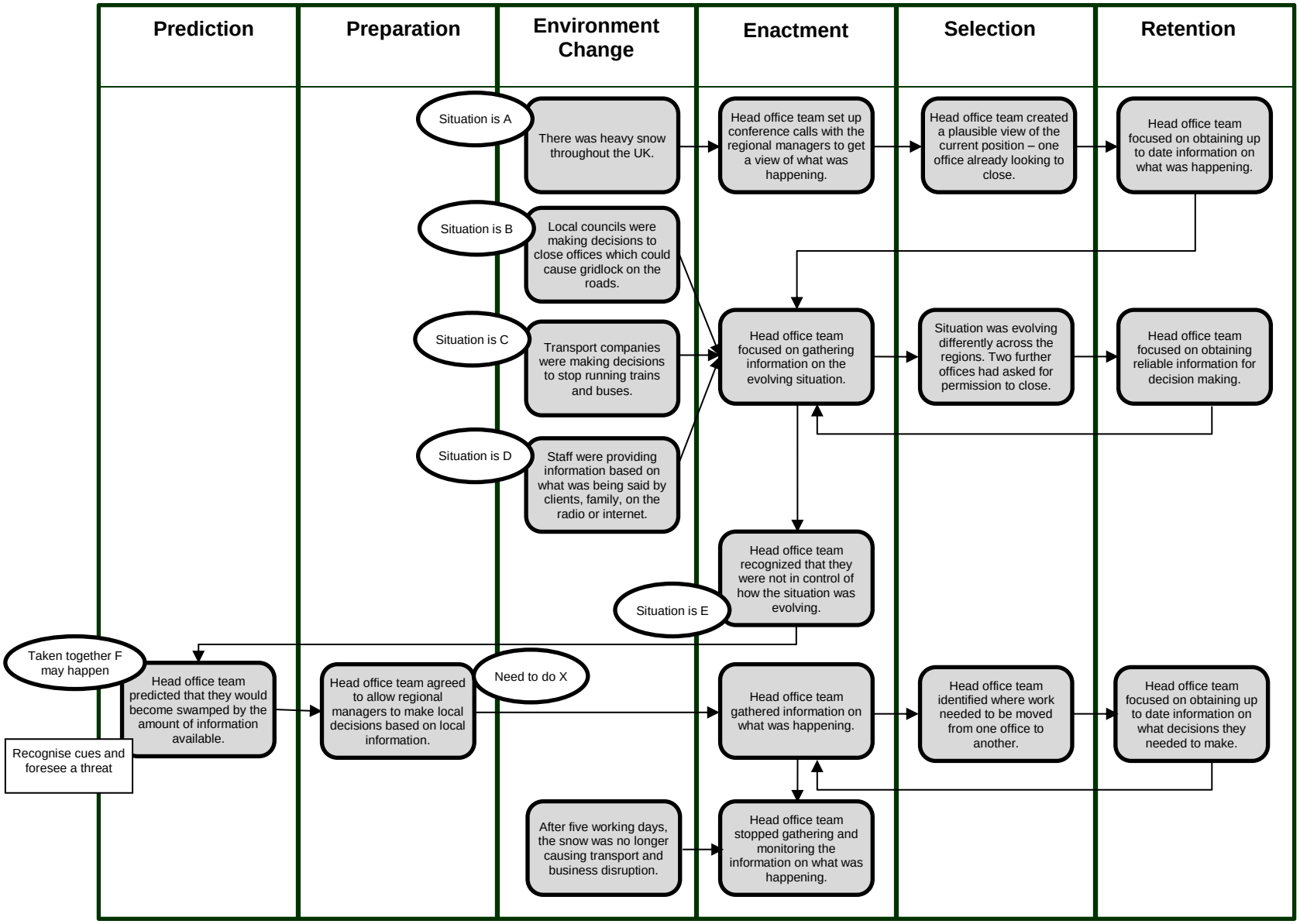

Figure 26 – Convergent and Retrospective Sensemaking: Heavy snow throughout the UK (Crisis 21)

4.3.3.6 Crisis 22: Suspended manager who poses a threat

Crisis 22 (see visual map shown in Figure 27) is a further example of a crisis that exhibited convergent sensemaking based on four cues. The organization was replacing their IT hardware which meant that hundreds of screens, laptops, PCs would be destroyed. The crisis unfolded when a staff member spoke to a senior manager to raise a concern that Manager A was stealing the IT equipment and selling it online. The senior manager initially engaged in cycles of sensemaking in which he investigated whether there was evidence that Manager A was stealing the IT equipment. He checked CCTV footage and found that Manager A had been taking IT equipment out of the building. The senior manager raised the issue with his HR and IT colleagues. They gathered further information to investigate the situation and discovered that old IT equipment as well as some of the new IT equipment was being sold online and that this had been happening for some time. This situation came as a shock to the organization as Manager A was a trusted member of staff who had worked at the organization for years.

> *"And someone came to me and said that they didn't know who to turn to but that they thought that their manager was stealing. And I investigated, and sure enough they were and they were selling stuff [online]. Some of it was old stuff, but some of it was new stuff. So I took that to the Head of IT and to HR and we investigated a bit more and we found out that it had been going on for quite some time." (Interviewee 11)*

Manager A was suspended (situation is A). However this gave rise to some issues for the organization. The senior managers realised that Manager A had systems access rights so he could access their systems remotely and do damage (situation is B). Also Manager A could contact suppliers to get further IT equipment because he had the relationship with the suppliers (situation is C). In addition, the senior managers were concerned for the safety of the person who has first raised the issue (situation is D). The senior managers engaged in a cycle of convergent sensemaking based on these four cues (see Table 32).

They realised that they needed to act quickly to avert the threat posed by Manager A. The senior managers agreed a course of action which involved contacting suppliers, removing Manager A's system and building access, and being vigilant in case Manager A tried to gain access to their buildings again. They implemented this course of action, and contacted suppliers to stop Manager A from obtaining further IT equipment and found that Manager A had indeed been in contact with the suppliers. They blocked Manager A's building access but found that he still tried to gain access to the buildings by tailgating someone into a building. They removed his systems access as quickly as possible. The senior managers then engaged in further cycles of retrospective sensemaking in which they continued to gather information on what was happening and to monitor the situation.

> *"[H]e was one of the few people that had full admin rights to our IT system. So he knew how to do things and where to get in. So we had to very quickly ensure that he couldn't get in anywhere. We had to very quickly ensure that all of our suppliers knew that he was no longer working for us. We found that he was trying to contact suppliers, to put things in place, and it threw up a real vulnerability. If someone in IT with admin rights goes rogue you are really wide open for anything. So it threw up lots of unexpected things, and it was just unexpected, he was well respected, well liked, friendly, helpful member of the team. And he had been living a double life for quite a while. So that threw up lots of things." (Interviewee 11)*

Table 32 – Convergent sensemaking processes: Crisis 22

Crisis title: Suspended manager who poses a threat.
Threat: Manager A may obtain IT equipment, attack staff or cause damage to property.
Situation is A: The manager was suspended for suspected theft of IT equipment which was then sold online.
Situation is B: Senior managers realised that Manager A had administration rights to their IT systems.
Situation is C: Senior managers recognised that Manager A had the relationship with IT suppliers so could order IT equipment.
Situation is D: Senior managers were concerned that Manager A would try to get access to their buildings.
Taken together E is likely: They predicted that Manager A would obtain IT equipment, attack staff or cause damage to property.
Need to do X: They agreed to block his building and systems access, and to contact all their IT suppliers.

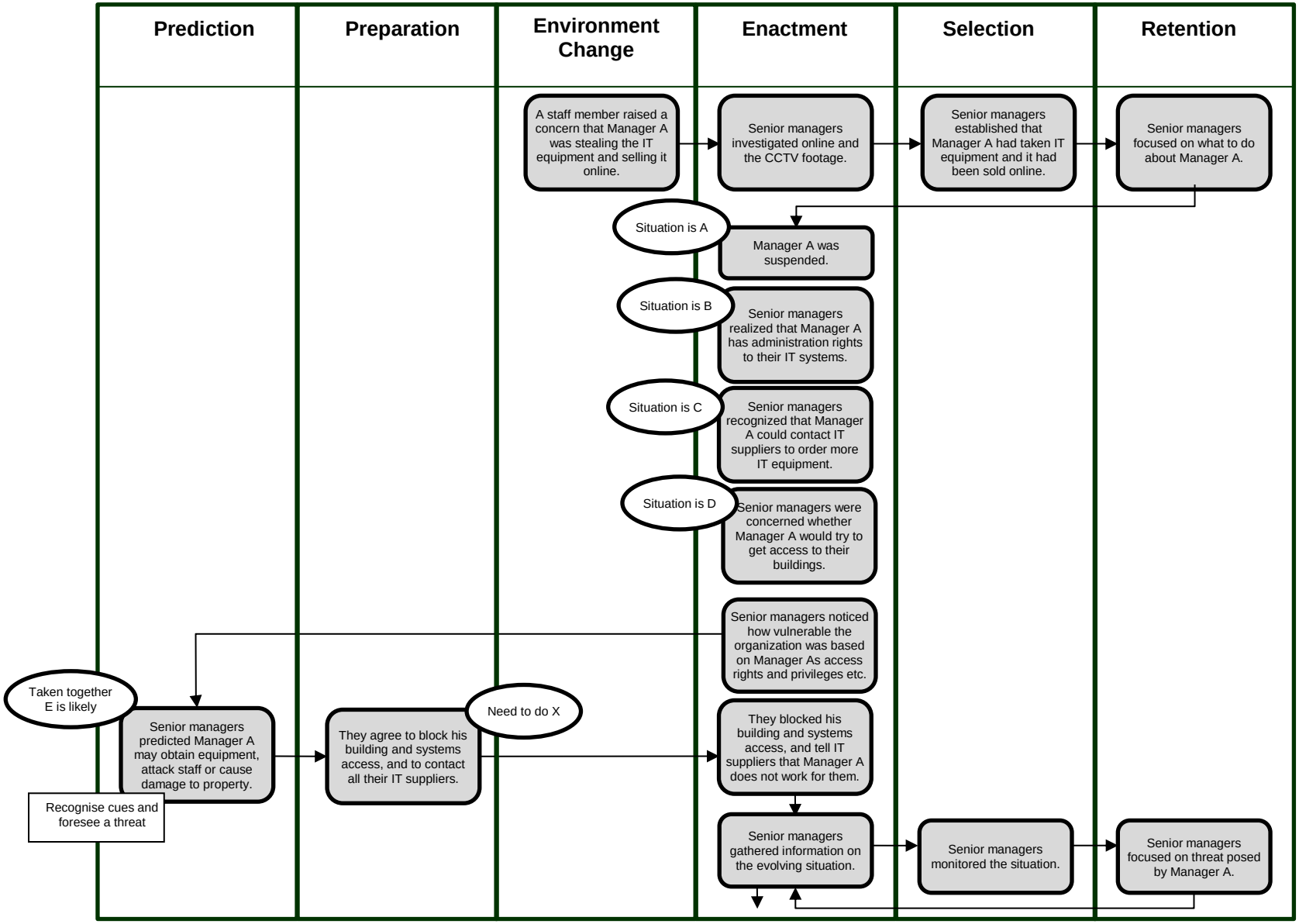

Figure 27 – Convergent and Retrospective Sensemaking: Suspended manager who poses a threat (Crisis 22)

Section 4.3 has presented the 18 crises that unfolded as proactive sensemaking processes. The following section (4.3.4) will provide a summary of the findings based on these 18 crises.

4.3.4 Summary of Findings on Proactive Sensemaking Processes

In summary, there are three findings in relation to the proactive processes. Firstly, the sensemaking processes unfolded as cycles of retrospective sensemaking followed by a cycle of anticipatory sensemaking in which a future threat was predicted and a course of action prepared to avert this threat. The cycle of anticipatory sensemaking was then followed by further cycles of retrospective sensemaking in which the actors assessed the unfolding crisis against their goal to avert the predicted threat. Three forms of anticipatory processes were identified; pattern matching, trajectory tracking and convergent sensemaking. Secondly, enactment formed a pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. Based on how cues were interpreted, this gave rise to the form of sensemaking that then unfolded. Thirdly, organizing structures were created during the proactive sensemaking processes. These structures took the form of the collective goal to avert the predicted threat with the agreed course of action as a means to achieve this goal. While these three findings relate to the proactive processes, the following section presents a further finding which relates to both the proactive and reactive processes. During each of the twenty-two crises a perceived sense of a ‘need to do something’ was an underlying generative mechanism for the sensemaking processes. This ‘need to do something’ arose from a perceived sense of responsibility or obligation felt by the actors.

4.4 Sense of a ‘Need to do Something’

An emergent finding identified from the analysis of the empirical data is an underlying generative mechanism for the sensemaking processes during the unfolding crises. For all twenty-two crisis, the interviewees described their sense of a ‘need to do something’ during the unfolding crisis. This perceived need related to a sense of responsibility to protect or an obligation to provide. The responsibility to protect involved ensuring the safety of and/or minimising

the impact on people and property (e.g. buildings or machinery). The obligation involved either providing a key business service or technical product. These technical products were due to be provided on an agreed date, in particular for presentation to customers or for use during a customer service trial. Below are example quotes in which the interviewees made reference to their sense of a 'need to do something'.

> *"It was a case of you had to do something at the time to stop the alarms." (Interviewee 2)*

> *"… you can say just a minute stop digging, we need to do something." (Interviewee 4)*

> *"It was one of those moments where you make a decision and you're in a very difficult position, the worst thing you can do is do nothing, you need to do something and if I'd got it wrong, yes its better doing something, taking some action than just waiting to crash." (Interviewee 9)*

> *"We have got to do something." (Interviewee 10)*

> *"[W]e have got to do something, we have got to start pulling locations until we get to a figure that was acceptable." (Interviewee 10)*

> *"It needs energy to then do something about it immediately." (Interviewee 15)*

> *"… to agree with all four parties to do something about it." (Interviewee 18)*

> *"It just means right I need to do something." (Interviewee 15)*

For example, in Crisis 8 (described in section 4.3.1.4, page 123) where the project team predicted that one community would attack the second community, the interviewee stated their responsibility as:

> *"[O]ur responsibility to let them know that further there was no sense in their trying to retaliate." (Interviewee 12)*

During Crisis 15 (section 4.3.2.4, page 145) where there was insufficient water coolant, the responsibility for people and property gave rise to the sense of a 'need to do something':

> *"I got a phone call from my boss who said we are in trouble; we are running out of water…So I rang [main customer] and told them what we were about to do, told them I didn't have an alternative." (Interviewee 9)*

A further example is Crisis 14 (section 4.3.2.3, page 142) where a burst pipe caused a major flood in 5-star hotel and the 'need to something' arose from the responsibility for the safety of property and the obligation to provide a key business service:

> *"Our job at the time for the three of us was to make the building safe, get the hot water back on, check it and go at that time." (Interviewee 3)*

A final example is Crisis 6 (section 4.3.1.2, page 116) where a new service was being developed for a customer trial. The obligation to provide the new receiver by an agreed date gave rise to the team's sense of a 'need to do something':

> *"It was a significant investment for them. The date for the customer trial was set…we knew the future of the service depended on it." (Interviewee 5)*

Table 33 shows for each of the twenty-two crisis whether the 'need to do something' arose from a sense of responsibility and/or a sense of obligation. A further finding relating to the 'need to do something' is that the several of the interviewees stated that in taking action during the unfolding crisis they recognised that they may make a 'bad decision' (Interviewee 19) or a 'wrong decision' (Interviewee 19) or address the 'wrong issues' (Interviewee 16). However they perceived that it was more important to engage in the sensemaking processes and take action rather than not take action as 'the worst thing you can do is do nothing' (Interviewee 9).

“You basically need to make decisions on instinct and go with them. You need people to help document what decisions were, why it was made, because you might make a bad decision, but you don’t have time to second guess your decisions.” (Interviewee 19)

“Sometimes you have to change a decision half way through.” (Interviewee 3)

“The wrong issue gets addressed. The wrong conclusions are jumped to and people try to fix something that they think is a problem that isn’t necessarily the problem.” (Interviewee 16)

“So we all think we know what we’re doing we all run up to the sprinkler chamber to turn the sprinkler off, it’s not that. It’s the incoming mains, there’s two isolation valves ... I think everybody forgot where the isolation valves were because nobody had ever had to turn them off, ever. It was not a scenario that had ever happened.” (Interviewee 3)

“It was one of those moments where you make a decision and you’re in a very difficult position, the worst thing you can do is do nothing, you need to do something and if I’d got it wrong, yes its better doing something, taking some action than just waiting to crash.” (Interviewee 9)

Table 33 – Perceptions giving rise to the 'need to do something'

Crisis title	Responsibility to Protect		Obligation to Provide	
	Safety of people and property	Impact on people and property	Business service	Business product
Fire at adjacent hotel	✓	✓	✓	
Burst pipe causes major flood in 5-star hotel		✓	✓	
Alarms that could not be deactivated		✓	✓	
Hotel basement flood		✓	✓	
Power outage and emergency back-up generator fails		✓	✓	
24 hour telephone outage at hotel		✓	✓	
Failure in the development of a new mobile device component				✓
Wireless receiver performance issues				✓
Heavy snow throughout the UK	✓		✓	✓
Gas leak that could lead to fire and/or explosion	✓	✓		
Insufficient coolant for power generator	✓	✓		✓
Presentation of new network technology				✓
Failure of a new appointment booking system			✓	✓
Contamination of the public water system	✓	✓		✓
Suspended manager who poses a threat	✓	✓		
Project team held hostage	✓	✓		
Community threaten retaliation	✓	✓		
Failing billion dollar oil rig decommissioning project			✓	✓
Costly delays shutdown of an oil storage facility			✓	✓
Threatened cancellation of £multi-billion project			✓	
Fire in client's building	✓	✓	✓	
Plan to be collapsed from 4 to 2.5 months				✓

4.5 Summary of the Findings

A finding of this study (Table 34) is that the sensemaking processes during unfolding organizational crises emerged in two forms: reactive processes and proactive processes. The reactive processes involved the organizational actors engaging in cycles of retrospective sensemaking when they gathered information to diagnose the cause of the crisis or explain what was happening during the crisis. Similar to the reactive sensemaking processes, the proactive processes initially involved cycles of retrospective sensemaking in which the actors created plausible explanations for what had occurred and focused their actions based on these plausible explanations. However, the proactive processes also involved the actors engaging in a cycle of anticipatory sensemaking when a future threat was predicted and a course of action prepared to avert this threat. The cycle of anticipatory sensemaking was then followed by further cycles of retrospective sensemaking that were focused on assessing the on-going activities against this newly prepared course of action. The cycles of anticipatory sensemaking unfolded in three forms: pattern matching, trajectory tracking and convergent sensemaking. A further finding from this research is that enactment functioned as pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. When the actors noticed cues from their organizational environment, based on how these cues were recognised and whether or not the cues led the actors to predict a future threat, this gave rise to the form of sensemaking that then unfolded; either as an anticipatory process or a retrospective process. The integrative model of the sensemaking processes during unfolding crises (see section 5.3) reflects this function of enactment as a pivotal interaction point between the cycles of retrospective and anticipatory sensemaking.

In addition, an emergent finding from this study is that a sense of a ‘need to do something’ was a generative mechanism for the sensemaking processes. During each of the twenty-two crises the actors perceived a ‘need to do something’ in response to the unfolding crisis, with this need being perceived as a sense of responsibility to protect people, property or the organization, and/or an obligation to provide a key business service or product. The interviewees

recognised that they may make a ‘bad decision’ (Interviewee 19) or a ‘wrong decision’ (Interviewee 19) or address the ‘wrong issues’ (Interviewee 16), however ‘the worst thing you can do is do nothing’ (Interviewee 9). Section 5.4 will show how the identification of this ‘need to do something’ has enhanced the model of anticipatory sensemaking.

A final finding is that during the sensemaking processes, organizing emerged through the creation of structures that either provided a collective focus for the actors in the form of a collective goal, or provided the actors with a means to carry out their sensemaking activities. The proactive sensemaking processes involved structures in the form of the collective goal to avert the predicted threat, with the prepared course of action being the means to achieve this goal. Three of the four reactive sensemaking processes involved iterative cycles of retrospective sensemaking in which the actors created temporal processes as organizing structures that enabled their collective retrospective sensemaking. The contributions to knowledge made by these findings are considered in chapter 5.

4.6 Chapter Summary

The purpose of this chapter is to present the findings from the empirical study. First the findings in relation to the reactive sensemaking processes were described, following which the findings regarding the proactive sensemaking processes were considered. The next finding presented was the sense of a ‘need to do something’ as an underlying generative mechanism for the reactive and proactive sensemaking processes. Finally the organizing structures that emerged during both the reactive and proactive sensemaking processes were presented. In chapter 5, the contributions to knowledge based on these findings are discussed and consideration is given to the new theoretical insights that this research study has raised.

Table 34 – Summary of the main findings

Summary of the Main Findings
1. Forms of sensemaking processes Two categories of sensemaking processes: reactive processes (4 of the 22 crises) and proactive processes (18 of the 22 crises). Three sub-categories of proactive sensemaking processes involved: pattern matching, trajectory tracking or convergent sensemaking. The reactive processes involved cycles of past-oriented retrospective sensemaking while the proactive processes involved cycles of retrospective and future-oriented anticipatory sensemaking.
2. Enactment as the pivotal interaction point between retrospective and anticipatory sensemaking The sensemaking processes involved enactment that functioned as pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. Based on how the cues from the environment were recognised, whether or not the cues led the actors to predict a future threat, this gave rise to the form of sensemaking that then unfolded as either an anticipatory or retrospective process.
3. Organizing through structures The organizing structures created during the proactive sensemaking processes took the form of the collective goal to avert the predicted threat, while the agreed course of action served as a means to achieve this goal. During three of the four reactive sensemaking processes the actors created temporal structures in the form of a series of meetings. These temporal structures served as a means through which the actors could engage in retrospective sensemaking in order to assess what was happening and agree their next actions.
4. Need to do something The actors sensed a 'need to do something' arising from their perceived sense of responsibility to protect people, property or the organization, and/or obligation to provide a key business service or product. They recognised that they may make a 'bad decision' (Interviewee 19) or a 'wrong decision' (Interviewee 19) or address the 'wrong issues' (Interviewee 16), however 'the worst thing you can do is do nothing' (Interviewee 9).

5 DISCUSSION

5.1 Chapter Overview

Chapter 2 located the research problem within the extant organizational crisis and sensemaking literatures thus enabling the identification of the specific research gap and question for this study. Chapter 3 then presented the research methodology, methods and the design used to address the research question. Following this, chapter 4 presented the findings from the empirical study. The purpose of this chapter is to discuss these findings and the theoretical contributions to knowledge made by this study, giving consideration to the new theoretical insights this research has raised. Firstly, section 5.2 provides a summary of the research problem and question being addressed. Following this, section 5.3 presents a model of the sensemaking processes during unfolding organizational crises, and discusses the function of enactment as a pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. Section 5.4 then considers the temporal orientation of the anticipatory sensemaking processes that were identified in the empirical data, while section 5.5 discusses the model of anticipatory sensemaking which has been enhanced based on the emergent finding of a 'need to do something'. Next, section 5.6 discusses how organizing emerged through the creation of shared meaning structures. Finally section 5.7 summarises the three main contributions to knowledge based on this research.

5.2 Research Problem and Question

The central purpose of this doctoral research project is to study the forms, temporal orientation and interaction of the sensemaking processes during unfolding organizational crises. As detailed in chapter 2, research on sensemaking processes during organizational crises has identified retrospective action-meaning creation processes in which actors respond to a change in their environment to give meaning to what has happened, thus reducing uncertainty and enabling action (e.g. Weick, 1988, 1993). Through these past-oriented diagnostic processes actors construct plausible interpretations of uncertain

situations, so that these interpretations are sufficient to sustain action (Weick, 2005; Weick, Sutcliffe and Obstfeld, 2005). These action-meaning creation processes occur dynamically and repeatedly as actors construct plausible interpretations that they continuously enact and modify (Maitlis and Christianson, 2013). The literature on the management of foreseeable but unexpected events has identified two interpretative forms of retrospective sensemaking processes through which actors can prepare for foreseeable but unexpected events that may interrupt their daily work. The first is a form of prospective sensemaking that is a retrospective future-perfect-thinking process through which actors envision possible future scenarios and define contingency plans that can be implemented if and when a scenario occurs (Hayes and Birch, 2009; Gephart, Topal and Zhang, 2010; Van Den Heuvel, Alison and Powel, 2014). The second is a retrospective sensemaking process in which actors utilise existing interpretative meaning structures such as organizational roles, rules and procedures (Bechky and Okhuysen, 2011; Weick, 1993) to make sense of changes in their environment in order to regularly manage the unexpected when it occurs (Patriotta, 2003; Bechky and Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015). However as Weick (1993) points out, such structures can breakdown during unfolding crises and an over-reliance on these structures, including contingency plans can lead to problems of entrainment or normalization where the subtle cues in the environment are ignored or discounted leading to an escalation in the situation. Indeed, Weick (2005) counsels that sometimes the only way to manage crisis is to wait for the crisis to start happening and make sense of the crisis as it unfolds rather than respond by implementing a contingency plan assuming that the crisis will unfold as envisaged. This view was reflected by one of the interviewees “[a]nd there are some proactive things that you can do but sometimes you just have to be prepared to respond to the way the incident unfolds” (Interviewee 8).

While sensemaking, in both the theoretical and empirical literature is predominately viewed as a retrospective past-oriented process (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015), the view that sensemaking

only occurs as a past-oriented process has been challenged with future-oriented forms of sensemaking being presented. Research in the context of intentional change, such strategic change, new product development and organizational change, has identified a future-oriented form of prospective sensemaking that focuses on the creation and elaboration of shared views of potential futures (Gioia and Chittipeddi, 1991; Gioia *et al*., 1994; Gioia, Corley and Fabbri, 2002; MacKay, 2009; Gephart, Topal and Zhang, 2010; Stigliani and Ravasi, 2012; Kaplan and Orlikowski, 2013). From the post-Weickian perspective this form of prospective sensemaking is viewed as being predominately a future-oriented process that also incorporates the past and present temporal dimensions when actors rethink the past and reconsider present concerns in the creation of envisioned futures. However, this interpretative future-oriented form of sensemaking is focused on the creation and elaboration of coherent shared views of potential futures in the context of intentional change where there is time available to articulate and elaborate the tentative interpretations, rather than in time constrained contexts that occur during an unfolding organizational crisis (Stigliani and Ravasi, 2012). Recently, Klein, Snowden and Pin (2007, 2011) have proposed anticipatory sensemaking as a future-oriented process that can occur during unfolding crises when actors recognise and prepare in the present to try to avert a predicted threat. However there is a paucity of empirical studies on anticipatory sensemaking, in part perhaps because this form of sensemaking has only been proposed relatively recently. The sensemaking literature identifies two forms of sensemaking processes that can occur during crises, anticipatory processes and retrospective processes. It is contended here that to help explain the sensemaking processes during unfolding organizational crises, it is necessary to integrate both retrospective action-meaning creation processes (Weick, 1988) and anticipatory action-prediction-preparation forms of sensemaking (Klein, Snowden and Pin, 2007, 2011; McLennan, Elliot and Holgate, 2009; Sandberg and Tsoukas, 2015), where the pivotal interaction between the cycles of sensemaking emerges through enactment. As such, an integrative model of

anticipatory and retrospective sensemaking processes during unfolding organizational crises has been synthesised from the sensemaking literature.

The increasing frequency, severity and types of crises mean that an organization's capability to respond during a crisis has become an important item on the executive agenda (Cockram and Van Den Heuvel, 2012). The study of anticipatory sensemaking during unfolding crises is relevant as an important value of anticipatory sensemaking is that it functions as 'an early warning system' (Klein, Snowden and Pin, 2011, p. 3) that there is trouble on the horizon by identifying a future threat as the crisis unfolds, thus enabling actors to take action in an attempt to avert the threat before it occurs (Klein, Snowden and Pin, 2007, 2011; Johns, 2011). In addition the study of anticipatory sensemaking as a future-oriented process affords the opportunity for new research contributions that can challenge the key ontological assumption about sensemaking as a retrospective process (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015). The topic of future-oriented sensemaking remains an on-going debate in the sensemaking literature (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015). This research attempts to make a contribution to this debate by clarifying the forms and temporal orientation of the sensemaking processes during unfolding organizational crises, and how these sensemaking processes interact. As such, the research question to be answered by this study is: ***What are the anticipatory and retrospective sensemaking processes during unfolding organizational crises and how do these processes interact?*** The following section discusses the forms of sensemaking processes that were identified in the empirical study.

5.3 Model of Anticipatory and Retrospective Sensemaking Processes During Unfolding Organizational Crises

In answer to the research question, the findings of this study identify that the sensemaking processes during unfolding organizational crises emerged in two forms: reactive processes that involved cycles of retrospective sensemaking; and proactive processes that exhibited cycles of retrospective sensemaking

dynamically interspersed by cycles of anticipatory sensemaking. These cycles of anticipatory sensemaking unfolded in three forms: pattern matching, trajectory tracking and convergent sensemaking. During the reactive processes, the organizational actors engaged in retrospective sensemaking when they gathered information to explain the cause of the crisis or to identify what was happening during the crisis. The proactive processes initially involved cycles of retrospective sensemaking in which the actors created plausible explanations for what had occurred and focused their actions based on these plausible explanations. However, the proactive processes differed from the reactive processes when through enactment the actors noticed cues in their environment, and based on these cues they engaged in anticipatory sensemaking in which a future threat was predicted and a course of action was prepared to try to avert this threat. The anticipatory sensemaking was then followed by further cycles of retrospective sensemaking that were focused on assessing the on-going activities against this newly prepared course of action. The findings of this research show that both the proactive and reactive sensemaking processes involved enactment. During the proactive processes enactment functioned as a pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. Through enactment, the actors noticed cues from the organizational environment. Based on how these cues were recognised, whether or not the cues led the actors to predict a future threat, this gave rise to the form of sensemaking process that then unfolded; either as anticipatory sensemaking or as retrospective sensemaking.

These proactive and reactive sensemaking processes are consistent with the model of sensemaking (Figure 3) that was presented in chapter 2. In this model the retrospective sensemaking processes unfold as cycles of action-meaning creation in which organizational actors construct plausible interpretations that diagnose or explain what has happened, and based on these plausible interpretations they take action. In addition, the anticipatory sensemaking processes unfold as cycles of action-prediction-preparation when based on cues from the environment, actors extrapolate, foresee or identify a pattern that leads them to predict a future threat arising during the crisis, and they then

prepare and enact a course of action in an attempt to avert this predicted threat. This research makes a contribution to theory through the synthesis of the novel integrative model of anticipatory and retrospective sensemaking processes during unfolding organizational crises and the subsequent identification of the anticipatory and retrospective sensemaking processes in the empirical data. The following section presents the findings in relation to the temporal orientation of the anticipatory sensemaking processes.

5.4 Temporal Orientation of Anticipatory Sensemaking

As detailed in chapter 2, although sensemaking is generally considered to be a retrospective past-oriented process, several scholars challenge the view that sensemaking is exclusively a past-oriented process (MacKay, 2009; Stigliani and Ravasi, 2012) and claim that this underestimates the inherently future-oriented stance that practitioners adopt in their practices (Shotter, 2005; Rosness *et al*., 2016). Research in the context of intentional change, such as strategic change, new product development and organizational change, has identified both past-oriented and future-oriented sensemaking processes (Gioia and Chittipeddi, 1991; Gioia *et al*., 1994; Gioia, Corley and Fabbri, 2002; MacKay, 2009; Gephart, Topal and Zhang, 2010; Stigliani and Ravasi, 2012; Kaplan and Orlikowski, 2013). The future-oriented process is a form of prospective sensemaking in which actors seek to create a shared vision of possible future events. From a post-Weickian perspective this process incorporates all three temporal dimensions (past, present and future) while still being predominately future-oriented. The process involves actors reimagining the future, rethinking the past and reconsidering present concerns and thus creating a plausible shared vision that is coherent across all three temporal dimensions (Kaplan and Orilikowski, 2013). However, this future-oriented form of perspective sensemaking is an interpretative process that has been identified in the context of intentional change where there is time available to focus on interpretation and elaboration of envisioned futures, unlike the time constrained contexts experienced during unfolding organizational crises (Stigliani and Ravasi, 2012). Recently, scholars have proposed a future-oriented anticipatory

form of sensemaking that can occur during unfolding crises when actors prepare in the present to avert a predicted future threat (Klein, Snowden and Pin, 2007, 2011).

It is claimed here that the temporal orientation of the anticipatory sensemaking process identified in the empirical data is future-oriented rather than past-oriented, and that this anticipatory sensemaking process differs from the other sensemaking processes that were identified in the sensemaking literature (see Table 2, page 43). These forms of sensemaking are: the retrospective past-oriented action-meaning creation process identified during unfolding crises (Table 2, process SP1); the past-oriented form of prospective sensemaking that involves future-perfect-thinking (Table 2, process SP2); the retrospective sensemaking processes that utilise shared meaning structures in the management of foreseeable but unexpected events (Table 2, process SP3); and the future-oriented forms of prospective sensemaking through which possible desired futures are envisioned (Table 2, processes SP4 and SP5). Could the anticipatory sensemaking process identified in the empirical data be challenged as being any of these other forms of sensemaking? The anticipatory sensemaking process is compared to each of the processes in turn, starting with the retrospective action-meaning creation process that was originally described by Weick (1979) and is shown in Figure 1 (see page 20).

Similar to the retrospective sensemaking processes identified during unfolding crises (Table 2, process SP1) and during the management of foreseeable but unexpected events (Table 2, process SP3), the anticipatory sensemaking process involves actors noticing cues in their environment and bracketing data about these cues. However, the focus of the actors' attention during anticipatory sensemaking is on an event that is predicted to occur in the future. Based on the data bracketed for attention and existing data from previous sensemaking, experience and knowledge, the actors predict a future threat, and in the present they identify actions that they can enact in the immediate future to try to avert that future threat before it occurs. While the anticipatory sensemaking process identified in the empirical data is a future-oriented process, the retrospective

sensemaking processes are past-oriented, as during these sensemaking processes actors focus in the present on an event that has already occurred in the past.

The retrospective future-perfect-thinking form of prospective sensemaking (Table 2, process SP2) is a process in which actors envision possible future scenarios, with the assumption being made that this scenario has already occurred and contingency plans are then defined from this virtual past-oriented temporal perspective. However, during the anticipatory sensemaking processes a course of action is prepared in the present and then enacted from the perspective that the threat is in the future, so that action can be taken to try to avert the threat before it occurs. As such the retrospective future-perfect-thinking form of prospective sensemaking differs from anticipatory sensemaking in how the future event is perceived, in the former the event is viewed as if it had already occurred, while in the latter the event is perceived as being in the future.

As discussed in chapter 2 (section 2.4), academics have recently called for a more holistic view of sensemaking as a process that can involve all three temporal dimensions of past, present and future, while also being predominately a past-oriented or future-oriented process (Gephart, Topal and Zhang, 2010; Wiebe, 2010; Kaplan and Orlikowski, 2013; Rosness et al., 2016). From this post-Wieckian perspective (Gephart, Topal and Zhang, 2010; Kaplan and Orlikowski, 2013), actors are able to be in the present but alter their conception of their temporal orientation and imagine themselves in the past or future. In addition, there is no one fixed interpretation of the past, present or future, but there are multiple interpretations based on the how actors reconstruct histories from their different prior experiences, and how in the present actors direct their attention through multiple assessments of current concerns (Emirbayer and Mische, 1998). From this perspective, the future-oriented forms of prospective sensemaking (Table 2, processes SP4 and SP5) are viewed as being predominately a future-oriented process that may incorporate past and present temporal dimensions in which actors “not only reimagining the future but

rethinking the past and reconsidering present concerns" (Kaplan and Orilikowski, 2013, p. 1). Could the anticipatory sensemaking process identified in the empirical data be challenged as being a future-oriented form of prospective sensemaking? The anticipatory sensemaking process differs from this future-oriented forms of prospective sensemaking in that it is carried out in time constrained situations such as during unfolding crises (Stigliani and Ravasi, 2012), and it is less focused on interpretation and elaboration of the future vision, but is focused on the identification of plausible action that can be taken arising from the 'need to do something' to avert the threat that is predicted will occur in the future.

While the anticipatory sensemaking processes identified in the empirical data are predominately future-oriented, it is acknowledged that the sensemaking processes are not exclusively future-oriented, but may be informed by past knowledge in the recognition of cues and patterns. All three forms of anticipatory sensemaking (see Figure 28) include an externally focused prediction processes in which a future threat is predicted based on the recognition of cues. The pattern matching form of anticipatory sensemaking involves "associating a cue with a threatening outcome" (Klein, Snowden and Pin, 2011, p. 3) such as when the actors recognise that "something may be amiss" (McLennan, Elliot and Holgate, 2009, p. 90) due to an anomaly in or a similarity to an existing pattern of activities. In this way the pattern of activities may have been created in the past, prior to the unfolding crisis. The actors predict the future threat through the recognition that in the current situation there is an anomaly in or similarity to this pattern. However, their focus in this sensemaking process is on the predicted future threat, and the identification of actions they can enact to avert this threat before it happens, rather than on the further elaboration or interpretation of the existing pattern. For example during Crisis 5 (see section 4.3.1.1, page 111) when a project team were being held hostage, the project team identified that the tribesmen were very upset so that the situation was very volatile and could easily get out of control. As such the project team recognised that they needed to be careful about how they responded to the tribesmen's actions. They thought that it was likely that they

would be harmed and feared for their lives. In this example, the project team engaged in multiple cycles of retrospective sensemaking in which they focused on the hostage takers' behaviours and actions. However, it was the recognition of the implications of these behaviours and actions during the cycle of anticipatory sensemaking that lead the project team to predict the future threat that they could be harmed and that their lives were at risk. Their focus during this anticipatory sensemaking process was on what they could do to avert the threat i.e. on the identification of a plausible course of action through which they could try to avert the threat before it happened. In this crisis, the plausible course of action was to seek an audience with someone who could understand their position and help them to be released. "*We were really in a helpless position in that situation, there was really very little we could do. We could only just pray that we would be able to speak to someone that would be stable enough to understand what we were about and hopefully plead our case and get them to release us*" (Interviewee 12).

During the trajectory tracking form of anticipatory sensemaking actors recognise and extrapolate trends "to get ahead of the curve" (Klein, Snowden and Pin, 2011, p. 3). The process involves actors noticing and preparing for how events are unfolding and their likely implications (McLennan, Elliot and Holgate, 2009). The prediction process may in part be informed by meaning structures that have been created in the past, prior to the unfolding crisis. However, it is both the recognition of the cues and the foresight of the implications that leads to the prediction of the threat. As an example, during Crisis 15 (see section 4.3.2.4, page 145) in which an operational team were re-commissioning one of their three generators when they identified that one of the valves for the generator could not be opened automatically. During the process to manually open the valve, they noticed that the level of water coolant was dropping. They identified that the coolant water that was shared between the three generators was flowing away through the overflow. This meant that the water to cool the two operational generators was draining away. In addition, the water levels for the pumps that were feeding the two operational generators had dropped so low that the pumps started to "fight each other" (Interviewee 9). They predicted that

over time this “could very easily rupture the pipework” (Interviewee 9) which would lead to a shutdown of the generators for a couple of weeks and that would be a “disaster” (Interviewee 9), causing a loss of service and costing several billion pounds. As such the identification of the threat was based on the recognition that the water levels for the pumps that were feeding the two operational generators had dropped and that this was starting to impact the pumps. Through the extrapolation of these cues the team predicted that there could be damage caused to the generators that could lead to the costly shutdown and repair of the generators with the resulting loss of service. Their focus during this anticipatory sensemaking processes was on identification of the actions they could plausibly enact to try to avert this threat before it happened, and they identified a course of action which was to try a radical untested approach to shut down one of the two operating pumps and run the two operational generators on a single pump which might slow down the rate of loss of water.

Similarly, the convergent form of anticipatory sensemaking involves actors recognising and foreseeing a future threat based on “the implications of different events and their interdependencies” (Klein, Snowden and Pin, 2011, p. 3). The prediction process may in part be informed by meaning structures that have been created in the past, prior to the unfolding crisis. However, it is the extrapolation and foreseeing of the implications of the different cues taken together that leads to the prediction of the threat. For example during Crisis 17 (see section 4.3.3.1, page 154) there was a gas leak (cue 1), the team recognised that gas was being vented into an enclosed area so this was creating a build-up of the gas (cue 2). In addition there was florescent lighting in the enclosed area (cue 3). Taking these three cues together the team predicted that there could be a fire and/or explosion. From the sound of the gas they estimated that it would cause a fireball, “40 foot flame thrower” (Interviewee 9), but they did not know in which direction the fireball would go. As such, it was the extrapolation and foresight of the implications of the different cues that led the team to predict that the gas could ignite and cause an explosion that threatened peoples’ lives and could cause damage to the generators. Their

focus during this anticipatory sensemaking processes was on what action they could take, so they identified that they needed to keep the fire brigade away from the building and evacuate the area while they continued the de-gas process until the sound of the leaking gas was reduced and the gas that had built up in the enclosed area had diffused.

Taken together, the findings of this study identify that the proactive sensemaking processes during the unfolding crises involved anticipatory sensemaking in which actors predicted a future threat and prepared a course of action that they could enact to try to avert the threat before it occurred. This anticipatory sensemaking is a future-oriented process that differs from the other forms of sensemaking that are identified in the sensemaking literature. The findings of this study provide empirical evidence that challenges the key ontological perspective that the temporal orientation of sensemaking is retrospective only. Moreover, the findings provide a richer understanding of the temporal orientation and dimensions involved in the anticipatory sensemaking process in the context of unfolding organizational crises. The following section considers the model of anticipatory sensemaking which provides further detail on these anticipatory processes during unfolding organizational crises.

5.5 Model of Anticipatory Sensemaking

This research contributes to knowledge in offering a detailed model of the anticipatory sensemaking during unfolding organizational crises. As described in chapter 2, the model of anticipatory sensemaking (Figure 2, page 33) was initially synthesised from the descriptions of the anticipatory sensemaking process provided by Klein, Snowden and Pin (2007, 2011) and by McLennan, Elliot and Holgate (2009). The model shows anticipatory sensemaking as action-prediction-preparation cycles that consist of four sub-processes (see Figure 28); environment change, prediction, preparation and enactment.

Following the prediction process, based on their sense of responsibility and/or obligation, the actors perceived a ‘need to do something’ to avert the predicted threat and they generated a plausible course of action during the unfolding crisis through which they could collectively seek to avert that threat. Both the

sense of a ‘need to do something’ and the perceived sense of responsibility and/or obligation are indicated within the ‘Preparation’ process in the model of anticipatory sensemaking shown in Figure 28.

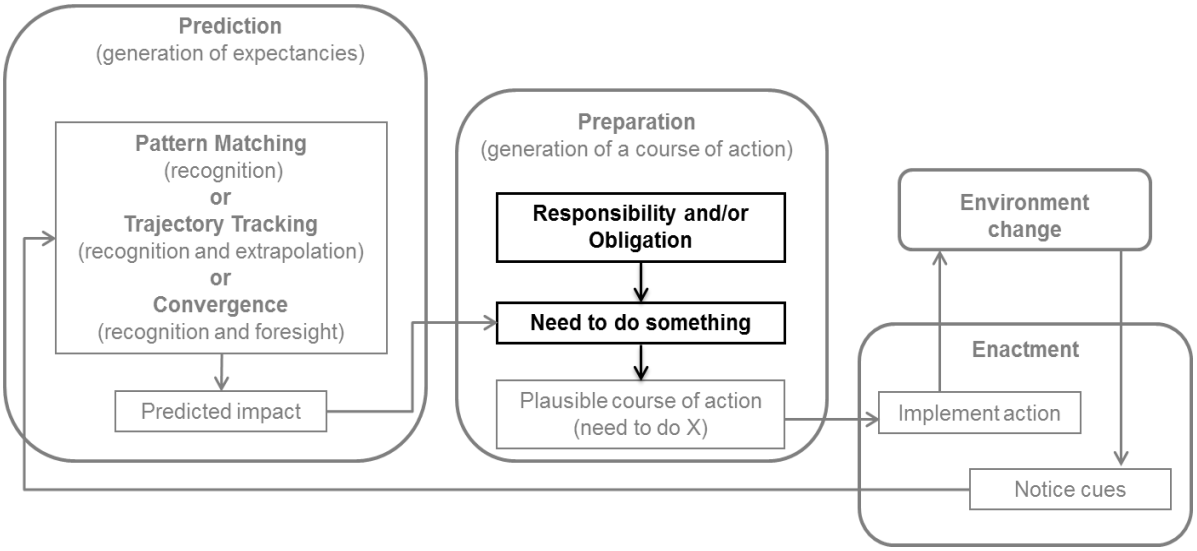

Figure 28 – Model of anticipatory sensemaking processes during unfolding organizational crises

As such this novel model enhances our understanding of the detailed processes underlying the cycle of anticipatory sensemaking within the integrative model of sensemaking during unfolding organizational crises. Several of the interviewees stated that in taking action during the unfolding crisis they recognised that they may make a ‘bad decision’ (Interviewee 19) or a ‘wrong decision’ (Interviewee 19) or address the ‘wrong issues’ (Interviewee 16). However they perceived that there was a ‘need to do something’, to engage in the sensemaking processes and take action rather than not take action as ‘the worst thing you can do is do nothing’ (Interviewee 9).

McLennan, Elliot and Holgate (2009) describe a ‘need to do X’ as part of the sensemaking processes that they identified in their exploratory study of the anticipatory processes used by supervisors in the management of wildfires in Australia. They found evidence for three forms of anticipatory sensemaking as part of the supervisor’s individual decision making processes. These three

forms of anticipatory sensemaking resembled the forms proposed by Klein, Snowden and Pin (2007, 2011): pattern matching; trajectory tracking; and convergent sensemaking. McLennan, Elliot and Holgate (2009, p. 92-93) provided details of how these processes unfold, and each process description includes the term ‘need to do X’:

1) Pattern matching (the situation is A, this is likely to lead to B, so we need to do X);
2) Trajectory tracking (the situation is one of A, over time this is likely to entail B, which may lead to C, so we need to do X); and
3) Convergent sensemaking (the situation is characterised by A, by B, and by C. Taken together, D is likely, so we need to do X).

The findings show that these three forms of anticipatory sensemaking were evident as collective sensemaking processes in the empirical data in this study. However, for clarity, this ‘need to do X’ is distinct from the actors’ perceived sense of a ‘need to do something’. The ‘need to do X’ refers to the need to implement the single course of action that is generated to avert the predicted threat and as such it relates to ‘what’ is perceived as needs to be done. The ‘need to do something’ which arose from the actors’ sense of responsibility and/or obligation, is an underlying generative mechanism that relates to the ‘why’ the actors engaged in sensemaking to identify a course of action to avert the predicted threat. As such, the findings of this research identify a novel generative mechanism that gave rise to the need to take action during the unfolding crises.

In summary, this research study provides a novel model of anticipatory sensemaking that was synthesised from the extant literature, and has been enhanced based on the finding from the empirical study that a ‘need to do something’ gave rise to the need to take action during the unfolding crises. In addition, the empirical findings identified that the anticipatory sensemaking processes during unfolding organizational crises are future-oriented. However, it is acknowledged that from a wider temporal view, the anticipatory processes may also involve the past and present temporal dimensions. In the present, the

actors identify a course of action that they can implement to try to avert the predicted future threat. The course of action may in part be informed by knowledge, experience or meaning structures that have been created in the past, prior to the crisis. However, the focus of the anticipatory process is the predicted future threat, and as such the predominant temporal orientation of the anticipatory sensemaking is future-oriented. The following section considers a further finding which relates to the organizing structures that were created during the proactive sensemaking processes.

5.6 Organizing through the Creation of Structures

The literature on sensemaking in the context of the management of foreseeable but unexpected events has identified a retrospective sensemaking process that utilises existing shared meaning structures to enable actors to regularly manage the unexpected when it occurs (Patriotta, 2003; Bechky and Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015). As previously stated in section 2.5, Weick distinguished (1979, 1993) two different forms of organizing through collective structure. One form is focused on 'ends' or goals that embody what people collectively seek to achieve. The second form is focused on 'means', that is on how people collectively act and create meaning that can be stabilised through the creation of shared meaning structures. Through the use of existing shared meaning structures, actors can retrospectively create plausible meaning for what has happened in their environment to enable them to take action based on this plausible meaning. These structures can be focused on shared goals or on a means of making sense, and can embody the dominant shared meaning such as organizational roles, rules, processes and procedures (Weick, 1993; Bechky and Okhuysen, 2011), shared task knowledge and common workflow expectations (Bechky and Okhuysen, 2011), narratives frameworks (Patriotta, 2004), metaphors (Patriotta and Brown, 2011) or temporal based frameworks (Patriotta and Gruber, 2015). These structures provide the flexibility for the actors to adapt to make sense of and handle a foreseeable but unexpected event, so that they can regularly "expect the

unexpected" (Bechky and Okhuysen, 2011, p. 239) or "turn the 'unusual' into 'business as usual'" (Patriotta and Brown, 2011, p. 34).

While actors regularly manage foreseeable but unexpected events through the use of existing shared meaning structures, Weick (1993) found that the breakdown of these structures along with the social interaction processes for creating new meaning, can lead to the collapse of sensemaking during crises. He identified through his study of the Mann Gulch Disaster (Weick, 1993) that this disaster arose from a collapse of both the sensemaking structure that was based on the team role system, and the means of making sense: "What makes such an episode so shattering is that both the sense of what is occurring and the means to rebuild that sense collapse together" (p. 633). He claims that during crises when the dominant meaning framework breaks down, actors should focus on and increase their means of making sense through "their formal and informal social ties" (Weick, 1993, p. 646), as this will lead to increased meaning and then to the creation of new shared meaning structures. Conversely, when there is a breakdown in the social ties, actors should focus on the dominant meaning structures until the social ties become clearer as the means of making sense.

This research found that during the unfolding crises, organizing emerged through the creation of new shared meaning structures. During the crises involving proactive sensemaking processes, organizing structures were created in the form of a collective goal or 'ends' to avert the predicted threat, with a course of action being prepared as a means to seek to avert the threat. Three of the four crises in which reactive processes were carried out involved the creation of organizing structures that were focused on the means of taking action. These organizing structures unfolded as a temporal process based on a pattern of gatherings or meetings through which the actors came together to enable collective retrospective sensemaking. While the actors did not have a clear course of action that they sought to follow, the emergence of an organizing structure enabled them to carry out collective retrospective sensemaking and through this enabled action. These temporal organizing

structures were based on clock-time e.g. every eight hours, regular pattern of meetings at set times every day, last 24-hours/next 24-hours. The structures emerged as the actors arranged when they would come together to share information, to try to give meaning to what was happening, and to agree what their immediate short-term actions would be. These temporal structures provided a 'drum beat' (Interviewee 14) or a 'routine' (Interviewee 17) that enabled collective retrospective sensemaking through which the actors continued 'firefighting' and 'muddled' their way through (Interviewee 14). While the literature on sensemaking in the context of the management of foreseeable but unexpected events has identified that actors engage in retrospective sensemaking processes in which pre-existing interpretative structures are employed to make sense of and handle unexpected events, the structures identified in the empirical data in this study were novel structures that emerged during the unfolding crises.

The findings confirm Weick's (1979) view of organizing as emerging through focusing on collective structure during crises, and the findings also make a contribution in identifying the organizing structures that were created: 'ends' in the form of a collective goal to avert a predict threat; a course of action that functioned as a 'means' of sensemaking in order to try to achieve the collective goal; and organizing structures that were based on clock-time which functioned as a 'means' of sensemaking through which the actors identified and agreed their next actions. Section 5.7 will now provide a summary of the contributions to knowledge made by this research.

5.7 Summary of Contribution to Knowledge

There are three main novel contributions from this study (Table 35). The first contribution is the novel integrative model of anticipatory and retrospective sensemaking processes during unfolding crises. The findings of this study show that the sensemaking processes during unfolding organizational crises involve highly iterative cycles of diagnostic retrospective action-meaning creation sensemaking that are dynamically interspersed with cycles of anticipatory sensemaking when a future threat is predicted. In addition, the findings identify

that enactment is a pivotal interaction point between the cycles of anticipatory and retrospective sensemaking. Based on how the cues from the environment are recognised, and whether or not the cues lead actors to predict a future threat, this gives rise to the form of sensemaking that then unfolds as either anticipatory sensemaking or retrospective sensemaking.

The second contribution is the model of anticipatory sensemaking during unfolding crises. The anticipatory sensemaking processes involve actors preparing in the present to avert a threat that they predict will occur in the future. The model of anticipatory sensemaking during unfolding crises was synthesised from the sensemaking literature and has been enhanced based on the novel emergent finding that a perceived 'need to do something' arising from a sense of responsibility and/or obligation gave rise to the preparation of a course of action to seek to avert the predicted threat. This model provides further detail and understanding of the anticipatory process, and shows the three forms of anticipatory sensemaking that were identified in the empirical data; pattern matching, trajectory tracking and convergent sensemaking. Sensemaking in both the theoretical and empirical organizational literature is predominately viewed as a retrospective process. The identification of this future-oriented form of sensemaking process during unfolding organizational crises challenges the key ontological assumptions that from a temporal perspective all forms of sensemaking are retrospective past-oriented processes.

The third contribution is how organizing emerged through the creation of shared meaning structures during the unfolding crises. These structures either provided a collective focus for the actors in the form of a shared goal, or provided the actors with a means to take action. The anticipatory sensemaking processes identified in the empirical data involved structures in the form of the collective goal to avert the predicted threat, with the prepared course of action being the means to achieve this goal. In addition three of the four reactive processes involved the creation of temporal structures based on clock-time which provided a 'routine' (Interviewee 17) or 'drum beat' (Interviewee 14) to the actors' cycles of retrospective sensemaking, and thus acted as a means by which they made

sense and took action to continue ‘firefighting’ and ‘muddled’ (Interviewee 14) their way through. Table 35 shows the summary of these three main contributions.

5.8 Chapter Summary

This chapter has discussed the contributions made by this research study based on the findings from the empirical data as presented in chapter 4. First, the integrative model of the sensemaking processes during unfolding organizational crises was considered, along with enactment as a pivotal interaction point between retrospective sensemaking processes and anticipatory sensemaking processes. Next the temporal orientation of anticipatory sensemaking was discussed. Then the model of anticipatory sensemaking during unfolding crises was considered. This model was synthesised from the sensemaking literature and enhanced based on the emergent finding that of a perceived ‘need to do something’ was a generative mechanism for the preparation and enactment of a course of action. Following this, the finding that organizing emerged through the creation of shared meaning structures during the unfolding crises was discussed. The final chapter of this thesis, chapter 6, will consider the conclusions that can be drawn from this study and also considers the limitations and recommendations for further research.

Table 35 – Summary of contributions

Finding	Existing knowledge	Type of contribution
Integrative model of anticipatory and retrospective sensemaking processes during unfolding organizational crises. This novel model presents the sensemaking processes as highly iterative cycles of retrospective sensemaking that are dynamically interspersed with cycles of anticipatory sensemaking when a future threat is predicted. Enactment forms the pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. Depending on how actors recognize and interpret the cues in their organizational environment gives rise to either a cycle of retrospective sensemaking or a cycle of anticipatory sensemaking when actors predict a future threat.	The model of retrospective sensemaking adapted from Weick (1979) and Jennings and Greenwood (2003). Description of anticipatory sensemaking as a process involving both prediction and preparation which can take one of three forms (Klein, Snowden and Pin, 2007, 2011; McLennan, Elliot and Holgate, 2009): pattern matching, trajectory tracking and convergent sensemaking. Weick (1979) identified two different forms of enactment during sensemaking, when the actors take notice of change in their environment and when they take action to change their environment.	The findings of this research make a novel contribution to theory through the synthesis of the integrative model of sensemaking during unfolding crises, and the identification of enactment as the pivotal interaction point between the cycles of anticipatory and retrospective sensemaking.

Table 35 – Summary of contributions (continued)

Finding	Existing knowledge	Type of contribution
Future-oriented anticipatory sensemaking process in which actors prepare in the present to avert a threat that they predict will occur in the future. The temporal orientation of the anticipatory sensemaking processes identified in the empirical data is future-oriented rather than past-oriented. The conceptual model of anticipatory sensemaking was synthesised from the existing literature and enhanced based on the emergent finding that a perceived 'need to do something' arising from a sense of responsibility and/or obligation was a generative mechanism for the preparation of a course of action to avert the predicted threat.	A key ontological assumption is that sensemaking is a retrospective past-oriented process (Weick, 1979, 1988, 1993, 1995, 2003, 2005; Weick, Sutcliffe and Obstfeld, 2005). However, the view that sensemaking is only a past-oriented process is challenged (MacKay, 2009; Stigliani and Ravasi, 2012) and anticipatory sensemaking is presented as a future-oriented processes that may be involved in crisis (Klein, Snowden and Pin, 2007, 2011). Description of anticipatory sensemaking as a process involving both prediction and preparation (Klein, Snowden and Pin, 2007, 2011). Description of three forms of anticipatory sensemaking (Klein, Snowden and Pin, 2007, 2011; McLennan *et al*., 2009): pattern matching, trajectory tracking and convergence.	The findings provide evidence for the counter-argument that challenges the key ontological assumption that sensemaking is a past-oriented process only. The findings confirm that during unfolding organizational crises sensemaking can occur in future-oriented forms of anticipatory sensemaking. The findings make a novel contribution in the model of the anticipatory sensemaking process during unfolding crises that was synthesised from the existing literature, and has been enhanced based on the findings from the empirical data that perceived 'need to do something' gave rise to the preparation of a course of action to avert the predicted threat during the anticipatory sensemaking process.

Table 35 – Summary of contributions (continued)

Finding	Existing knowledge	Type of contribution
Organizing through emergent structures Organizing emerged from the sensemaking processes through the creation of novel structures. The proactive sensemaking processes involved structures that were focused on the collective goal to avert the predicted threat, with the means to achieve this being by implementing a course of action. The reactive sensemaking processes involved the creation of temporal clock-time structures through which the actors arranged when they would come together to share information, to try to give meaning to what was happening, and to agree their immediate short-term actions.	Weick (1979) describes two forms of structuring: one focused on the means of collective interaction, and the second focused on the collective goal to be achieved through interaction. Research on sensemaking in the context of the management of foreseeable but unexpected events has identified retrospective sensemaking process that utilise existing shared meaning frameworks (Patriotta, 2003; Bechky and Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015).	This research extends our understanding of how organizing emerges in sensemaking processes through the identification of the novel structures that were created to enable collective sensemaking and organizing during the unfolding crises.

6 CONCLUSION

6.1 Chapter Overview

The final chapter of this thesis document provides an overview of the research problem and the study that was designed to address the research question. This chapter presents a summary of the contributions to knowledge and to practice made by this research, and in addition considers the limitations of the study and the directions for further research. Firstly, section 6.2 presents the research problem. Then section 6.3 provides an overview of the research study and summarises the findings, while section 6.4 provides the contributions to knowledge based on these findings. Next, section 6.5 considers the implications for practice, while section 6.6 reflects on the limitations of this study. Finally, section 6.7 describes areas for further research.

6.2 Research Problem

This doctoral research project has focused on the study of the forms, temporal orientation and interaction of sensemaking processes during unfolding organizational crises. As detailed in chapter 2, a review of the organizational crisis and sensemaking literatures revealed that research on sensemaking during organizational crises has identified retrospective action-meaning creation processes in which actors give meaning in the present to activities that have occurred in the past, thus reducing uncertainty and enabling action (e.g. Weick, 1988, 1993). Research on sensemaking in the context of the management of foreseeable but unexpected events has identified two forms of retrospective sensemaking processes through which actors regularly handle foreseeable but unexpected events. The first is a form of prospective sensemaking that is a retrospective future-perfect-thinking process through which actors envision possible future scenarios and define contingency plans that can be implemented if and when any of these scenarios occurs (Hayes and Birch, 2009; Gephart, Topal and Zhang, 2010; Van Den Heuvel, Alison and Powel, 2014). The second is a retrospective sensemaking process in which actors utilise existing interpretative meaning structures such as organizational roles,

rules and procedures (Weick, 1993; Bechky and Okhuysen, 2011) to make sense of changes in their environment in order to regularly manage the unexpected when it occurs (Patriotta, 2003; Bechky and Okhuysen, 2011; Patriotta and Brown, 2011; Patriotta and Gruber, 2015). However as Weick (1993) points out, such structures can breakdown during unfolding crises and an over-reliance on these structures, including contingency plans can lead to problems of entrainment or normalization where the subtle cues in the environment are ignored or discounted leading to an escalation in the situation.

Sensemaking is generally considered to be retrospective, however several scholars dispute that it is exclusively a past-oriented process (Shotter, 2005; MacKay, 2009; Stigliani and Ravasi, 2012; Rosness *et al*., 2016). Research in the context of intentional change, such strategic change, new product development and organizational change, has identified a future-oriented prospective sensemaking processes that focuses on the creation and elaboration of shared views of potential futures (Gioia and Chittipeddi, 1991; Gioia *et al*., 1994; Gioia, Corley and Fabbri, 2002; MacKay, 2009; Gephart, Topal and Zhang, 2010; Stigliani and Ravasi, 2012; Kaplan and Orlikowski, 2013). From the post-Weickian perspective, this form of prospective sensemaking is viewed as being predominately a future-oriented process that incorporates past and present temporal dimensions when actors rethink the past and reconsider present concerns in the creation of envisioned futures. However, this interpretative form of sensemaking has been identified in the context of intentional change where there is time available to articulate and elaborate the tentative interpretations of the possible future events, rather than the time constrained situations that occur during unfolding organizational crises (Stigliani and Ravasi, 2012). Recently, scholars have proposed a future-oriented anticipatory form of sensemaking that can occur during unfolding crises, when actors predict a future threat and they prepare and enact a course of action to avert this predicted threat (Klein, Snowden and Pin, 2007, 2011; McLennan, Elliot and Holgate, 2009).

The increasing frequency, severity and types of crises mean that an organization's capability to respond during a crisis has become an important item on the executive agenda (Cockram and Van Den Heuvel, 2012). The paucity of empirical research on anticipatory sensemaking affords the opportunity for new research contributions that can challenge the key ontological assumption about sensemaking as a retrospective process and can also extend knowledge on the temporal orientation and forms of sensemaking processes (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015). The topic of future-oriented sensemaking is an on-going debate in the sensemaking literature as it poses a challenge to key ontological assumptions about sensemaking as a retrospective process (Maitlis and Christianson, 2013; Sandberg and Tsoukas, 2015). This research has attempted to contribute to the debate by offering a deeper understanding of the sensemaking processes in the context of unfolding organizational crises, in answer to the research question: ***What are the anticipatory and retrospective sensemaking processes during unfolding organizational crises and how do these processes interact?*** The following section provides an overview of the research study carried out with the aim of answering this research question.

6.3 Overview of the Empirical Study and Findings

A critical realist study was carried out which adopted a qualitative methodology. The chosen method for data collection was semi-structured interviews in which the interviewees were asked to describe an organizational crisis that they had experienced. Twenty people were interviewed from the fourteen organizations, across nine different industries and three continents. The interviews took place during the period November 2012 to July 2014. Analysis of the empirical data identified twenty-two sensemaking processes that met the following two selection criteria:

1) The event was a crisis, that is: a high-impact event that posed a threat to the goals or survival of the organization; involved uncertainty about the impact and means of resolution; required an urgent response to minimize

the impact; and included activities that were not planned prior to the event.

2) The interviewee was involved in the activities to minimise the impact of the crisis i.e. they had first-hand experience of the crisis.

Narratives were prepared for each of the twenty-two crises, and the sensemaking processes identified in the narratives were interpreted and detailed using a visual mapping technique. The analysis of the empirical data utilised the five sub-processes from the integrative model of anticipatory and retrospective sensemaking during unfolding organizational crises. These sub-processes were used to clarify the forms and temporal orientation of the sensemaking processes that were described in the narratives. The sensemaking processes were then compared and contrasted, with two categories being identified: reactive processes and proactive processes. As such, in answer to the research question, the findings of this study show that the sensemaking processes during unfolding organizational crises emerged in two forms: reactive processes that involved cycles of retrospective sensemaking, and proactive processes that consisted of cycles of retrospective sensemaking dynamically interspersed by cycles of anticipatory sensemaking. These cycles of anticipatory sensemaking unfolded in three forms: pattern matching, trajectory tracking and convergent sensemaking. During the reactive processes, the organizational actors engaged in retrospective sensemaking when they gathered information to explain the cause of the crisis, or to identify what was happening during the crisis. The proactive processes initially involved cycles of retrospective sensemaking in which the actors created plausible explanations for what had occurred and focused their actions based on these plausible explanations. However, the proactive processes differed from the reactive processes when the actors noticed cues in their environment, and based on these cues they engaged in anticipatory sensemaking in which a future threat was predicted and a course of action was prepared to try to avert this threat. The anticipatory sensemaking process was then followed by further cycles of retrospective sensemaking that focused on assessing the on-going activities against this newly prepared course of action.

The findings of this research show that both the proactive and reactive sensemaking processes involved enactment. During the proactive processes enactment functioned as pivotal interaction point between the cycles of retrospective and anticipatory sensemaking. Through enactment, the actors noticed cues in their organizational environment. Based on how these cues were recognised, whether or not the cues led the actors to predict a future threat, this gave rise to the form of sensemaking process that then unfolded as either anticipatory sensemaking or retrospective sensemaking. In addition, the findings show that during the sensemaking processes organizing emerged through the creation of structures that either provided the actors with a collective focus in the form of a goal or 'ends' (Weick, 1979) or provided a 'means' (Weick, 1979) to carry out their activities. During the eighteen proactive sensemaking processes, the structures took the form of the collective goal to avert the predicted threat, with the agreed course of action as a means to achieve this goal. During three of the four reactive sensemaking processes the actors created temporal structures in the form of a pattern of meetings or gatherings. These temporal structures were based on clock-time, and they served as a means through which the actors could engage in retrospective sensemaking in order to assess what was happening and agree their next actions. An emergent finding was that the actors sensed a 'need to do something' with this need being perceived as a sense of responsibility to protect people, property or the organization, and/or an obligation to provide a key business service or product. This sense of a 'need to do something' was an underlying generative mechanism for the sensemaking processes. The next section presents the contribution to knowledge based on these findings.

6.4 Contribution to Knowledge

The findings make three main contributions to knowledge (see Table 35, page 206). The first is the novel integrative model of anticipatory and retrospective sensemaking processes during unfolding organizational crises. This conceptual model presents the sensemaking processes as highly iterative involving cycles of retrospective sensemaking dynamically interspersed with cycles of

anticipatory sensemaking when a future threat is predicted. In addition, the model shows that enactment is a pivotal interaction point between the cycles of anticipatory and retrospective sensemaking.

The second contribution is the model of anticipatory sensemaking during unfolding crises. The anticipatory sensemaking process involves actors preparing in the present to avert a threat that they predict will occur in the future. The model provides further detail and understanding of the anticipatory processes, and also confirms the three different forms the anticipatory sensemaking that can unfold; pattern matching, trajectory tracking and convergent sensemaking. In addition, the model incorporates the emergent finding that a perceived 'need to do something' arising from a sense of responsibility and/or obligation gave rise to the preparation of a course of action to avert the predicted threat during the anticipatory sensemaking processes. Sensemaking in both the theoretical and empirical organizational literature is predominately viewed as a retrospective process. The identification of this future-oriented form of sensemaking process during unfolding organizational crises challenges the key ontological assumptions that from a temporal perspective, all forms of sensemaking are retrospective past-oriented processes.

The third contribution is the identification of the organizing structures that emerged during the unfolding crises. These shared meaning structures either provided a collective focus in the form of a goal, or provided a means for the actors to carry out their activities. Organizing during the proactive processes emerged through the structure provided by the collective goal to avert the predicted threat and the course of action as a means to achieve this goal (see section 5.6, page 201). The reactive sensemaking processes on the other hand involved iterative cycles of retrospective sensemaking through which the actors created temporal structuring processes that were based on clock-time, and provided a means to make sense and take action. These processes unfolded as the actors arranged when they would come together to share information, to try

to give meaning to what was happening, and to agree what their immediate actions would be.

6.5 Implications for Practice

The three findings from this research have implications for practice in relation to providing knowledge to organizational members who may experience crises. The means for providing this knowledge could be through its inclusion in new or existing crisis awareness and training courses. The first finding relates to the knowledge of the forms of sensemaking processes that emerge during unfolding crises, and how these processes interact and enable action. The second finding is that the creation of organizing structures during unfolding crises can enable collective sensemaking processes. The third finding relates to the perceived sense of a 'need to do something' that is an underlying mechanism for the sensemaking processes. Each of these three findings is considered in turn, starting with the knowledge of the sensemaking processes.

6.5.1 Knowledge of the Sensemaking Processes

Much of the academic and practitioner literature on organizational crises focuses on preventing a crisis or on detailing a contingency plan prior to a crisis occurring (Fink, 1986; Mitroff, 2000; Hutchins and Wang, 2008). However the findings of this study show that there are many crises that involve sensemaking activities which were not pre-defined but unfold during the crises. The organizational actors engaged in reactive or proactive sensemaking processes during an unfolding crisis to enable them to make plausible sense and take action to mitigate the impact of the crisis. As such, knowledge of these sensemaking processes could be of benefit to practitioners, in particular those practitioners who work in similar circumstances to the participants in this study. These circumstances are where they can be called on to respond if a crisis arises within their organization or they work in a time constrained situation such as on projects delivering key new business services or technical products. These practitioners may benefit from the knowledge that the participants were able to take action through reactive sensemaking processes that involved cycles of retrospective sensemaking in which action was incrementally taken

based on collective meaning that was created to plausibly explain what had occurred. It could be beneficial to practitioners to know that when a threat was predicted during an unfolding crisis, the creation of a plausible course of action enabled the participants to implement action to avert the predicted threat.

6.5.2 Possibility of Progressing by Organizing through Structures

During three of the four reactive sensemaking processes, the actors created temporal organizing structures in the form of a pattern of regular meetings or gatherings. Knowledge of these temporal structures may provide practitioners with a means to try to give meaning to what is happening during unfolding crises, and based on this plausible meaning, to agree what their immediate short-term actions will be. These regular meetings may provide a rhythm to the sensemaking activities, a 'routine' (Interviewee 17) or 'drum beat' (Interviewee 14) and so enable collective retrospective sensemaking through which the practitioners can continue to take action to minimise the impact of the unfolding crisis. In addition, during the eighteen proactive sensemaking processes when a threat was predicted, the participants implemented organizing structures in the form of an agreed course of action which provided both a collective focus for their actions to avert a perceived threat and also provided a means to try to achieve this collective goal. Practitioners could make use of the knowledge that if they predict a threat during an unfolding crisis then they may be able to implement an organizing structure in the form of an agreed course of action through which they can focus their actions to try to avert the predicted threat.

6.5.3 Recognition of the 'Need to do Something'

The sense of a 'need to do something' was an underlying generative mechanism for the sensemaking processes that the organizational actors engaged in to mitigate the impact of the unfolding crisis. This 'need to do something' arose from the actors' perceived sense of responsibility to protect people, property or the organization, and/or an obligation to provide a key business service or product. Organizations could seek to recognise and develop a sense of responsibility and/or obligation within their organizational members so that if a crisis unfolds where there is no contingency plan, the organizational

members may engage in collective sensemaking and take action to mitigate the impact of the unfolding crisis. However, further research would be required to understand what gives rise to the perceived sense of responsibility and/or obligation so that this can be recognised and developed. In addition, several of the interviewees stated that during an unfolding crisis they recognised that they may make a 'wrong decision' or 'bad decision' or address the 'wrong issue', however 'the worst thing you can do is do nothing' (Interviewee 9). Recognition that practitioners may sometimes make the 'wrong' decisions in taking action during an unfolding crisis may assist them to focus on taking action, rather than do nothing.

6.6 Limitations and Reflection

As is the case with all research, the findings of this study are subject to a series of limitations that should be acknowledged. Three main areas of limitation for this study relate to: researcher bias; the sampling regime; and the qualitative approach used in this study, in particular the context and generalisability of the findings. Each of these areas of limitation is considered below.

6.6.1 Researcher Bias

The researcher began this study with a personal interest in understanding how people collectively make sense during an unfolding organizational crisis to enable them to take action in order to minimise the impact of the crisis. Having experienced crises on four separate occasions, her primary motivation for this research was to understand how others had handled unfolding crises, so that if she ever faced such a situation again she may know more about how she and her colleagues could make sense of the unfolding crisis and take action to mitigate the impact of the crisis. However, as a researcher this prior experience could call into question the validity of the interpretive findings. To counter this, throughout the data collection and analysis stages effort was made to ensure that there was an accurate reflection of the accounts given by the interviewees. The use of semi-structured interviews enabled the interviewees to select and describe in their own words their accounts of the crisis in which they were personally involved. The interview questions were both open and probing, but

were not overly directing. The critical incident technique was used to specify the approach for data collection to ensure objectivity and consistency in the approach used. The narrative strategy was adopted to prepare consolidated accounts of each crisis based on the words used by the interviewees. Then visual mapping was used to present a consistent approach for the representation of the data on the sensemaking processes that were carried out during each of the twenty-two crises. Based on these visual maps, the sensemaking processes were then compared, contrasted and categorised. In addition, the findings are evidenced by numerous extracts from the interviews which provide support using the interviewees own words. However, it is acknowledge that bias can never be totally eliminated, in particular in studies such as this one where the findings are interpretive.

6.6.2 Sampling

Twenty people were interviewed in this study, and it is acknowledged that this sample size is small. However, it is comparable to other studies of activities during organizational crises (Eisenhardt, 1989; Langley, 1990; Meszaros, 1999; Hale, Hale and Dulek, 2006). The participant sample was not pre-specified prior to the data collection, as additional participants who fitted the target group were identified after the data collection and analysis had commenced. The target participants for this study were people who had first-hand experience of a crisis in their organization, in that they were involved in the activities to minimise the impact of the unfolding crisis. In order to target such people, the interviewees were selected on the basis that they could be called on to respond if a crisis arose within their organization or they worked in a time constrained situation such as on projects delivering key new business services or technical products where they could be called upon to respond to a crisis arising from the project. However, their day-to-day roles were operational or project related and were not primarily focused on responding to crises. The difficulty in identifying such a specific sample group necessitated the use of personal links to identify organizations and individuals who would be willing to participate, as well as the use of institutional links with Cranfield University School of Management.

However, for clarity, this researcher had no prior knowledge or experience of the crisis identified by this study. As a result of the sampling approach, both the participant sample and the sample of unfolding crises may be skewed and not representative of the wider populations.

6.6.3 Qualitative Approach

Several limitations arise from the use of a qualitative approach in this study, in particular the generalisability of the findings and use of interviews as a data collection method. The generalisability of the findings is a limitation that can be raised with many qualitative studies and this study is no exception. The findings of this research are based on the sensemaking processes in the context of unfolding organizational crises, and so may not be representative or generalisable to other organizational or crisis contexts. In addition, the study did not consider any antecedent factors such as cultural, skills, knowledge or organizational structure that may have influenced the sensemaking processes, although this is an area where further research could be carried out.

This study was based on semi-structured interviews with participants who had first-hand experience of an organizational crisis. Semi-structured interviews were chosen as the data collection method as these interviews provide an open and flexible way in which to gather data while enabling the participants to describe the events they have experienced in their own words. In addition, semi-structured interviews allowed the researcher to probe areas of specific interest and in the case of this research to guide the interviewee to elaborate on crises which involved activities that were not planned prior to the crisis. However, the use of interviews has meant that the participants retrospectively described the crises from their perspective. This may have introduced error, embellishment or post hoc rationalisation in how they recalled and described the sensemaking processes during the unfolding crises. However to counter this, the critical incident technique was used to design the data collection approach and the interview protocol. In line with this technique, as recommended by Hughes, Williamson and Lloyd (2007) the following four steps were carried out. First, the interview questions were carefully worded and were

piloted during the first three interviews to minimize ambiguity and bias. Following this pilot, minor adjustments were then made to the interview protocol. Secondly, to enable full and accurate responses, the participants were requested to focus on incidents that they had experienced. Thirdly, the participants were enabled to describe one or several incidents that represent positive and/or negative aspects of the activity carried out during the unfolding crises. Fourthly, the participants were encouraged to provide factual reports rather than interpretations of what happened. The interview extract below is an example of where the interviewee offered general information rather than a specific example that had occurred in their experience. The interviewer asked a question to prompt the interviewee for a specific example. This is in line with the critical incident technique recommendation to request participants to focus on incidents that they had taken part in, as well as to seek specific incidents rather than interpretations, opinions or generalisations. Section 3.5 (page 63) provides a further example where the interviewee offered interpretation and opinion rather than a specific example that had occurred in their experience, and the interviewer asked a question to prompt the interviewee for a specific example. Finally, to corroborate the reports of the crises provided by the interviewees, secondary data was obtained where available from the organization or from media reports on the crisis.

[Interviewee]: "… so that's one example and the other one is I've just reminded myself component lead times, you get a quote from a supplier and they tell you it's going to be four weeks and then you design that part in and if there isn't an equivalent part that lead time suddenly shoots out to 12 weeks you have a problem. So again when we're doing those kind of proposals the component lead times or the availability of parts is always one of the assumptions because clients that we work with that have designed and manufacturing, internally recognise that that can be a problem, clients that don't do that have no R&D are less likely to know about that so that's why we always point those things out and if it is a key part that there's no other and you can't just drop something in as an equivalent, again that's the risk that you need to manage in the program

and make the client aware of should that part go out; these are the steps we're taking to manage that process. So you get quotes, you get samples or…"

[Interviewer]: "Is there a particular example where that happened, can you just talk me through what that was?"

6.7 Directions for Further Research

This research identified that enactment formed the pivotal interaction point between the cycles of retrospective sensemaking and cycles of anticipatory sensemaking. Based on how the cues from the environment were recognised, whether or not the cues led the actors to predict a future threat, this gave rise to the form of sensemaking that then unfolded; either anticipatory or retrospective. Research could be carried out to further explore the enactment processes; to describe and explain the underlying mechanisms within these processes which generate the cycles of anticipatory or retrospective sensemaking that then unfold. While all three forms of anticipatory sensemaking (pattern matching, trajectory tracking and convergent sensemaking) were identified in this study, further research could be carried out on sensemaking processes involved during unfolding crises to identify other forms of anticipatory sensemaking. Indeed, Klein, Snowden and Pin (2007, 2011) expect that additional forms of anticipatory sensemaking will be identified by researchers in the future. In addition, this study identified that a perceived 'need to do something' is a generative mechanism for the sensemaking processes during an unfolding crisis. Further studies could be carried out to explain and understand this generative mechanism that underlies the sensemaking processes.

6.8 Chapter Summary

This chapter has provided an overview of the research problem and the study that was designed to address the research question. It has presented a summary of the contributions to knowledge and to practice made by this research, and in addition has considered the limitations of the study and the directions for further research.

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APPENDICES

Appendix A – Interview Protocol

Introduction and Personal Statement

(To cover: Who I am; purpose of research; confidentiality; no right answers; and note taking)

1. Thank you for agreeing to do this interview. This is part of a research study which is looking at the activities that are carried out in response to a crisis*.
2. There are no right answers to the questions that I will ask. I am interested in your experience of responding to a crisis*.
3. I will tape the interview so that afterwards I can go back to analyse the information gathered. Is that ok?
4. I will also make notes so that I can come back to points you mention as we go along.
5. Your answers will be confidential, and your identity will be kept anonymous.

Interview outline

(To cover: structure of interview; specific question; primary questions; follow-up questions; and conclusion)

6. The interview will start with some questions about how long you have worked in the organization.
7. I'll then ask the more specific question relating to your experience of responding to a crisis*, and will ask follow-up questions to expand on your experience. Please feel free to clarify any question you do not understand.
8. Finally, I'll sum up, and there will be an opportunity for you to ask questions or add further information that you feel is relevant.

Specific questions

9. What is your role in the organization?
10. How long have you worked in that role?

Primary questions

Think of a time where you were involved in responding to a crisis* which did proceed as expected.

11. What was the crisis*?
12. What happened?
13. Who was involved?

14. What actions were taken?
15. What was the outcome of those actions?
16. What lead up to the crisis*?
17. Was there anything that helped in dealing with this crisis*?
18. Has a similar crisis* happened before?

Follow-up questions

19. Can you explain further about …
20. Give an example of …

Summing-up

21. So to summarise …
22. I have no further questions. Do you have any questions or anything you would like to add?
23. Would it be ok for me to contact you if I have any points after this interview that I would like to clarify?
24. Thank you.

* The term crisis, incident or project issue was used depending on the interviewee's role and the term used to describe such events within their organization. For example project issue was used if the interviewee worked within a project environment.