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Together Telling: Reconciling Information Equivocality in Crisis Response

by

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This thesis is submitted in fulfilment of the requirements for the degree of
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Preface

Date: September 11, 2012

Time: 8:50 a.m.

Location: Company X Distribution Headquarters, Los Angeles, California.

It is a busy morning at Company X. A team of sales consultants are scheduled to meet with the Company's key directors to discuss the year-end projections. Shortly before the meeting, the office phone of the International Supply Chain Director rings. The operator informs that on the other line is the Country Manager from Pakistan and its urgent. The Director takes the call.

Country Manager: *[In a quavering voice]* Do you know... do you know anything about Saleem? He is missing.

Director: No, I don't. What happened? What happened to him?

Country Manager: We can't find Saleem. I called him on his mobile but there is no response. Do you know anything?

Director: What do you mean you can't find him? Calm down and tell me what happened?

Country Manager: You don't know? There is a fire at the factory, and he was inside. No one has seen him since then.

Director: Fire? How? When did it happen?

Country Manager: We don't know anything yet. No one knows anything. I'm here...it's unbelievable...it's chaotic, sir.

Director: Listen! Get hold of yourself. Let me find out what is going on there and as soon as you speak with Saleem, let me know.

[One hour later, a call is made from the Director's office]

Director: Did you hear anything from Saleem?

Country Manager: *[After a brief pause]* He is gone. They found him in the basement. He couldn't make it. He is no more. You will not believe what I am seeing. Ayan, Hussnain, and Ahmed are also missing.

[Silence]...the call ends.

The preceding conversation between the Director and the Country Manager is not part of any script, rather depicts a story of a real-life tragedy that left its mark on everyone involved in this incident. The Director in this conversation is the researcher himself and the following is his original and independent work; a journey towards exploring what happened on that ill-fated night when a group of his colleagues lost their lives in a factory fire and what can be done to prevent such incidents from reoccurring.

Contents

PREFACE.....	III
LIST OF FIGURES	VIII
LIST OF TABLES	IX
ACKNOWLEDGEMENTS.....	1
EXECUTIVE SUMMARY	4
1. INTRODUCTION.....	5
1.1 The Ali Enterprises Factory Fire Incident	5
1.2 Research Motivation	5
1.3 Research Overview and Aim	6
1.4 Sensemaking in Groups.....	7
1.5 Research Question	8
1.6 Structure of the Remainder of the Thesis.....	8
2. LITERATURE REVIEW	11
2.1 Crisis Management.....	13
2.1.1 Crisis and Its Origins	13
2.1.2 Organizational Crisis Overview.....	14
2.1.3 Communication and Its Role in Crisis Response	20
2.1.4 Information	22
2.1.5 Information Equivocality	29
2.2 Sensemaking.....	33
2.2.1 Definition of Sensemaking	33
2.2.2 History of Sensemaking in Organizational Contexts	35
2.2.3 Process of Sensemaking	36
2.2.4 Sensemaking Levels of Analysis	38
2.2.5 Individual Sensemaking.....	39
2.2.6 Group Sensemaking.....	46
2.2.7 Practical Insights into Sensemaking	56
2.2.8 Crisis and Sensemaking.....	61
2.3 Sensegiving.....	64
2.3.1 Linking Sensemaking and Sensegiving	64
2.3.2 Sensegiving Outcomes Through Sensemaking Forms	65
2.3.3 Sensemaking-Sensegiving Gaps.....	67
2.4 Storytelling.....	68
2.4.1 Organizational Storytelling.....	69
2.4.2 Stories' Role in Crisis Sensemaking and Sensegiving	71
2.4.3 Storytelling Challenges During Crisis.....	73
2.5 Summary	76
3. METHODOLOGY.....	79
3.1 Paradigm Selection: Interpretive Research Paradigm.....	79

3.1.1	Functionalist vs. Interpretive Paradigms	80
3.2	Research Strategy: Modes of Reasoning.....	82
3.2.1	Abductive Reasoning.....	83
3.3	Research Approach: Design Science Research	84
3.3.1	DSR Suitability for the Current Study.....	85
3.3.2	Design Propositions	86
3.3.3	Practical Guidelines for Conducting DSR	86
3.3.4	Synthesis Between Theory and Data.....	87
3.4	Data Collection	89
3.4.1	Data Sources and Protocols.....	90
3.4.2	Exploratory Phase: Data from Ali Enterprises, Pakistan	91
3.4.3	Main Phase: Data from Illinois Fire Service Institute, USA.....	95
3.5	Data Analysis.....	98
3.6	Data Validation	106
3.7	Artefact Development	109
3.8	Summary	110
4.	FINDINGS AND ANALYSIS	111
4.1	Exploratory Phase: Ali Enterprises, Pakistan	111
4.1.1	Environmental Assessment and Responsiveness	111
4.1.2	Inadequate Resources	117
4.1.3	Stress.....	120
4.1.4	Cross-Training Deficiencies.....	125
4.2	Main Phase: Illinois Fire Service Institute, USA	129
4.2.1	Inconsistent Terminologies.....	130
4.2.2	Firehouse Culture and Subcultures	136
4.2.3	Training Disparities and Inadequacies.....	138
4.2.4	Complicating Communication	143
5.	DISCUSSION.....	151
5.1	Exploratory Phase: Ali Enterprises, Pakistan	151
5.1.1	Environmental Assessment and Responsiveness	151
5.1.2	Cross-Training Deficiencies.....	155
5.1.3	Stress.....	158
5.2	Main Phase: Illinois Fire Service Institute, USA	166
5.2.1	Inconsistent Terminologies: The Root of IFSI Communication Problems	166
5.2.2	Trust and Technology: Factors Contributing to Communication Problems	174
6.	SOLUTION ARTEFACT	182
6.1	Towards Artefact	182
6.1.1	What is Together Telling?.....	185
6.1.2	How is Together Telling Different?.....	186
6.2	Role of Ensemble Theatre in TT Incubation	187
6.3	Practical Steps Toward Together Telling	190

6.3.1	Exercise 1: Good Listener – Good Speaker.....	191
6.3.2	Exercise 2: Spontaneous Narration	193
6.3.3	Exercise 3: Zoom Activity	194
6.3.4	Exercise 4: Together Telling	196
6.4	Outcomes and Conditions of TT	197
6.5	Validation Phase.....	199
6.6	Communication Phase.....	201
7.	CONCLUSION	203
7.1	Research Summary	203
7.2	Managing Equivocality with ‘Together Telling’.....	205
7.3	Relevance to Literature.....	206
7.4	Relevance to Practice.....	207
7.5	Limitations and Future Research	208
	REFERENCES.....	211
	APPENDICES	235
	Appendix A: Pre-Interview Description.....	235
	Appendix B: Interview Consent Form.....	236
	Appendix C: Interview Protocol Sample	237
	Appendix D: IFSI-EVOL-01	239
	Appendix E: IFSI-EVOL-02	240
	Appendix F: IFSI-EVOL-03	241
	Appendix G: IFSI-EVOL-04.....	242
	Appendix H: IFSI-EVOL-05.....	243
	Appendix I: IFSI-EVOL-06.....	244
	Appendix J: IFSI-EVOL-07.....	245
	Appendix K: IFSI-EVOL-08	246
	Appendix L: Photos from Exploratory Phase.....	247
	Appendix M: Photos from Main Phase	248

List of Figures

Figure 2.1: Literature Review Mind Map	12
Figure 2.2: Central Metaphor of the Sensemaking Methodology.....	40
Figure 2.3: A Conceptual Model of Sensemaking by Russell et al. (1993)	41
Figure 2.4: The Sensemaking Model of Pirolli and Card (2005).....	43
Figure 2.5: Data/Frame Model of Sensemaking.....	44
Figure 2.6: Relationship Between Sensemaking and Organizing.....	55
Figure 2.7: The Three Variations of RPD Model	61
Figure 2.8: Summary of the Four Forms of Sensemaking.....	66
Figure 2.9: Representation of Literature Interplay.....	77
Figure 3.1: Summary of Research Flow.....	88
Figure 4.1: Representation of Blocked Access.	126

List of Tables

Table 2.1: Organizational Crisis Definitions	15
Table 2.2: Crisis Management Frameworks	18
Table 2.3: Characteristics of Ambiguous, Changing Situation.....	29
Table 3.1: Exploratory Phase Data Collection Summary	92
Table 3.2: Main Phase Data Collection Summary.....	96
Table 3.3: Sample Content Analysis Worksheet	100
Table 3.4: Coding Structure Representation of Sensemaking Dimension	102
Table 3.5: Coding Structure Representation of Sensegiving Dimension	103
Table 3.6: Coding Structure Representation of Storytelling Dimension	104
Table 3.7: Coding Structure Representation of Information Management.....	105
Table 4.1: Data Representation of Environmental Assessment and Responsiveness.....	116
Table 4.2: Data Representation of Inadequate Resources.....	119
Table 4.3: Data Representation of Stress Among ERTs	124
Table 4.4: Data Representation of Cross-Training Deficiencies.....	129
Table 4.5: Data Representation of the Impact of Regional Jargons on Fireground.....	133
Table 4.6: Data Representation on Complicating Communication	150
Table 6.1: Summary of Intervention, Mechanisms, and Outcomes	198

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The seekers of two concerns are never satisfied: the seeker of knowledge and the seeker of the world.

Prophet Muhammad (Peace be upon him)

Even after four arduous years, it feels like the research journey that started with the aspiration of making a difference in the field of interest has barely scratched the surface. While this expedition carries on, I owe a big debt of gratitude to those travel companions without whom reaching this far was almost impossible.

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EXECUTIVE SUMMARY

Information is essential during crises. In a crisis response operation, information is usually shared among autonomous relief agencies to facilitate collective understanding and action. However, this may evoke the problem of equivocality which signifies the presence of multiple competing or contradicting interpretations of the same information. The aim of this thesis is to offer pragmatic means of managing equivocality so collective understanding within and among groups can ensue and response to crises is improved.

The primary theoretical constructs underlying this study are sensemaking, sensegiving, and storytelling. Sensemaking activities seek, process, create and use the information to come up with plausible understandings by assigning one meaning out of many plausible meanings in a situation, which is then communicated to others through the sensegiving efforts. Storytelling, as a communication tool, helps with the building of narratives in which open and negotiated conversations can lead to share understandings and coordinated actions.

Built on the case of a garment factory fire incident in Pakistan that led to the death of 289 workers, the study adopted a Design Science Research approach by combining both existing theoretical understandings and relevant empirical data collected in two related settings. The data collection phase in Pakistan included analysis of investigations reports that examined the contributing factors and challenges faced by the first responders in handling the fire incident at the factory. Interviews with different actors of the factory fire incident, including survivors, victims' family members, and emergency responders, were conducted. The second data source came from the fieldwork conducted at Illinois Fire Service Institute (IFSI) in the United States. This was reinforced with reports retrieved from the National Institute for Occupational Safety and Health (NIOSH) database investigating the common causes of firefighter fatalities. The data were analysed using *content analysis* and validated through the *member-checking* process.

Based on the theoretical and empirical data, this study developed and introduced the concept of *Together Telling* (TT). By utilising storytelling exercises adopted from theatre ensemble, TT addresses the information-sharing issue of equivocality by enhancing the dialogic competencies of the crisis handlers so they can collectively understand the situation and move towards action. This study has important theoretical and practical implications. Theoretically, it facilitates episodes of collective sensemaking by improving sharing of information among team members and the application of storytelling techniques in the context of crisis response as this has been largely used in pre-crisis and post-crisis settings. TT provides practical incremental steps towards achieving common understandings while managing misunderstandings and confusions among the crisis response teams which is crucial in moving forward jointly. It also allows new form of leadership to emerge where everyone contributes to developing the larger narrative of the ongoing situation.

CHAPTER 1

INTRODUCTION

1.1 The Ali Enterprises Factory Fire Incident

On the 11th of September 2012 at 6:30 p.m., a fire occurred at the textile factory of Ali Enterprises in Karachi, Pakistan. The fire caused the death of 289 workers who were trapped inside the burning building behind locked emergency exits and barred windows. The locked exits and boarded up windows were in response to the management's fear that the workers may steal their merchandise or would want to leave earlier than they should – something the owners of Ali Enterprises could not deny in their testimonies. The fire raged until 2:00 p.m. on September the 12th.

According to some post-incident reports, one of the main causes of the fire was the storage of combustible materials on the ground floor of the building. The ground floor was a densely filled array of workstations. The circulation space was cluttered with textile products and electrical wiring which ran into overhead service runs. Since there was no effective alarm system in the building, occupants on the first and second floors were first informed about the fire around 6:56 p.m. – approximately 26 minutes after the fire first broke out. Around the same time, the electricity supply was cut off as the fire reached the main power supply room located on the ground floor. With no emergency lighting and unclear escape paths, wayfinding was severely disrupted. While those working on the upper floors of the factory were being smothered by smoke and licked by flames, exploding boilers sent scorching water gushing out of the basement killing all those hiding there, including Saleem.

1.2 Research Motivation

Earlier in 2007, the researcher was tasked with setting up a new garment manufacturing and distribution facility in Karachi for Company X. At the time, Company X nominated Ali Enterprises as the preferred supplier of raw materials. For the next six months while the researcher was in Pakistan managing the new manufacturing plant, his relationship with the management and other staff members of Ali Enterprises became stronger. Thus, the news of the fire incident at Ali Enterprises which took so many innocent lives had a deep

personal impact on the researcher. It was this impact which in 2016 became the main motivation for this study.

The evidence presented in the post-incident reports as well as the witness testimonies undoubtedly spoke about the management's failure in following legal occupancy requirements and in employing proper safety regulations at Ali Enterprises. The limited exit points, defective fire extinguishers and fire alarms, and lack of clearly marked escape routes; all were contributing factors to the fire's heavy toll. While these accounts emphasized the negligence of the factory's management and exposed key internal operational issues, there were hardly any discussions on the abilities of the emergency services in responding to the incident.

The emergency services that took part in the response operation at Ali Enterprises included the local fire brigade, police, and a private emergency medical service. Curious to know how and why a normal factory fire turned into a major catastrophe, the researcher, in contrast to many other reports and studies that blamed the factory's management for this disaster, wanted to examine the efficacy of the emergency services response during the fire incident. Thus, this study is perhaps among the very few that seeks to establish and highlight the underexplored role of the Karachi's emergency services in managing the crisis response operation at Ali Enterprises.

1.3 Research Overview and Aim

Crisis response is usually a team endeavour. In most crises, response teams from different emergency services come together in attempts to isolate, contain, and neutralize the situation. However, crises, by nature, are ambiguous, uncertain, equivocal events and can be changeable (James et al., 2011). These challenging characteristics makes it difficult for those involved in a crisis to establish an exact and objectively valid account of the conditions (Weick et al., 2005) that they must have in order to plan and take apt decisions. Hence, crisis handlers rely on each other as they seek, interpret, and use the available information to develop plausible shared understanding of the situation so they can move forward. That is, they engage in the sensemaking activities.

The term sensemaking has been used in a variety of disciplines and simply represents the process by which people collectively construct and reconstruct the circumstances to give meaning to an experience. The meaning

people give to an experience is primarily based on the information they gather and process from the environment and it is because of this core principle that sensemaking has frequently been modelled as a part of the information seeking process (Choo, 2002). Since sensemaking allows people to have a better grasp of what is going on in their environments (Ancona, 2012), its role in the context of crisis is highly significant. During a crisis, when the stakes are high and the consequences severe, sensemaking allows the creation of shared awareness and understanding out of different individuals' perspectives and varied interests through collaborative information sharing – a process typically known as *collective sensemaking* among the involved actors.

The process of collective sensemaking results in shared understanding of the situation, 'at which point the appropriate decision to make is obvious or greatly simplified' (Klein et al., 2010, p. 304). Though this expected outcome of collective sensemaking can be useful in conditions that demand working jointly in accord (e.g., crisis response settings), achieving a cohesive and agreed upon understanding of the situation which can be used as the framework for future action is not straightforward. Based on their personal beliefs, emotions, values, and background, people interpret the same information in ways which may or may not align with others (Choo, 2006). Thus, in the presence of different, sometimes, conflicting interpretations, the development of shared meanings and understandings becomes increasingly difficult causing possible delays or breakdowns in the ongoing collective sensemaking activities. While such obstructions in sensemaking activities may not be impactful in some settings, they are highly consequential in the context of crisis where common understanding and action coordination among the stakeholders is critical.

1.4 Sensemaking in Groups

Contrary to its inherently social nature, most of the models and theories of sensemaking view it as an individual cognitive activity (Dervin et al., 2003; Klein et al., 2006b; Pirolli and Card, 2005; Russell et al., 1993). Some of these discussions have posited that sensemaking consists of iteratively finding information based on an initial framework; organizing information into frameworks or representations; and changing representations or frameworks in use to fit new information (Klein et al., 2006b; Russell et al., 1993), thus overlooking the social and interactive aspects of sensemaking.

This intentional or unintentional focus on individual level sensemaking has created a shortfall in understanding of how sensemaking takes place in groups such as mutual-aid crisis responses settings. While some studies have made great strides in highlighting this shortfall and focused around identifying and understanding the difficulty of sensemaking in teams (Maitlis and Sonenshein, 2010; Merkus et al., 2017; Waller and Uitdewilligen, 2008; Wolbers and Boersma; 2013), there are limited discussions on what practical steps groups can take in order to mitigate the effects of multiple interpretations or understandings that are common to occur and which ultimately leads them to experience weak collective sensemaking episodes.

1.5 Research Question

The aim of this study is to not only advance collective sensemaking discussions by providing useful insights into the factor(s) that tend to weaken such activities, but to also find pragmatic ways in which those factor(s) can be managed so shared understandings in highly intense moments such as crisis can be developed for better planning and action. Thus, the research question is:

RQ: What information-sharing challenges do emergency response teams face, and how can these be overcome to facilitate collective sensemaking in times of crisis?

This research question acknowledges that sharing of information is a key component of group sensemaking. However, when information-sharing or communication issues erupt within and among groups, their abilities to develop common understanding is severely limited. This limitation can cause all sorts of problems for those involved in managing crises and may lead to flawed, delayed, or even a breakdown in collective sensemaking activities. Thus, it is essential to first recognize what kind of information-sharing issues commonly occur and which techniques can support group sensemaking efforts to help mitigate the effects of such issues.

1.6 Structure of the Remainder of the Thesis

The remainder of this thesis is structured as follows:

Chapter 2 provides an integrative review of the literature on: crisis management, sensemaking, sensegiving, and storytelling. The chapter begins

with a review on crisis management literature leading to the role of communication and information in crisis response. The chapter then provides a synthesized review of sensemaking as the main theoretical construct underpinning this research. Here sensemaking research at both the individual and group levels is discussed as well as the research gaps are pointed out. Alongside sensemaking, the process of sensegiving is explicated which is often deployed as an attempt to influence others of the sensemaking and meaning construction that one has developed. Related to sensemaking and sensegiving discussion is the role of stories (Boje, 1991; Boyce, 1995; Colville et al., 2012; Gioia and Chittipeddi, 1991; Maitlis, 2005). Extant literature views storytelling as a sensemaking instrument that supports individual interpretations of past, present and future events and communicates socially constructed meanings to others through stories. Thus, stories are considered as powerful sensemaking and sensegiving vehicles that shape meanings (Humphreys et al., 2012). The last part of Chapter 2 builds on such scholarly discussions and provides further insights into the sensemaking, sensegiving, and storytelling interplay.

Chapter 3 provides details about the methodology used for the study which is conducted in two phases. The first phase is labelled as the *exploratory phase* which pertains to the data collected in Pakistan regarding the Ali Enterprises fire incident. The second phase is called the *main phase* which includes data collection from a fire academy where the researcher participated in live fire training evolutions and worked closely with several dozen firefighters and fire and battalion chiefs of the U.S. Fire Administration (USFA). Since the end-goal in this research is to find a practical solution – an artefact – to manage the information-sharing problems faced by crisis response individuals and groups, the Design Science Research (DSR) approach is adopted. The chapter further explicates the data collection and data analysis techniques used in this research.

Chapter 4 documents the findings of the two phases and Chapter 5 provides an interpretation of the findings. Most of this chapter is spent in gaining deeper understanding of how the findings from Chapter 4 relate to the research aims and whether they prove, refute, or extend the existing discussions. Chapter 5 also provides the basis of developing a solution artefact to the achieve the aims of this study. Chapter 6 is where the designed solution artefact

is first introduced along with the validation and communication techniques utilized to test the designed artefact in the intended field i.e., within and among crisis response teams. Chapter 7 marks the end of this research journey by providing its contribution to the literature and practice along with the call to extend this work further where more effective response to crisis can be made possible.

CHAPTER 2

LITERATURE REVIEW

Several streams of literature grounded the theoretical underpinnings of this research. These include crisis management (Hermann, 1963; Pearson and Clair, 1998), sensemaking (Dervin, 1983; 1998; Weick, 1979; 1995), sensegiving (Gioia and Chittipeddi, 1991), and storytelling (Boje, 1991; 1995; Boyce, 1995). A mind map, illustrated in Figure 2.1, was developed to help organize the literature review. By placing the research idea in a simple and abstract form, the mind map was used to allow for a more detailed exploration of the topic by visually laying out all the possible associations, connections, and broad themes that emerged from several classic and contemporary scholarly discussions. In composing the literature review, the integrative review methodology (Broome, 1993) was adopted where each body of literature was reviewed, critiqued, and synthesized to develop new frameworks and perspectives that could inform and contribute to the aims of this research. The following sections of this chapter explore both the insights offered by these works and their contributions to shaping the current study.

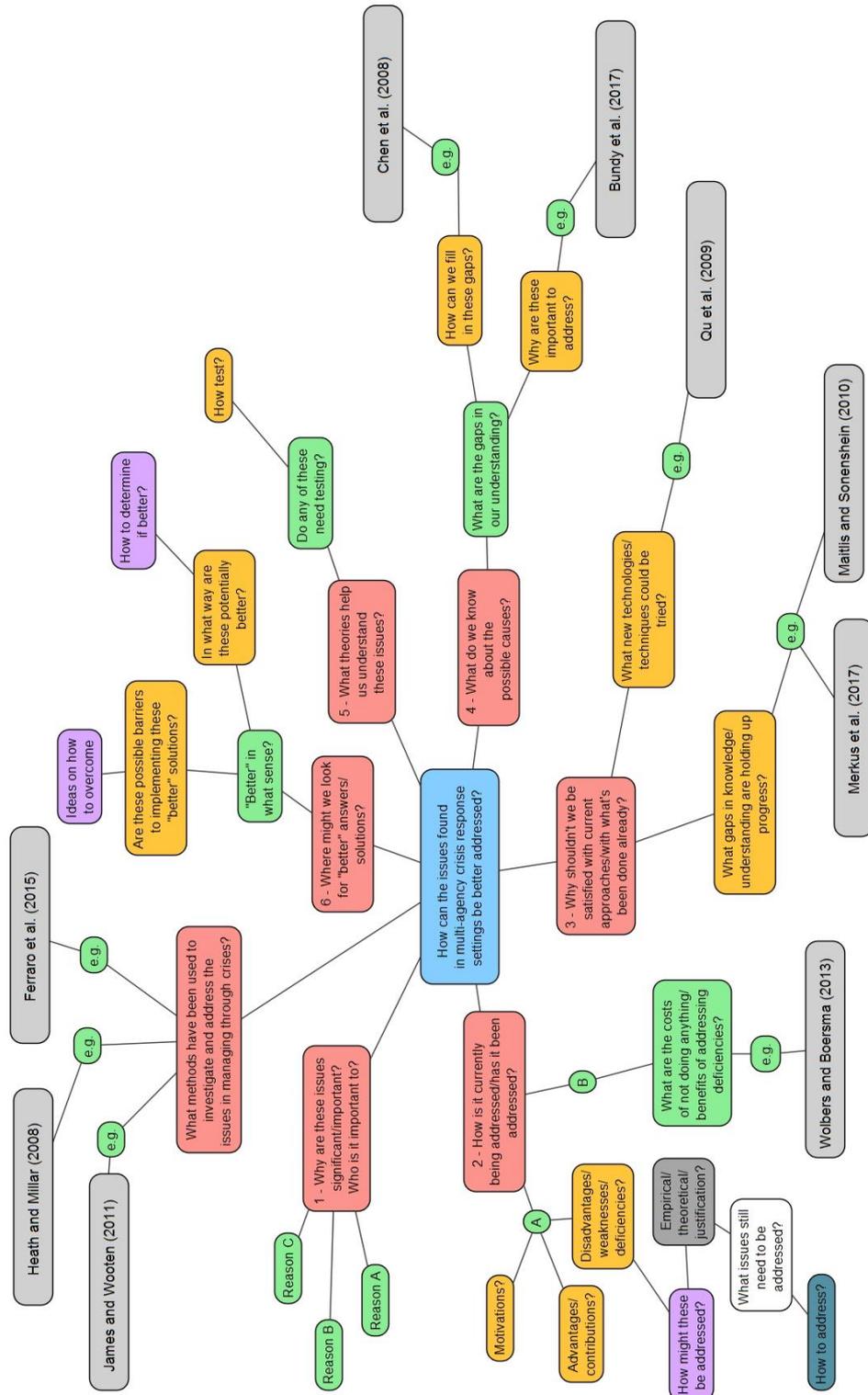


Figure 2.1: Literature Review Mind Map

2.1 Crisis Management

2.1.1 Crisis and Its Origins

According to the Oxford Dictionary, a crisis is defined as: ‘a vitally important or decisive stage in the progress of anything; a turning-point’ (‘Crisis’, n.d., para. 3). However, ‘crisis’ does not mean the same thing to everyone. Authors in the fields of management, science, economics, psychology, sociology, political science, history, and the environment all have defined and theorized crises as per the demands of their fields. Within these fields, several terms for a crisis, such as ‘emergency,’ ‘disaster,’ or ‘catastrophe,’ have been used interchangeably, although with slight differences (Hiltz et al., 2010). This indicates that there is no unequivocal definition of the term crisis.

Milburn et al. (1983) captured some of the complexities that are inherent to crises and suggested that:

- (a) Crisis produces individual stress;
- (b) Crisis can be associated with positive or negative conditions;
- (c) These positive or negative conditions have associated value and probabilities of gain or loss associated with them;
- (d) Crises can occur suddenly (surprisingly) or developed over time (predictable); and
- (e) Regardless of its type, resolution is necessary.

Based on such understandings, Chen et al. (2008) documented some challenges that are typically found in crises. They include:

- (a) High levels of uncertainty;
- (b) Increased time pressure and urgency;
- (c) Severe resource shortage;
- (d) Large-scale impact and damage;
- (e) Disruption of infrastructure support; and
- (f) High demand for timely information.

Additionally, Kahn et al. (2013) and Bundy et al. (2017) suggested that crises are periods of discontinuity that requires critical decision-making and action. They are unanticipated, ambiguous, and denote crucial stages or turning points in which people – based on the judgments they have made on what is happening and what the context is – must make quick decisions on the course of action they will pursue.

In summary, this research embraces the popular opinion that crises, by definition, represent highly unusual and divergent events (cf. Dutton, 1986; Hermann, 1963; James et al., 2011; Pearson and Clair, 1998). They are part of large processes rather than discrete events that are sources of uncertainty, disruption, and change and have the potential to bring physical, psychological, and functional harm to the stakeholders. They represent a situation that is often resolved during a short time frame and difficult to manage because of limited control over the environment. Given this understanding, discussing the potential impact of crisis on organizations and its members is salient for a study like this. The following section, therefore, provides an overview on organizational crisis.

2.1.2 Organizational Crisis Overview

Several definitions for the term ‘organizational crisis’ are found in the literature. Table 2.1 lists some of the widely used definitions over the past three decades. Common in nearly all the tabled explanations is the notion that crises are inherently harmful and threatening events and have the potential to cause disruptions to organizational routines. These definitions also suggest that the management of organizational crisis usually requires a collective effort from all the involved actors in order to minimize its harms and to establish normalcy.

Drawing from the convergence of these perspectives, this research adopts the synthesized definition of organizational crisis put forward by Coombs (2018):

A crisis is the perceived violation of salience stakeholder expectations that can create negative outcomes for stakeholders and/or the organization. (p. 3)

Coomb’s (2018) definition provides a deeper understanding of the impact of crisis on organizational performance and the negative outcome that it generates. He further summarized that organizational crisis involves a destabilizing effect to the organization and its members and where core values are under threat. In such circumstances, organizational members are required to make critical decisions as they are faced with issues and potential errors.

Table 2.1: Organizational Crisis Definitions

Author(s)	Organizational Crisis Definition
Pauchant and Mitroff (1990)	‘ A disruption that either affects or has the potential to affect a whole system, thus threatening the very core of its social identity.’ (p. 121)
Barton (1993)	‘ An organizational crisis is a major, unpredictable event that may produce negative outcomes including substantial damage to an organization and its employees.’ (p. 2)
Pearson and Clair (1998)	‘ An organizational crisis is a low-probability, high-impact situation that is perceived by critical stakeholders to threaten the viability of the organization and that is subjectively experienced by these individuals as personally and socially threatening.’ (p. 60)
Seeger et al. (1998)	‘ A specific, unexpected and non-routine organizationally based event or series of events which creates high levels of uncertainty and threat or perceived threat to an organization’ s high priority goals.’ (p. 233)
James and Wooten (2011)	‘ A rare, significant, and public situation that creates highly undesirable outcomes for the firm and its stakeholders... and requires immediate corrective action by firm leaders.’ (p. 17).
Bundy et al. (2017)	‘ As an event perceived by managers to be highly salient, unexpected, and potentially disruptive.’ (p. 1663)

The fact that crises represent 'threats to the organizational systems' leading to 'destabilizing effects' in which 'decisions' must be made suggests that people facing a crisis need to understand what is going on and make judgments so they can decide how to act (Muhren and Walle, 2009). This high degree of uncertainty embedded in crisis means that its management is impacted by how well the actors collect, manage, and disseminate information to others to limit the potential harms. To fully grasp an understanding of what goes in managing crisis, it is important to outline the history of the crisis management models that organizations typically rely on.

2.1.2.1 Historical Background

Despite its rich historical background and importance, 'crisis' is a relatively new term in the field of management (Pauchant and Douville, 1993). Hermann reintroduced the idea of crisis and crisis management in organizational studies in his *Administrative Science Quarterly* article in 1963. Hermann used his past experiences in the military, political, and business domains to suggest how a crisis in an organization's external environment can activate behaviour within the organization. He defined organizational crisis along three dimensions, as a situation that: (a) threatens high priority values of the organization, (b) presents a limited amount of time to respond, and (c) is unexpected or unanticipated by the organization engendering high levels of stress.

Hermann's (1963) work sparked interest among scholars and practitioners to examine the strategic question: *When does a situation become a crisis for an organization?* Dutton (1986) attempted to respond by suggesting that for organizations, any unusual or out-of-the-ordinary event might be considered a crisis if it is perceived by organizational members to have high values on one or more of three dimensions: *importance*, *immediacy*, and *uncertainty*. According to Dutton (1986) the salience of a crisis depends on the value of the possible loss (impact of crisis) and the probability of the loss (likelihood). The immediacy is related to the time pressure and uncertainty is the number of unknowns in the crisis.

More recent reviews have identified additional characteristics that can classify a crisis for organizations. For example, James et al. (2011) asserts that

crises may be distinguished from non-crisis strategic issues using the following characteristics that are uniquely found in the former situations:

- (a) Rare (abnormal and infrequent);
- (b) Significant (having potential to devastate and exhaust resources);
- (c) High impact (highly consequential);
- (d) Ambiguous (neither clear nor understandable);
- (e) Urgent (surrounded by time pressures); and
- (f) Involve high stakes (creates undesirable outcomes for those associated with the event).

Thus, crises are sources of ‘uncertainty, disruption, and change’ (Bundy et al., 2017, p. 1663) for organizations and its members. They have both the elements of subjectivity and objectivity to them. They are subjective in a way that a situation is not a crisis until the organizational members perceive it as such. That is, organizational members must feel that their expectations and routines have been violated for them to label an event as a crisis (Boin 2009). On the other hand, the objective view suggests that no matter how they are perceived, crises are intrinsically threatening to the very survival of an organization and must be tackled effectively (James and Wooten, 2011).

2.1.2.2 Organizational Crisis Management Models

To mitigate crises, organizations require crisis management. Crisis management attempts to identify an organization’s vulnerabilities to a wide range of problems in order to prevent crises from ever occurring. Not all crises can be avoided, of course, so crisis management also involves plans for how to handle and effectively communicate about crises when they do arise (Coombs and Laufer, 2018; Pearson and Clair, 1998). Essentially, the goal of crisis management is to prevent or lessen the adverse outcomes of a crisis and thereby protects the organization, stakeholders, or industry from damage. (Coombs, 1999b).

According to Deloitte Global’s 2018 crisis management survey, nearly 60 percent of respondents believe that organizations face more crises today than they did ten years ago. Another study conducted by McKinsey and Company in 2017 revealed that because of the growing complexity of products

and organizations in the recent times, many company incidents are turning into major full-blown organizational crises.

This trend in organizational crises has led scholars to develop several crisis management models. Table 2.2 illustrates and compares some of the influential crisis management frameworks that have positively impacted organizations in improving their crisis prevention and mitigation capabilities (Simola, 2005). Although each model outlines a specific approach to crisis management, they fundamentally operate within the three phases of a crisis described by the *three-stage model*.

Table 2.2: Crisis Management Frameworks

	Fink (1986) 4-Stage Model	Pearson and Mitroff (1993) 5- Stage Crisis Framework	Herrero and Pratt (1996) 4- Phases of Crisis Life Cycle
Pre-Crisis	1) <i>Prodromal Stage</i> : crisis managers are proactively assessing the impact an actual crisis could have on the company.	1) <i>Signal Detection</i> : identifying the signs of possible crisis within an organization. 2) <i>Probing and Prevention</i> : forming crisis management teams and plans to tackle crisis.	1) <i>Birth</i> : practicing issues management before the birth of a crisis 2) <i>Growth</i> : preparing to deal with the upcoming crisis.
During-Crisis	2) <i>Acute Stage</i> : dealing with the actual crisis, the key in this stage is to limit damage control. 3) <i>Chronic Stage</i> : organizations attempt to deal with the lasting effects of the crisis.	3) <i>Damage Containment</i> : acting to minimize damage.	3) <i>Maturity</i> : reacting as the crisis explodes.
Post-Crisis	4) <i>Resolution Stage</i> : organizations attempt to learn from the crisis and turn challenge into an opportunity	4) <i>Recovery</i> : attempting to resume activities to as close to normal as feasible. 5) <i>Learning</i> : reflecting and learning from the crisis.	4) <i>Decline</i> : analysing the crisis as it subsides.

According to Seeger et al. (2003), 'The three-stage model is not associated with any particular theorists, but it appears to have emerged from several research efforts as a general analytical framework' (p. 97). Richardson (1994) is considered among the first to list the components of the three-stage

model. According to Richardson, the first component of the three-stage model is the *pre-crisis* phase that notes the warning signs of an upcoming crisis and the attempts made by the crisis managers to minimize the degree of risks if they do occur. The second stage is the *crisis impact or response* that involves taking actions to manage and control the various effects of the crisis. The third stage of the crisis management model is the *recovery or demise* phase. This phase consists of those actions that bring the disrupted area back to an often-improved normal condition.

Burnett (1998) and Coombs (1999b) expanded Richardson's macro-level explication of the three-stage model and proposed some micro-level sets of actions that should be covered during each stage of crisis management. Some of the salient crisis management steps are synthesized as:

1. *Pre-crisis*:
 - a. Constant monitoring to detect crisis signals;
 - b. Planning to minimize risks;
 - c. Setting response goals;
 - d. Collecting data and developing communication strategies.
2. *Crisis impact or response*:
 - a. Crisis recognition;
 - b. Formulating suitable response strategy;
 - c. Clarifying roles, responsibilities, and objectives;
 - d. Developing common understanding;
 - e. Information seeking, processing, and distribution;
 - f. Effective decision-making;
 - g. Evaluating developments.
3. *Recovery or demise*
 - a. Damage containment;
 - b. Recovery from the crisis;
 - c. Individual and organizational readjustments of previous assumptions;
 - d. Learning.

Since this research is located in the context of crisis response, the focus in the forthcoming sections will thereby shift away from the pre- and post-crisis phases to the crisis response stage.

2.1.3 Communication and Its Role in Crisis Response

Following the list of crisis response tasks postulated by Burnett (1998) and Coomb (1999b), the importance of interaction with key crisis stakeholders, such as emergency responders, government and public agencies, and crisis volunteers cannot be ignored. This research proposes that interaction among these stakeholders is facilitated by effective communication.

In his model of communication (proposed before 300 B.C), Aristotle claimed that human communication originated and evolved due to the intrinsic need of man to cooperate, share, and help others. This idea is most pertinent in the field of crisis management. Although communication is essential in all three crisis management phases (Sellnow and Seeger, 2013), its role in crisis response is particularly useful for situation adaptation, clarifying roles, developing common understanding of the situation, and processing critical event information (Fischer et al., 2016). However, before communication's role in crisis response settings is further explicated, it is important to first understand what communication means and what types of communication models can be utilized to improve crisis response attempts.

2.1.3.1 Communication: Definition and Models

Traditionally, communication was largely viewed as a static process between the *sender* and the *receiver* in which the active sender was responsible for originating the message, and the passive receiver was assumed to accept and act on it. This concept originated from the classical works of Aristotle and persisted through the mid of the 20th century in the works of Shannon and Weaver (1949) and Berlo (1974).

Designed to improve technical communication, Shannon and Weaver's (1949) linear model of communication is focused on the purpose and objectives of transmitting the message. That is, the sender originates the message which goes through the encoding and decoding process before reaching the receiver. The receiver then provides the feedback that the message has been received. Although still linear in its structure, Berlo (1974) *sender-message-channel-receiver* (SMCR) model gave more importance to the message than its transmission as Shannon and Weaver (1949) did. The SMCR model has four key elements: the sender (S) represents the person who originates the message using his communication skills, knowledge, or attitudes. The

message (M) is the content that is being communicated (e.g., codes, structures elements, and other information elements). The channel (C) is the medium being used to transmit the message (e.g., hearing, seeing, or touching), and receiver (R) represents the person who the message is directed towards. Here again, there is no two-way interaction.

Dance (1967) and Barnlund (1970), however, soon challenged previous linear approaches and offered communication as a bidirectional, dynamic, and social way of transacting meaning. Dance (1967) argued that communication is both dynamic and cumulative and is heavily influenced by past experiences. Barnlund (1970) posited a transactional model that emphasized that communication is a complex process that is continuous, circular, and unrepeatable. It involves encoding and decoding systems, ongoing feedback loops, and the ongoing co-creation of meaning.

Later, Cheney (2011) and Sellnow and Seeger (2013) used Dance's (1967) and Barnlund's (1970) approaches to advance research in crisis communication. They embraced communication as a relational and collaborative force that facilitates the construction of a social world through ongoing and simultaneous exchange of messages between the sender and the receiver using multiple channels.

2.1.3.2 Communication During Crisis

Communication is the essence of crisis management (Coombs, 2010; 2015a; Lie and Servaes, 2015; Netten and van Someren, 2011). Although communication plays a salient role in all the three phases of crisis management (Marsen, 2020; Sellnow et al., 2012), its role in crisis response stage is critical (Hale, 1997; Vercic et al., 2019). Scholars have long argued that crises, due to its inherent complexities and time pressures, represent stressful conditions in which actors' abilities to gather, discern, and disseminate information becomes limited (Hale et al., 2005). Therefore, in order to mitigate the challenges of searching and delivering relevant information to the appropriate group members, crisis handlers heavily rely on effective crisis communication (Martin and Boynton, 2005).

According to Coombs (2010), crisis communication includes: 'the collection and processing of information for crisis team decision making along with the creation and dissemination of crisis messages to people [inside and]

outside of the team' (p. 20). In Roux's (2013) view, crisis communication assists the decision makers through important exchanges of information and empowers them to get the best possible result for the crisis. Similarly, for Sellnow and Seeger (2020), crisis communication is 'an ongoing process of creating shared meaning among and between groups, communities, individuals and agencies within the ecological context of a crisis for the purpose of preparing for and reducing, limiting, and responding to threats and harm' (p. 17).

Common in these contemporary discussions of crisis communication is the close and salient relationship between information and communication. According to Papa et al., (2008) verbal and nonverbal information is the primary raw material of communication. People communicate to generate, perceive, and interpret information within and across various contexts. To that respect, information, as a functional component of communication, has a special place in crisis context. By collecting, disseminating, and acting on key information, the needs of the crisis handlers can be better met, and a more effective crisis response can be made possible (Walle et al., 2009).

Coombs (2010) expanded on the information-communication relationship and their role in crisis management:

'A crisis or the threat of crisis creates a need for information. Through communication, the information is collected, processed into knowledge, and shared with others. Communication is critical throughout the entire crisis management process. Each phase of the crisis management process has its own demand for creating and sharing knowledge – the need to collect and interpret information.' (p. 25)

Similarly, according to Bharosa et al. (2010), in both intra and inter-agency interactions, information is considered a primary asset that needs to be produced, retrieved, processed, enriched, validated, consumed and/or distributed within the inter-agency network. Given that the role of information is critical in managing dynamic environments such as crisis (Celik and Corbacioglu, 2010), the following section expands this discussion further.

2.1.4 Information

Information is defined as that which occurs within the mind upon the absorption of a message (Pratt, 1982). Miller (1987) equated information with

meaning while Losee (1997) suggested that 'information is produced by all processes and it is the values of characteristics in the processes' output that are information' (p. 256). Davenport and Prusak (2000) proposed that information is a message, usually in the form of written, audible, or visible communication intended to generate some meaning. Zack (2007) agreed with these understandings and viewed information as observations that have been cognitively processed and punctuated into coherent messages that must always be made explicit in some way. Thus, at the heart of information is the meaning that it delivers (Hjørland, 2007).

2.1.4.1 Managing Meaning

In his subsequent work, Coombs (2015a) posited two broad strategies for crisis communication in relations to information. They include: (1) managing information and (2) managing meaning. 'Managing information involves the collection and dissemination of crisis-related information, whereas managing meaning or information processing involves efforts to influence how people perceive the crisis and/or organization involved in the crisis (p. 142). Between the two strategies, this research is primarily interested in managing the meaning of information since it has direct implications in crisis response strategies where multiple agencies are involved and requires a common ground of understanding to be established. The following example explicates this point further.

Hurricane Maria was a deadly hurricane that devastated Dominica, St Croix, and Puerto Rico islands in September 2017. According to the United States Federal Emergency Management Agency (FEMA), despite all the information available to the agencies, FEMA and its partners had little understanding of what was happening across the island and lacked situational awareness early in the response resulting in subsequent efforts that were insufficient to stabilize the incident. That is, the emergency response services failed to develop a common operational picture (COP) with the information that they had.

According to Wolbers and Boersma (2013) the COP is considered as one of the most promising solutions in emergency management to improve the quality of information sharing and to support the development of situational awareness. Endsley (1988) defines situational awareness as the 'perception of the elements in the environment within a volume of time and space, the

comprehension of their meaning and the projection of their status in the near future' (p. 97). Thus, central to Endsley's definition is the idea that the development of situational awareness is predicated on how equivalently the meaning of information is shared among actors rather than on the amount of information.

2.1.4.2 Information Processing Challenges in Crisis Response

Now that the need of understanding the meaning of information in mutual-aid crisis response settings has been established, it is critical to recognize the many challenges that emergency response teams usually face in doing so. According to Taylor and Crocker (1981):

The processing of information involves scanning the environment, selecting items to attend to, taking in information about those items, and either storing it in some form, so that it can be retrieved later for consideration, or using it as a basis for action. It goes without saying that there is necessarily a tremendous amount of selectivity in this process, because we cannot notice every detail in the environment. To select the information that is useful and to process it quickly and efficiently, the perceiver needs selection criteria and guidelines for processing. (p. 90)

Heeding Taylor and Crocker (1981), it can be assumed that information processing is subject to a myriad of challenges in fast-evolving environments such as crises where complexities and time pressures demand swift and effective use of information to make critical decisions. This point is explicated further in the following section.

Crisis environments are laden with various forms of information challenges. Studies have reported that issues such as inaccurate, late, superficial, irrelevant, unreliable, and conflicting information can negatively affect the response efforts (Paul et al., 2008; Walle and Turoff, 2007; Walle et al., 2009) and quickly turn a bad situation into a worse situation. Industrial crisis such as the Bhopal chemical plant explosion (Weick, 1988; 2010) or the Tenerife air-traffic disaster (Weick, 1990); natural disasters such as the Mann Gulch fire (Weick, 1993) or the 2010 Icelandic ash cloud (Boin et al., 2014); and terrorists attacks such as 9/11 (Dearstyne, 2007) or the Manchester Arena bombing (Craigie et al., 2020) all exemplify the extraordinary events where information-processing challenges could result in major catastrophes.

For example, the 1977 Tenerife air disaster was a runaway collision between two Boeings 747s in which 583 lives were lost. The post-incident report suggested that the information-processing capacity of the pilots and the air-traffic controllers was reduced due to some environmental stressors such as the weather and short-staffed air-traffic control department. Weick (1990) claimed that with less information-processing capacity, 'people ignore more central cues, invoke simpler mental models that leave out key indicators, and become more tolerant of unexplained and unpredicted entailments' (p. 588), thus, making situation more vulnerable to greater danger and harm than originally perceived.

Manoj and Baker (2007) categorized three information-related challenges that can emerge during multi-agency crisis response operations. These include: *technological*, *sociological*, and *organizational*. Fischer et al., (2016) conducted a systematic review on the three categories set forth by Manoj and Baker (2007) and explained that technological barriers correspond to information-sharing problems based on the technology used for crisis management (e.g., lack of interoperability, inconsistent information formats, disruption of infrastructure support). Social barriers cause information issues because of the differences among individuals in the various crisis response organizations or the public involved during the crisis phases (e.g., religious, ideological, political, ethnic, cultural, and/or nationality differences, lack of trust, language barriers, incomplete or conflicting interpretations of information). Organizational barriers arise between and within organizations during crisis management (e.g., response organizations have different goals and interests, organizations use different terms or languages; a lack of trust between organizations).

Reddy et al. (2009) posited some specific reasons that can increase information processing challenges among crisis managers. They include: (i) ineffectiveness of current information and communication technologies (e.g., faulty or unconnected devices), (ii) lack of common ground (e.g., differences in terminology, work-flow and procedures that make use information between responders difficult), and (iii) breakdown in information flows (e.g., caused by technical or human errors).

Bharosa et al. (2010) argued that the environmental constraints, such as those studied by Chen et al. (2008) and Reddy et al. (2009), can evoke serious obstacles in sharing and coordinating information resulting in ineffective crisis communication. They provide an overview of information-sharing and coordination problems that commonly emerge at individual levels and can spread across teams thereby effecting agency-level work. These include:

- Information overload (i.e., information arriving from multiple sources);
- Inability to determine what should be shared (i.e., abundance of information makes it difficult to filter relevant and reliable information);
- Misinterpretation of information (i.e., same information is given different meanings based on individual beliefs, knowledge, training, and preferences);
- Bounded rationality (i.e., cognitive overload constituting a bottleneck in human information processing);
- Prioritization of own problems (i.e., not willing to coordinate with others);
- Information quality (i.e., lack of trust in how reliable or relevant the information is);
- System quality (i.e., lack of trust on system reliability); and,
- Access limit (i.e., access the information of other agencies, but not as a means of sharing own information with others).

Even though each of the above listed challenges has its own merit, the one underexplored information-sharing and coordination challenge that is particularly interesting for this research is the misinterpretation of information appearing commonly in the aforementioned works. Although studies have shown that different observers generate different information from the same data based on their different values, beliefs, and expectations (Dutton, 1993; Lewis, 1993), this research considers the misinterpretation of information occurs based on how each member perceive environment, collect environmental information, and the labels that are applied to the information that is collected. The most common mechanism for providing the context to create meaning from information are *frames of reference* (Choo, 1996). These are examined in the following section.

2.1.4.3 Frames of Reference

Through frames of references, events such as crises are perceived, categorized, and given meaning (Shrivastava and Schneider, 1984). Littlejohn (1992) defined frame of reference as 'a cluster of ideas that coalesce around a central theme, and by virtue of the coherency this provides, can be used to make an otherwise meaningless experience meaningful' (p. 182). Placing stimuli or current cues into a frame provides a reference that enables people to 'comprehend, understand, explain, attribute, extrapolate and predict' (Starbuck and Milliken, 1988, p. 51). Drazin et al. (1999) posit that through frames of references one develops '(1) an intra-subjective cause-and-effect map of events, actions, and consequences, (2) places himself or herself in this map, and (3) takes action according to this map as events unfold (p. 293). Thus, frames of references are interpretive frames that help in making sense and explaining events by assigning meaning to the information (Goffman, 1974) based on one's values, beliefs, schemas, cultures, experiences, and education (Tversky and Kahneman, 1981).

Like individuals, groups also develop a common frame of reference. These frames are shaped over time by interactions with others who are engaged directly or indirectly in similar endeavours (Drazin et al., 1999; Weick and Meader 1993). This means that although individuals hold particular meanings (frames) about a given situation, they interact and communicate with others and seek out their interpretations to construct shared meanings that allows a collective mind to emerge (Volkema et al., 1996).

However, interactions and communication do not always result in a common frame of reference. Walsh et al. (1988) note that even though two people share a similar set of experiences, education, or values, their frames of reference may differ based on the meanings they assign to the available information. This dilemma may lead to the development of different and sometimes antagonistic frames of reference (Trice, 1993). Besides having different or opposing frames, groups often find themselves in situations where there is either a lack of a frame of reference or too many frames of reference to process (Zack, 2007) consequently impacting the flow and exchange of information in environments where it could matter the most – e.g., crisis.

2.1.4.4 Lack of Frames of Reference

A lack of a frame of reference in any situation evokes ambiguity which represents a person's inability to interpret or to make sense of something (MacKay, 1969). Weick (1969) agreed and claimed that regardless of the amount and quality of information that is available, people surrounded by ambiguity struggle to make sense of what is essential in the given situation or anticipate what may happen next. In a crisis context, this usually happens in the initial stages of emergency response when people are confronted with an unexpected situation that is neither clear nor understandable to them (Weick, 1979).

Listed in Table 2.3 are some characteristics of ambiguity that typically emerge in dynamic situations (e.g., crises) and, therefore, salient for the ongoing discussion. Studies have shown that people concerned with ambiguity often rely on their past experiences (e.g., Muhren and Walle, 2009). They try to link those experiences with the situation at hand and act according to the frame of reference they find plausible. This explanation is perhaps reasonable when the aim is to resolve ambiguity on an individual level, but when teams must make sense of the situation and construct shared meanings collectively, sole reliance on past experiences is neither sufficient nor practical unless those experiences are shared, accepted, or negotiated.

Managing ambiguity at a group level requires 'the acquisition of explanatory knowledge from others (as well as from one's own leaning experiences) or by having an interpretation imposed by others' (Zack, 2007, p. 1666). While operating in groups, members engage in the process of repetitive cycles of interpretation, explanation, and collective agreement to resolve ambiguity; they must be prepared to interact and share their interpretations with others. In doing so, however, a subsequent problem emerges: confusion can be created by two or more meanings of similar information. This phenomenon is commonly known as information equivocality and is the bedrock of this study. Ambiguous cues and equivocality exist in a parallel relationship (Weick, 1979) and are examined in the following section.

Table 2.3: Characteristics of Ambiguous, Changing Situation (McCaskey, 1982)

Characteristic	Description and Comments
Nature of problem is itself in question	'What the problem is' is unclear and shifting. Managers have only vague, or competing, definitions of the problem. Often anyone 'problem' is intertwined with other messy problems.
Information (amount and reliability) is problematical	Because the definition of the problem is in doubt, collecting and categorizing information becomes a problem. The information flow threatens either to become overwhelming or to be seriously insufficient. Data may be incomplete and of dubious reliability.
Multiple, conflicting interpretations	For those data that do exist, players develop multiple, and sometimes conflicting, interpretations. The facts and their significance can be read several different ways.
Different value orientations, political/emotional clashes	Without objective criteria, players rely more upon personal and/or professional values to make sense of the situation. The clash of different values often politically and emotionally charges the situation.
Goals are unclear, or multiple and conflicting	Managers do not enjoy the guidance of clearly defined, coherent goals. Either the goals are vague, or they are clearly defined and contradictory.
Time, money, or attention are lacking	A difficult situation is made chaotic by severe shortages of one or more of these items.
Contradictions and paradoxes appear	Situation has seemingly inconsistent features, relationships, or demands.
Roles vague, responsibilities unclear	Players do not have a clearly defined set of activities they are expected to perform. On important issues, the locus of decision-making and other responsibilities is vague or in dispute.
Success measures are lacking	People are unsure what success in resolving the situation would mean and/or they have no way of assessing the degree to which they have been successful.
Poor understanding of cause-effect relationships	Players do not understand what causes what in the situation. Even if sure of the effects they desire, they are uncertain how to obtain them.
Symbols and metaphors used	In place of precise definitions or logical arguments, players use symbols or metaphors to express their points of view.
Participation in decision-making fluid	Who the key decision-makers and influence holders are changes as players enter and leave the arena?

2.1.5 Information Equivocality

Equivocality—or confusion—represents the existence of multiple interpretations of the same thing (Coombs, 2015b; Daft and Macintosh, 1981; Mackay, 1969). Weick (1979) asserts that 'things that are equivocal do not lend themselves to definite classifications...they can always be classified as indications of two or more different objects and meanings' (p. 174). Daft et al. (1987) viewed equivocality as a means of confusion, disagreement, and lack of understanding. Whereas Zack (1998) maintains that an equivocal situation is a result of too many frames of reference, rather than no frames (which represents an ambiguous situation). Thus, equivocality is known to emerge due to lack of

clarity, high complexity, or a paradox that leads to more than one interpretation of environmental feedback (Martin, 1992).

Equivocality is mostly a group-level problem. Zack (2001) maintains that in equivocal circumstances, each interpretation, or frame of reference, is individually unambiguous, but collectively the interpretations differ from each other and may be mutually exclusive or in conflict. This notion is in accord with Weick (1979) who sums up equivocality as a problem for a recipient where, given an output, the receiver cannot decide what input generated it. 'Two or more possible inputs are implied in that single output message, and the recipient faces the question of which of those possible meanings is the appropriate one' (Weick, 1979, p.180).

Working within or between teams, the presence of more than one viewpoint impedes understanding on a collective level. This variety or diversity in frames of reference primarily exists because everyone's experiences are unique; individuals and communities develop their own sets of values and beliefs and tend to interpret events differently, thus, leading to competing or contradictory conceptual frameworks (Zack, 2001).

Equivocality can also occur for reasons other than differing frames of reference. These include unreliable or conflicting information sources, noisy communication channels, differing or ambiguous goals and preferences, vague roles and responsibilities, or disparate political and power interests (McCaskey 1982; Zack, 2001). Gray et al. (1985) have also identified some key factors that can lead to competing or contradictory meanings and are particularly relevant for this study. These include:

- (a) Power dynamics;
- (b) Allegiance to various occupational groups;
- (c) Cultural and occupational training; and
- (d) Disagreements on action plans.

Drawing from these discussions, power seems to play an influencing role in developing the common understanding within and among highly centralized groups (e.g., emergency response teams). Power is generally explained as influence towards a course of action that an agent would not otherwise undertake (Clegg et al., 2006). Lawrence et al. (2012) define power as the 'dimension of relationships through which the behaviours, attitudes, or

opportunities of an actor are affected by another actor, system, or technology' (p. 105).

According to Schildt et al. (2020), there are two main sources of power in organization studies that can influence how groups attempt to understand a situation. The first is *episodic power* which refers to the acts of deliberate coercion or influence on others. Episodic power games are usually played by top managers to impose salient observations, beliefs, and goals on their subordinates and have often appeared in the literature as sensegiving attempts (discussed in the forthcoming sections). Then, there is *systemic power* where domain-specific knowledge and familiarity with rules instinctively work in the favour of the dominant actors in directing and shaping the identities and understandings of the less powerful groups or organizations. Thus, no matter the form, there is a strong link between how group understandings are influenced by power dynamics, especially, in the context of crisis response (Weick, 1995).

In sum, there are several sources of equivocality that researchers have identified. However, regardless of its source, equivocality is problematic: especially in situations where allowing confusion or misunderstandings within and across teams could mean risking valuable human lives and resources, and, therefore, must be reduced.

2.1.5.1 Reducing Equivocality through Communication

While emphasizing the usefulness of effective communication in multicultural health care setting, Kreps and Kunimoto (1994) stated:

Equivocality is not merely a characteristic of an event (or information input) but rather is a characteristic of the individual's ability to perceive and respond to the event. That is, a situation is not inherently imbued with a certain level of equivocality. A situation that is of very high equivocality to one person may be quite simple for another person. It is the ability of the individual to effectively interpret a phenomenon that determines its level of equivocality. Therefore, multicultural relations may now be a very equivocal phenomenon for many organizational actors, but with some communication experience, training, and skill-building, the equivocality of multicultural relations can be reduced. (p. 90)

Previous to Kreps and Kunimoto, a similar assumption on equivocality and how it is managed was made by Huber and Daft (1987):

When confronted with an equivocal event, managers use language to share perceptions among themselves and gradually define or create meaning through discussion, groping, trial, and error, and sounding out. Managers organize cues and messages to create meaning through their discussion and joint interpretation. (p. 151)

People, therefore, interact or communicate with one another to reduce the number of possible interpretations, and in so doing, make coordinated action possible. Thus, to converge on an interpretation among several competing or contradictory interpretations, people *organize* (process information) through communication (Weick 1969).

Weick (1969) defines organizing as ‘the resolving of equivocality in an enacted environment by means of interlocked behaviours embedded in conditionally related process’ (p.11). Through these behaviours, ‘the group notices and brackets information from the environment, applies knowledge structures to interpret that information, and then acts out their interpretations in ways that develop the group’s knowledge and bring order to its environment’ (Kudesia, 2017, p. 12). The act of organizing, thus, is a social process where groups and individuals communicate and socially construct meaning of an ongoing flow of experience.

The process through which people assign meaning to the ongoing flow of experiences is usually referred as the *sensemaking* phenomenon. Sensemaking theory describes how individuals and collectives notice cues in their environments, interprets those cues into meaningful information, and then uses that information to pursue action (Sutcliffe, 2018). In other words, sensemaking is a process through which individuals turn flows of experience into understandings and words that serves as a springboard to action (Taylor and Van Every, 2000; Weick et al., 2005). Given the nature of this study where common understanding is crucial for proper planning and action in order to mitigate the effects of the dynamic situation (e.g., crisis), the sensemaking construct is considered most suitable for discussion. Thus, the following section of this chapter explicates the process of sensemaking in greater detail.

2.2 Sensemaking

2.2.1 Definition of Sensemaking

The main theoretical concept underlying this research is *sensemaking*. Sensemaking – a metacognitive framework – is the process by which people find meaning in a situation using their past experiences (Weick et al., 2005) and current interpretative skills (Kramer, 2017). By ascribing meanings to the situation, people can then enable themselves to the appropriate response or opt to switch to alternative practices and routines that can facilitate action (Cornelissen, 2012). Thus, sensemaking involves the perception of cues whereby people interpret events (Holt and Cornelissen, 2014) and act their way into knowing. This description makes sensemaking a kind of diagnostic process that involves sizing up a situation and discovering what one faces, while simultaneously acting and determining the nature of what one discovers (Sutcliffe, 2018).

Over the years, sensemaking has been applied in a variety of disciplines such as information systems (Dervin, 1983; 1998), intelligent systems (Jacobson, 1991), education and learning (Schoenfeld, 1992), human-computer interaction (Russell et al., 1993), organizations (Weick, 1995), and military network-centric operations (Gartska and Alberts, 2004). Maitlis and Christianson (2014) argued that while differing contexts and methodologies have added significantly to the sensemaking literature, ‘these advancements have also led to differing opinions as to what sensemaking encompasses, how it is accomplished, its temporal orientation and the degree to which it is shared (p. 58). Thus, there is no one way to define sensemaking.

Among several existing definitions of sensemaking, some most used explanations found during this research are:

- ‘Sensemaking is the discursive process of constructing and interpreting the social world’ (Gephart, 1993, p. 1485);
- ‘Sensemaking is a conversational and narrative process through which people create and maintain an intersubjective world’ (Balogun and Johnson, 2004, p. 524);
- ‘Sensemaking has to do with the way managers understand, interpret, and create sense for themselves based on the information surrounding the strategic change’ (Rouleau, 2005, p. 1415);

- ‘Sensemaking is a fundamentally social process: organization members interpret their environment in and through interactions with others, constructing accounts that allow them to comprehend the world and act collectively’ (Maitlis, 2005, p. 21); and
- ‘Sensemaking is an ongoing process that creates an intersubjective sense of shared meaning through conversation and non-verbal behaviour in face-to-face settings where people seek to produce, negotiate, and sustain a shared sense of meaning’ (Gephart et al., 2010, pp. 284–285).

Common across these different perspectives are two salient features of sensemaking that this research is fundamentally built on. First is that sensemaking is about generating meaning and understanding. People acquire information from their environment, interpret that information, and use that interpreted information in bringing order to a disordered situation. Thus, there is a close relationship between information and sensemaking as people seek and process information to make sense of the environment, to create new knowledge, and to make decisions (Choo, 1996).

The second common thread in these definitions is that the basic mode of sensemaking is discourse. Through rich media such as face-to-face communication, sensemaking engenders learning at all levels by enabling people to better understand themselves, their situation, and how to make sense in the future (Daft and Lengel, 1986). Furthermore, through discourse, the meanings that are generated are shared, persuaded, and negotiated (Choo, 2006). Given this understanding, this research settles on the following explanation of the sensemaking phenomenon offered by Maitlis and Christianson (2014) where sensemaking is considered as:

A process, prompted by violated expectations, that involves attending to and bracketing cues in the environment, creating intersubjective meaning through cycles of interpretation and action, and thereby enacting a more ordered environment from which further cues can be drawn.’ (p. 67)

This explanation is most suitable for the context under study since it not only describes the circumstances that could trigger, but also the process and expected outcome of the sensemaking activities.

2.2.2 History of Sensemaking in Organizational Contexts

The idea of sensemaking stems primarily from two famous schools of thought: *pragmatism* (Peirce, 1878) and *symbolic interactionism* (Mead, 1934; Blumer, 1969). Pragmatism theorizes that the purpose of intelligence, or knowing, is not 'to find,' but 'to act.' It suggests that the meanings people ascribe to current events and actions can be understood in terms of the future consequences that they anticipate from these events and actions (Elkjaer and Simpson, 2011). Meanwhile, *symbolic interactionism*, as explained by Blumer (1969), has three basic tenets: (1) people act toward things, including each other, on the basis of the meanings they have for them; (2) these meanings are derived through social interaction with others; and (3) these meanings are managed and transformed through an interpretive process that people use to make sense of and handle the objects that constitute their social worlds (Blumer, 1969, p. 2). Thus, a central theme in both pragmatism and symbolic interactionism is ascribing meanings to events which is also the central concept in sensemaking.

The term *sensemaking* was introduced and popularized in the organizational context for the first time in Karl Weick's (1969) book, *The Social Psychology of Organizing*. In this book, Weick offered sensemaking as a process-oriented tool for organizing in dynamic situations and emphasized that communication is crucial to deal with the equivocality and multiple meanings of information. Through communication, people share their interpretations and ideas of what happened, why it happened, and what can be done to solve the problem.

By the 1970s, sensemaking-related research was gaining attention. Heap (1976), for example, analysed the theoretical framework of sensemaking that had been developed from a sociological standpoint and critiqued the incompleteness of the work on sensemaking. Dervin (1976), from a communications perspective, challenged the old approach to system-oriented studies in information behaviours. She claimed that humans have their own already-collected internal information which, when organized with the external information, results in sensemaking.

As the cognitive, discursive, and phenomenological discussions continued to grow in the organizational literature in the 1980s, so did the work

on sensemaking (Maitlis and Christianson, 2014). A large body of scholars began looking sensemaking through different lenses. For example, Louis (1980) presented sensemaking perspectives of newcomers' entry experiences in the organizational world and how they cope with surprises, challenges, and change. Keisler and Sproull (1982) gave their perspective on organizational adaptation through problem sensing, which comprised noticing, interpreting, and incorporating stimuli. Starbuck and Milliken (1988) claimed that noticing cues was at least as crucial as sensemaking and described why some cues receive more attention than others.

The next decade and beyond witnessed deeper understanding and broader application of the sensemaking phenomenon across several organizational context and continued with an increased focus on understanding what defines sensemaking and how it is connected with organizing (e.g., Sandberg and Tsoukas, 2020), corporate and social responsibility (e.g., Aguinis and Glavas, 2019), mitigating change management failures (e.g., Will and Pies, 2018), and the impact dialogical sensemaking in collaborative researcher-practitioner conversations (e.g., Cunliffe and Scaratti, 2017).

2.2.3 Process of Sensemaking

The sensemaking process is facilitated by the placement of stimuli (information) into sensemaking frameworks (schemata or knowledge structures) that reduce the complexity of the information (Sackmann, 1992; Walsh, 1995) and allow its association with past actions and meanings (Starbuck and Milliken, 1988; Weick, 1995). It can be divided into three distinct yet related processes: the perception of cues (noticing), making interpretations, and engaging in action (Brown et al., 2015; Sandberg and Tsoukas, 2015).

The first step in the sensemaking process is of perception of cues, or noticing, also referred to as *triggering* (Maitlis and Christianson, 2014) or *creating* (Sandberg and Tsoukas, 2015). Noticing is an intentional process in which actors make an indication to themselves of some problematic stimuli in the encountered situation (Meltzer, 1994; Weick, 1969; 1995). Sandberg and Tsoukas (2015) developed a list of events that can cause disruption and initiate the sensemaking process, including major planned or unplanned events, minor planned or unplanned events, and hybrid events. These disruptions subsequently challenge the way ongoing activities are handled and force

individuals to make sense of the new situation. This stage commences the information gathering, as the environment gets noticed (scanned) to extract cues.

The second step in the sensemaking process is *interpretation*, where the information gathered in the previous step is organized (given meaning) through structuring (Gioia, 1986; Sandberg and Tsoukas, 2015). A frame of reference, or belief about 'what is' (Starbuck and Milliken, 1988, p. 51), facilitates this structuring of the noticed cues. It is when the noticed cue is put into a frame of reference that its meaning starts to emerge. Thus, to interpret the noticed cue is a kind of combining process in which the cue connects to a frame of reference and meaning of the cue emerges (Starbuck and Milliken, 1988; Weick 1995).

In the interpretation stage, individuals may assign labels (e.g., opportunity or threat) and values (e.g., controllable or uncontrollable) to the situation that they are making sense of (Dutton and Duncan, 1987; Jackson and Dutton, 1988; Weick et al., 2005). The process of labelling and assigning values to the interpreted cue often produces a direction for action. However, the labelling process also evokes the problem of different interpretations of the same information, which people start to construct based on their varying and sometimes competing or contradictory frames of reference. In other words, although the interpretation stage provides the grounds for a plan of action to be carried out, the plan itself may not be a result of a mutually agreed-upon decision (Combrink, 1984; Comes et al., 2011).

The final stage of the sensemaking process involves *action*, which occurs when one acts based on his or her newfound understanding of the situation (Weick et al., 2005). According to Weick (2001), the action is a process through which the individual makes real, or turns into reality, the idealized project (plan of action) that is represented in his or her mind. As these actions become part of the environment with which the actors now engage, enactment (i.e., the further actions taken by actors) may lead to further iterations of the three stages of sensemaking, until the interrupted activity is satisfactorily restored—that is, when sense and action are in sync again (Sandberg and Tsoukas, 2015, p. S14).

2.2.4 Sensemaking Levels of Analysis

Weick (1995) and Wiley (1988) suggested three levels of analysis in sensemaking. These include: (1) the individual level, (2) the intersubjective level, (3) the generic subjective level. The individual level of analysis is the most basic of the three levels in which the meaning-making takes place within the self. When confronted with equivocality or ambiguity, an individual reflects on his or her past experiences and social interactions to make sense of the situation (Weick 1979). The individuals then attempt to ascribe meanings to these events to reduce equivocality; they do this with what scholars synonymously refers to as frames (Goffman, 1974), enactments (Weick, 1979), and schemata (Poole et al., 1989).

The intersubjective level is where the self gets transformed from 'I' to 'we' through the process of interaction (Weick, 1995). According to Volkema et al. (1996), the social context plays a critical role in sensemaking as it helps individuals to deal with the equivocality through seeking out the interpretations of others. The interaction process facilitates the development of frame of reference that is more creative than those developed in isolation. Weick and Roberts (1993) defined this as an emergent capacity to act collectively, the continuous co-creation of intersubjective meanings, and mutual understanding through 'heedful interrelating.' They asserted that when interdependence is high, a collective mind can emerge, which is useful for sensemaking. This claim, however, heavily relies on the assumption that shared or harmonized frames of reference develop at the intersubjective level of sensemaking. What if the frames of reference do not converge or are not common enough to be shared? In such situations, meaning-making and sense development can gradually lead to meaning-breaking and destruction of sense – a process known as 'sensebreaking' (Pratt, 2000)

The generic subjective level of analysis represents organizations where the organizational identity takes over the self (personal identity). Balogun and Johnson (2004) define this level as an enacted reality at group level in the form of routines, rituals, systems, norms, assumptions and beliefs—a reality where the self is no longer present. This doesn't mean, however, that the individuals don't participate at this level. What it implies is that generic knowledge emerges

from a continuing transition from intersubjective meanings to generic subjective meanings (Weick, 1995, p. 71).

Previous sensemaking research has primarily focused on the individual levels (e.g., Dervin et al., 2003; Klein et al., 2006b; Pirolli and Card, 2005; Russell et al., 1993). Although Weick's (1993) articulation of sensemaking depicting the case of the Mann Gulch fire disaster included groups and group sensemaking, it was only relatively recently that group sensemaking (Lee and Abrams, 2008; Nosek and McNeese, 1997;) and collaborative sensemaking (Paul and Reddy, 2010; Qu et al., 2009;) have made their appearance, which refer to the sensemaking level of intersubjective and generic subjectivity levels.

The forthcoming section briefly explicates the individual level sensemaking theories that guided this research to gain deeper understanding on the phenomenon. However, since this research is in the crisis response context where intra- and interorganizational interactions are inherent, the bulk of the attention is given to the organizational level sensemaking from Weick's (1979; 1995) perspective.

2.2.5 Individual Sensemaking

2.2.5.1 Dervin's Sensemaking Methodology

One of the prominent theories of individual sensemaking is the Sensemaking Methodology postulated by Dervin et al. (2003). Over the years, the Sensemaking Methodology (also called sensemaking approach) has guided communicative approaches to research in various disciplines such as library and information centre services (e.g., Savolainen, 1995) health information behaviour (e.g., Nilan et al., 1988), and university information systems (Nilan and Pannen, 1989) – all with the significant focus on the study of human use of information and information systems. In short, information seeking, processing, creating, and using is central to sensemaking (Dervin, 1983).

Dervin (1983) explicated sensemaking as 'an information behaviour, both internal (i.e., cognitive) and external (i.e., procedural) which allows the individual to construct and design his/her movement through time-space' (p. 3). Using a central metaphor (Figure 2.2), Dervin and Frenette (2003) suggested that sensemaking occurs when a person, embedded in a particular context and

moving through time-space, experiences a 'gap' in reality compelling the person to make new sense in order to move forward. Sources of inputs such as individual's own ideas, thoughts, emotions, databases, experts, media, etc. act as bridges to create the new sense. The newly developed sense will be constantly evaluated to determine if the new sense helps or hinders the sensemaker's movement. If the new sense helps, the process ends, otherwise, the new gaps will require another gap bridging. Thus, sensemaking is a methodology to study the creation of meaning from the ambiguous situation an individual face by making references to the past experience and the current level of knowledge of the individual.

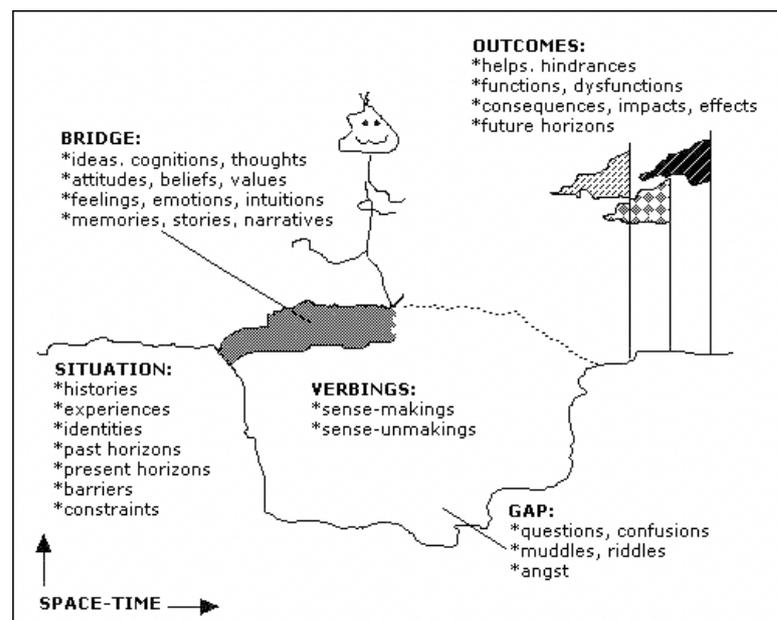


Figure 2.2: Central Metaphor of the Sensemaking Methodology (Dervin and Frenette, 2003)

Although sensemaking is useful in discussing conceptual issues of information (Dervin and Frenette, 2003), it suffers from two limitations. First is that the sensemaking methodology operates at the individual levels while overlooking the need to explicate how sensemaking occurs and takes shape in groups. This limitation is particularly important for the current research where the context under study is crisis response in which multiple actors are usually involved. Although sense can be made at individual levels using Dervin et al.'s (2003) approach, in practice, it will probably fall short when group sensemaking is required since the methodology essentially outlines information behaviours

to help understand how the gaps are bridged or how knowledge is created at an individual level.

Second, the metaphor that Dervin et al. (2003) proposed is at too abstract a level to be made applicable across different individuals and contexts. For example, gap defining, and gap bridging are contingent by nature, depending on individual, and situation factors (Savolainen, 1993). How individuals articulate a gap in detail or evaluate the depth of that gap may vary across individuals which may lead to different information seeking and using requirements.

2.2.5.2 Russell et al.'s Sensemaking Model

By illustrating the use of *representations*, Russell et al. (1993) defined sensemaking as ‘the process of searching for a representation and encoding data in that representation to answer task-specific questions’ (p. 269). Representations, in Russell et al.’s (1993) opinion are reflections of users’ knowledge of a particular task or problem and may consist of structural elements (entities, concepts, and/or relationships among them) and data. According to their theory, sensemaking is cyclic process of searching for external representations and encoding information into these representations to reduce the cost of the tasks to be performed. They explicated on this point through modelling the learning loop complex (Figure 2.3) which has three main processes.

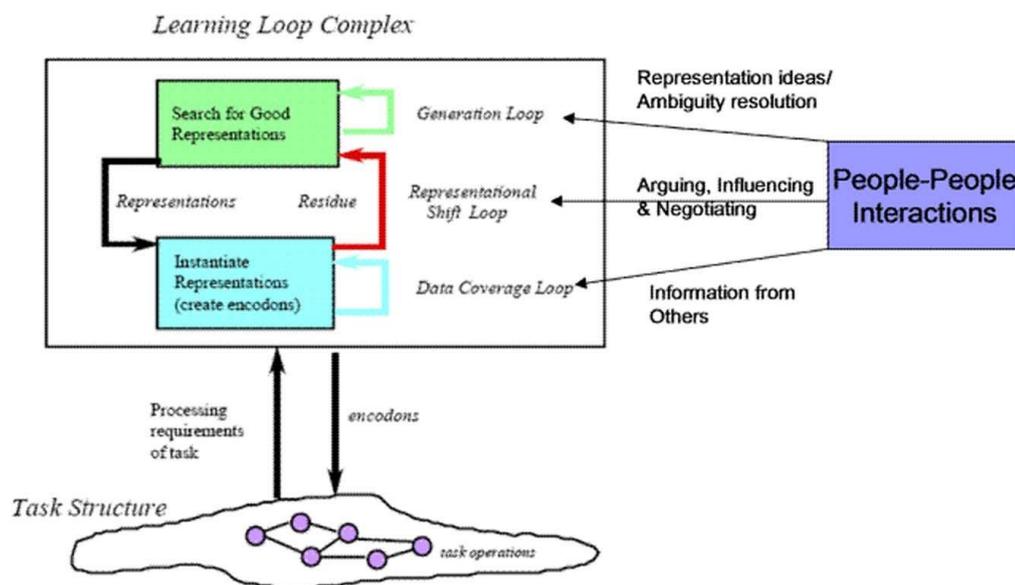


Figure 2.3: A Conceptual Model of Sensemaking by Russell et al. (1993)

In the first process, the sensemaker searches for and creates representations that can be used to capture and organize the salient features of the data. This search cycle is the *generation loop* where both representations and procedures for using them are created. In the next loop, the sensemaker identifies information needed to handle the task and places it in representations created in the previous process. Representations containing information are called *endocons* and the creation of endocons happens in the *data coverage loop*. The third process is the *representation shift* loop where the intention to reduce the cost of task operation is made. That is, when information does not fit in current representations, this ill-fitting data is called residue. As more residue is discovered, representation shifts take place where old representations are modified or abandoned, and new representations are created. Finally, the sensemaker consumes and uses the endocons in performing the task.

Like the Sensemaking Methodology proposed by Dervin et al. (2003), the sensemaking theory by Russell et al. (1993) also suffers from the same dilemma of being individually centred. The learning loop complex, for instance, is designed as a sensemaking tool to handle single task only. In groups setting or contexts, such as crisis, response where multiple tasks might require simultaneous handling, thus Russell et al.'s (1993) model of sensemaking will likely not hold. Similarly, Russell et al. (1993) does not consider the impact of multiple sensemakers' interaction on the learning loop complex discussed in the model which once again, may lead to challenges in group settings.

2.2.5.3 Pirolli and Card's Notional Model of Sensemaking

Pirolli and Card's (2005) 'notional' model of sensemaking is an extension to Russell et al.'s (1993) model of sensemaking and was built using cognitive task analysis to study the generalised activities of intelligence analysts. According to Pirolli and Card (2005), the overall sensemaking process takes place in two loops. The first is the *foraging loop* which involves the process of seeking and gathering information, filtering and reading it, and representing it in a form that aids some analysis. The second is the *sensemaking loop* which involves the iterative development of a mental model that best fits the evidence. Figure 2.4 illustrates the foraging and sensemaking loops in the overall

sensemaking; the rectangular boxes represent an approximate data flow. The circles represent the process flow. The processes and data are arranged by degree of effort and degree of information structure.

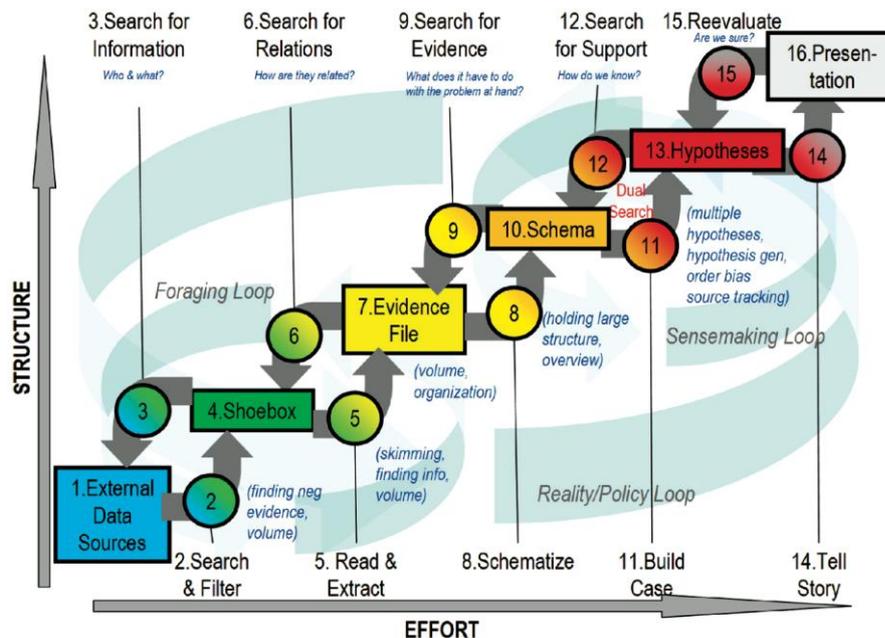


Figure 2.4: The Sensemaking Model of Pirolli and Card (2005)

The Pirolli and Card (2005) model provides a linear approach to sensemaking presenting it as a simple process of following the steps and reaching a conclusion. However, sensemaking is a complex process with no clear starting and end points making this step-by-step approach rather inadequate (Zhang et al., 2008). Especially when multiple sensemakers are involved, it is highly unlikely for members to follow all the steps in the model the same way or in harmony. Thus, the Pirolli and Card's (2005) model of sensemaking falls short in considering the sensemaking complexities embedded in the presence of multiple members.

2.2.5.4 Data Frame Theory

Klein et al. (2006b) postulated the data/frame theory of sensemaking which explains how field practitioners make sense of complex, real-world contexts (Figure 2.5). They define sensemaking process as the 'deliberate effort to understand events...typically triggered by unexpected changes or other surprises that make us doubt our prior understanding' (p. 114). The theory suggests that the sensemaking process is a combination of two related entities,

data and frame, where *data* are the interpreted signals (cues) the sensemaker receives from the situation, and the *frame* is the representation or explanation in the mind of the sensemaker that accounts for the received data. A main assertion of this theory is that sensemaking is the process of fitting data into a frame and fitting a frame around the data.

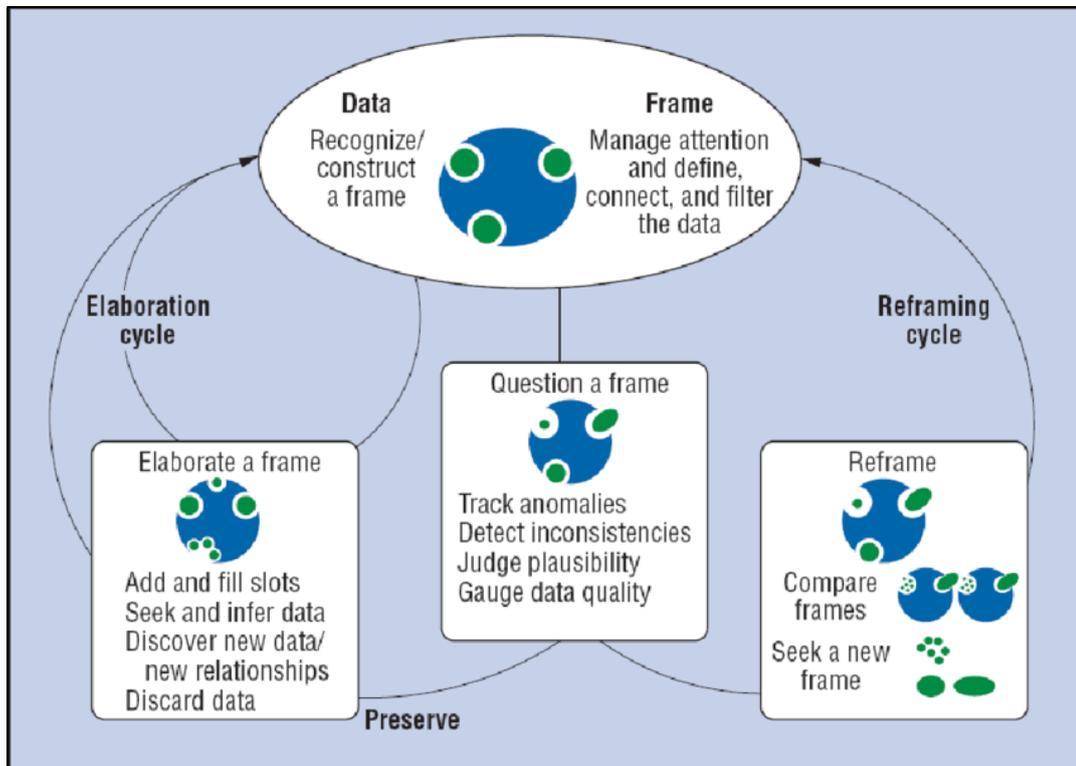


Figure 2.5: Data/Frame Model of Sensemaking (Klein et al., 2006b)

The data/frame theory of sensemaking is essentially built on Minsky's (1977) work. Minsky (1977) explained that when we are making sense of a situation, we 'select from memory a structure' of information that he conceptualized as frames. In accord with Minsky (1977), Klein et al. (2006b) suggested that when people attempt to make sense of an event, they begin with a perspective or a framework – called the *frame*. The frame is the necessary first step in noticing the abnormally and specifying what counts as the data that can then help make sense of the situation. They defined the frame, its purpose, and its forms as follows:

Frames help us filter and interpret the data while testing and improving the frame and cyclically moving forward to further adapt the frame. The purpose of a frame is to define the elements of the situation, describe the significance, of these elements, describe their relationship to each other, filter out irrelevant messages,

and highlight relevant messages. Frames can organize relationships that are spatial (maps), causal (stories and scenario), temporal (stories and scenarios), or functions (scripts). (p. 119)

Thus, frames define and give meaning to the elements of a situation, and guide sensemakers in the process of accounting for the data and guiding the search for more data.

Klein et al. (2007) use the data/frame relationship to explicate how sensemaking occurs. Viewing sensemaking as a balancing effort between the data and frames, Klein et al. (2007) claimed that sensemaking is often initiated when people detect signals (cues) from the environment that do not fit their frames. Faced with a surprising situation, people either modify their frame(s) or replace it with those that align with the data or, as another possibility, 'use the frame to search for new data or to reclassify existing data, which in turn could result in a discovery of a better frame' (p. 120). This process of framing and reframing continues until the surprising situation is no longer novel i.e., once data and a frame are brought into congruence, the sensemaking process ceases.

Despite the viable approach taken to explicate how sensemaking takes place at the level of individuals, Klein et al.'s (2006b) data/frame theory falls short in considering the impact of people's interaction on the data/frame alignment. That is, how different data pieces in a group setting are matched with different frames or how these frames are adjusted to make sense of the variable data to share a common sensemaking of the situation.

Contrary to the notion that discourse is a fundamental part of sensemaking (discussed earlier), the aforementioned individual-level theories conceptualized sensemaking as primarily a cognitive activity while overlooking its inherently social nature. These individual-level theories investigate the cognitive gaps that individuals experience when attempting to make sense of the observed data (information). The obtained information goes through a cyclic process of fitting information into the existing frames or representations or look for new information that fits the frame. Thus, much of the sensemaking activity is performed internally without considering the possibility of creating understanding out of different individuals' perspectives and varied interests. Weick's (1988; 1993; 1995; 2005) work on organizational sensemaking

provides insight into how group or organizational level sensemaking takes place in complex and dynamic situations.

2.2.6 Group Sensemaking

Organizations typically find themselves in turbulent environments (Weick 1979) that are best described by the term *dynamic complexity*. According to Senge (1992), dynamic complexity refers to environmental conditions that are ambiguous, uncertain, equivocal and can be changeable. Dynamic complexity provides groups or organizations (used interchangeably here) with pragmatic challenges. To mitigate these challenges, groups usually develop plausible and tentative interpretations of their environments by noticing and bracketing out certain pieces of information (Weick 1995). By acting based on these interpretations, organizational members make their environments more orderly and better understood (Weick et al., 2005).

Karl Weick was the first researcher to introduce the concept of sensemaking in the organizational studies literature. More than three decades after that introduction, Weick and his colleagues eventually described organizational sensemaking as follows:

Organizational sensemaking is first and foremost about the question: How does something come to be an event for organizational members? Second, sensemaking is about the question: What does an event mean? In the context of everyday life, when people confront something unintelligible and ask, “what’s the story here?” their question has the force of bringing an event into existence. When people then ask “now what should I do?” this added question has the force of bringing meaning into existence, meaning that they hope is stable enough for them to act into the future, continue to act, and to have the sense that they remain in touch with the continuing flow of experience. (Weick, et al., 2005, p. 410)

Though most of Weick’s characterization of sensemaking is at the individual level, Weick highlights the social character of sensemaking and emphasizes that during sensemaking, people interact to gain mutual understanding. He adopted a socio-constructivist approach to claim that sensemaking constitutes the social process by which members of an organization collectively interpret and explain sets of ambiguous information

from the environment (Weick, 1995). His conceptualization of sensemaking can be boiled down to seven salient properties, which are explicated as follows:

1. **Social context:** Sensemaking is inherently social. It is influenced by the actual, implied, or imagined presence of others. Weick (1993) claimed that sensemaking is less likely to break down and is more effective when conducted in a social context. He proposed that social exchange can be in the form of face-to-face interactions or in thinking through other's perspectives while deliberating individually. Regardless of the method used, sensemaking provides better results when constructed with others.
2. **Identity:** Humans continually construct, redefine, and adapt various identities as they interact with others. What goes into sensemaking and what it aims to accomplish depends on the identities of the individuals and the organizations. (Weick, 1979). On an individual level, the sensemaking process depends on how we make sense of ourselves (O'Connell and Mills, 2003), and that is what shapes our sensemaking process. On an organizational level, the question 'Who are we?' determines how organizations act and interpret the situation (Weick, 1995).
3. **Retrospect:** In sensemaking, the perceived world is in the past, and things are visualized and seen before they turn into concepts. This idea captured Weick's (1995) belief that 'people can know what they are doing only after they have done it' (p. 24). In other words, in dealing with the 'now' people consider and contemplate the 'then' to make sense of the already-occurred conversations, artefacts, and happenings.
4. **Salient cues:** Picking up prompts from the surrounding environment drives the sensemaking process. When people pay attention and extract a particular cue from the external environment, they then try to link it to the internal frames of past experiences or understandings, providing useful meaning. This newly constructed meaning is what influences sensemaking. As Weick (1995) stated:

Frames tend to past moments of socialization and cues tend to be present moments of experience. If a person can construct a relation between these two moments, meaning is created. This means that the content of sensemaking is to be found in the frames and categories

that summarize past experiences, in the cues and labels that snare specifics in the present experience, and in the ways these two setting of experience are connected. (p.111)

5. Ongoing: Humans are constantly immersed in the flow of events (Weick 1995). For Weick (1995), 'sensemaking never starts. The reason it never starts is that pure duration never stops' (p. 43). This means that when the flow of an event is interrupted, people search for meaning and try to make sense of 'what is going on?' As they are making sense, new stimuli that affect their ongoing sensemaking emerge as new cues that enable them to reconstruct new meanings, and this process continues.

6. Plausibility: Accuracy is not necessary in sensemaking (Weick, 1995). He wrote that:

Sensemaking is about accounts that are socially acceptable and credible.... It would be nice if these acceptable accounts were also accurate. Nevertheless, in an equivocal, postmodern world, infused with the politics of interpretation and conflicting interests and inhabited by people with multiple shifting identities, an obsession with accuracy seems fruitless, and not of much practical help either. (Weick, 1995, p. 61)

What is necessary in sensemaking is something that preserves plausibility, coherence, embodies past experience and resonates with other people (Weick, 1995). He further stated:

What is necessary in sensemaking is a good story. (...) a good story, like a workable cause map, shows patterns that may already exist in the puzzle (...) patterns that could be created anew in the interest of more order and sense in the future. (Weick, 1995, p. 61)

7. Enactment: Enactment refers to the activity of 'making' that which is sensed (Weick, 1995, p. 30). That is, action stems from sensemaking. It results from answering two questions: What's the story? and What is to be done now? Thus, sensemaking is as actionable as it is cognitive. Weick (2001) claimed that:

Action is a means to gain some sense of what one is up against, as when one asks questions, tries a negotiating gambit, builds a prototype to evoke reactions, makes a declaration to see what response it pulls, or probes something to see how it reacts. (p. 45)

In summarizing, the seven properties listed above are sensitizing concepts to analyse behaviour from a sensemaking perspective. Thus, people concerned with identity in the social context of other actors engage ongoing events from which they extract cues and make plausible sense retrospectively while enacting more or less order into those ongoing events (Weick, 1995).

2.2.6.1 Practical Implication of Weick's Seven Properties

In his subsequent work, Weick (2001) provided the linkage between the seven properties of sensemaking and organizations. He argued that if the way the organizations are designed maintains or strengthens these seven resources, then people will continue making sense of what they encounter. However, if the design is as such that it undermines or weakens these seven properties, then people may struggle to understand the situation. He postulated a list of practical questions for each sensemaking property that can help organizational actors to evaluate their preparedness to make sense when faced with dynamic complexities. The questions are:

1. Social context: Does the form encourage conversation?
2. Identity: Does the form give people a distinct, stable sense of who they are and what they represent?
3. Retrospect: Does the form preserve elapsed data and legitimate the use of those data?
4. Salient cues: Does the form enhance the visibility of cues?
5. Ongoing projects: Does the form enable people to be resilient in the face of interruptions?
6. Plausibility: Does the form encourage people to accumulate and exchange plausible accounts?
7. Enactment: Does the form encourage action or hesitation?

The researcher considers Weick's (2001) practical questions to ensure sensemaking preparedness as equally relevant and salient in emergency services as in any other organization. For instance, those in charge of crisis response team must develop an environment where everyone, regardless of their relative status in the hierarchy, is encouraged to become socially active sensemakers. The leaders must also ensure that contributions from others are not only valued but accumulated in a such a way that any differences in the

sensemaking accounts are resolved so common understanding and action is ensued. To achieve common understanding and action among groups, however, the issue of multiple interpretations that members give to the same information needs attention.

2.2.6.2 Back to Weick's Equivocality Reduction Model

Weick's (1969) model of organizing (introduced earlier) is primarily based on the assertions that human interaction is a crucial process through which organizational members can guide organized responses to complex situation i.e., enable organizing. The model is directly applicable to the study of communication and aims to reduce equivocality in information as Weick (1969) claimed:

Organizing consists of the resolving of equivocality in an enacted environment by means of interlocked behaviors embedded in conditionally related processes. To summarize these components in a less terse manner, organizing is directed toward information processing in general, and more specifically, toward removing equivocality from informational inputs. (pp, 90-91)

The following section explicates Weick's equivocality reduction model in further detail.

Stage 1: Ecological change. The process begins in response to the *ecological change* that 'represents some change or difference in the organizational environment, resulting in disturbances or variations in the flows of experience affecting the organization's participants' (Choo, 1996, p. 333). From an information perspective, these disturbances trigger attention and subsequently provide the occasion for 'attempts at equivocality removal and attempts to determine the significance or triviality of the differences' (Weick, 1979, p. 130). This reduction of information equivocality occurs based on circular socially mediated processes (enactment-selection-retention) to restore order. As a result, structure emerges from the process, which allows effective handling of any further change or disruption.

Stage 2: Enactment. The second stage in the organizing process is *enactment*. Weick (1995) explained that when differences occur in the stream of experience, organizational members actively engage in creating the environments that they will attend to understand the meanings of these

changes. In enacting an environment, people take in raw data from the information environment, selectively bracket and label the data for closer examination, and supply base material as outputs for subsequent organizing processes. Weick (1979) explained that through the enactment process, 'managers construct, rearrange, single out, and demolish many 'objective' features of their surroundings. When people act, they unrandomize variables, insert vestiges of orderliness, and literally create their own constraints' (p. 164). In short, the result of this enactment is to generate equivocal raw data about environmental changes, for the purposes of subsequently turning that raw data into meaning and action (Choo, 1996).

Stage 3: Selection. The third stage in Weick's organizing model is *selection*, where the process of choosing meanings occurs. Organizational members generate these meanings by reflecting on their past behaviours, interpretations, and experiences. Based on their prior understandings, organizational members overlay various plausible relationship structures on the enacted raw data to reduce equivocality (Choo, 1996). These relationship structures are constructed through three critical processes in which: (1) individuals choose interpretations, (2) select the type and number of rules to process these interpretations, and (3) initiate communication cycles to act upon these interpretations. Thus, rules and communication cycles are two organizational tools that helps with the selection process (Weick, 1979; Putman and Sorenson, 1982).

According to Weick (1979) rules are procedures, instructions, or guides that organizational member use to process data into a collective interpretation. They help ascertain the level of familiarity or equivocality in any message input (Weick, 1979), as well as search the pool of standardized message responses available that are compatible with (appropriate to) the specific message input (Kreps, 2009). Weick (1979) observed that when faced with equivocal information, organizations tend to tackle the situation by choosing some distinct rules. Among them, the four most used rules are: (1) solutions that are implemented quickly, which is a *duration* rule, (2) solutions that puts the knowledgeable workers in charge, which is a *personnel* rule, (3) solutions that rely on strategies that have worked before, which is a *success* rule, and (4) solutions that take the least amount of work, which is an *effort* rule.

Putnam and Sorenson (1982) built on Weick's organizing model to suggest that people use fewer rules in presence of more equivocal information because there is lack of clarity of what that information means and how many rules should be applied to make it understandable. On the other hand, there is more certainty and familiarity associated with less equivocal inputs which allows the use of greater number of rules to handle the data and assemble the interpretation. The number of rules used guide the selection of communication cycles.

Communication cycles are a series of interlocked message exchanges between organizational actors that allow the organization to process equivocal inputs (Weick, 1979). Weick labelled a communication cycle as a double interact; a combination of messages (act), the response to messages (interact), and adjustments to the responses (double interacts) that people use to cope with information problems. In essence, the communication cycle 'introduces an idea, elicits a response to that idea, and enables an adjustment to the response. It is a means of gathering information and feedback. The more equivocal a given information input is for organizational members, the more they must depend on performing several communication cycles to cope with the problem (Coombs, 2015b; Weick, 1979).

Bantz and Smith (1977) provided a summary of the relationship between rules and cycles as an equivocality reduction technique that are listed as follows:

1. The greater the equivocality of information inputs, the fewer rules used to assemble the process.
2. The fewer the rules used to assemble the process; the more behaviour cycles performed in processing the input.
3. Therefore, the greater the equivocality of information inputs, the more behaviour cycles used to process the information.
4. The more behaviour cycles, the more equivocality removed from the informational input.
5. The more equivocality removed, the less equivocality remaining in the input as it is passed to the next process.

Stage 4: Retention. The final stage in the organizing process is *retention*, where the actor(s) decide what information and meanings will be retained for future use. In other words, the retained information is integrated into knowledge structures that can be retrieved and used in the next enactment, selection, and retention sequence. Thus, people and organizations will remember what rules and cycles worked versus those that were less effective and use these meanings (information) to deal with similar equivocal inputs in the future. Kreps (2009) summarized this point as follows:

The various communication cycles developed and used to process equivocal information are evaluated for their usefulness, and if they are deemed to be successful strategies for coping with equivocal situations, they are made into rules for responding to similar inputs in the future. A repertoire of rules is developed in the retention phase to be used as a form of organizational intelligence to guide organizational actions. (p. 351)

In theory, Weick's model of organizing is a useful tool in reducing equivocality in information inputs. However, the practical orientation of the current research calls for empirical assessment of Weick's approach to reducing equivocality in environmental inputs. Therefore, to evaluate the empirical soundness of Weick's approach, the three most prominent and acknowledged studies were examined, including: Bantz and Smith (1977), Kreps (1980), and Putnam and Sorenson (1982).

In a library experiment designed to examine the relationship between equivocality and communication cycles, Bantz and Smith (1977) operationalized cycles as the number of adjectives applied to each equivocal passage to help make their meaning less equivocal to others. The study found that equivocality in information inputs is *not* directly related to the number of cycles needed to clarify the meaning of select literary passages as originally proposed by Weick. That is, even low equivocality passages were noticed as applying great numbers of adjectives deemed necessary to clarify the meaning of the selected passages. Based on these results, Bantz and Smith (1977) argued that 'the communicating that is organizing for Weick is activity that seeks to clarify content, not activity that seeks to accommodate individuals to one another' (p. 182).

Kreps (1980) rejected Bantz and Smith's findings on the assumption that the participants of the experiment lacked a history of group interaction and hence applied more adjectives than they would if the group members had some interaction experiences with one another. Kreps (1980) conducted a field experiment at a university and studied the relationship between the equivocality of faculty senate motions and the type and frequency of communication behaviour that ensued. Based on the experiment, Kreps concluded that high equivocality messages generated more communication cycles than low equivocal messages. Although Kreps investigation validated Weick's assumptions, it fell short in examining the role of rules in the selection of communication cycles (Putnam and Sorenson, 1982).

Thus, a subsequent empirical study was conducted by Putnam and Sorenson (1982) examining the impact of ambiguous messages and organizational level on the processing of equivocality. Using students as subjects, the study created simulated organizations and exposed them to messages that varied in ambiguity. Consistent with Weick's (1979) model of organizing, the study found that the participants used more rules to respond to low equivocal messages than to high equivocal messages. However, contrary to Weick's (1979) prediction, group interaction was higher in case of low equivocal messages than when messages were highly equivocal. A unique finding of this study was that how participants responded to ambiguity varied by their job level in the simulated organization. Lower-level 'employees' responded to ambiguity by generating multiple interpretations, while 'managers' moved more directly to action as means of reducing equivocality.

2.2.6.3 Linking Sensemaking with the Model of Organizing

Sensemaking typically describes the process by which interpretation and action are shaped by rarer and more unexpected events. As such, sensemaking can be considered as a special case of organizing: organizing in response to the unexpected. Weick et al. (2005) argued that 'if we conceptualize organizing as a sequence of ecological change-enactment-selection-retention with the results of retention feeding back to all three prior processes, then the specific activities of sensemaking fit neatly into this more general progression of organizing' (p. 414). Figure 2.6 graphically represents

the relationship between sensemaking and organizing as explained by Weick et al. (2005).

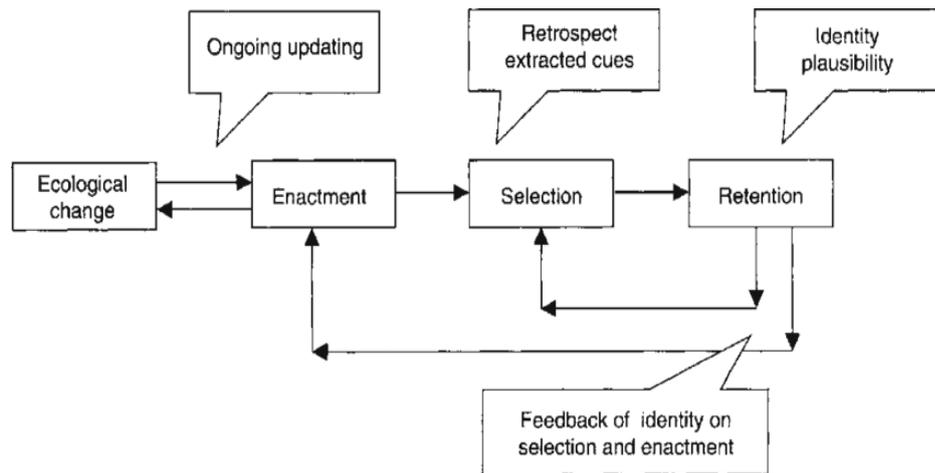


Figure 2.6: Relationship Between Sensemaking and Organizing (Adapted from Weick 1979, p. 132, in Weick et al., 2005)

Sandberg and Tsoukas (2015) builds on Weick et al.'s (2005) notion and offered a succinct explanation of the linkage between sensemaking and organizing. They wrote:

Organizing is a process in which individuals interactively undertake action (enactment), the results of which they subsequently confront as their “environment,” which they then seek to make sense of by retrospectively chopping their lived experiences into meaningful chunks, labelling them, and connecting them (i.e., selection). This sense made is retained in their minds in the form of cognitive “cause maps,” indicating what is crucial for carrying out their tasks and how they are interconnected (retention). Through sustained interaction, individuals interlock their behaviours over time, and, in so doing, they deal with residual equivocality, which they seek to remove through negotiating a consensus about their common task and how it ought to be handled. Thus, a group of individuals become organized when their cause maps converge. In other words, sensemaking is homologous to organizing: The latter is achieved to the extent that the former is accomplished. (p. S8)

Kudesia (2017) attempted to show the linkage between sensemaking and organizing which is summarized as follows:

- *Enactment* includes the perceptual process of noticing and bracketing information from the environment (4: salient cues) and the

behavioural process by which acting on the basis of interpretations helps shape the world and bring order to it (7: enactment).

- *Selection* describes how people draw on the past to interpret bracketed information (3: retrospective) and seek to find workable interpretations rather than completely accurate ones (6: driven by plausibility).
- *Retention* describes how the outputs of interpretation are stored in ways that affect individual and collective identities (2: grounded in identity), and how these outputs are negotiated through interactions with others (1: social) as they are applied continuously to the environment as its equivocality levels constantly fluctuate (5: ongoing).

Thus, the close fit between processes of organizing and processes of sensemaking illustrates 'that people organize to make sense of equivocal inputs and enact this sense back into the world to make that world more orderly' (Weick et al., 2005, p. 414).

2.2.7 Practical Insights into Sensemaking

Given the practical orientation of this research, it only makes it pertinent to discuss some ancillary theories to the sensemaking literature that illustrates how sensemaking is performed in action. The two streams of research that can be considered relevant within the crisis response context and the theoretical understandings of the sensemaking phenomenon are: *Reflection-in-Action* (Schön, 1983) and *The Naturalistic Decision-Making Model* (Klein, 2008). While the theory of Reflection-in-Action describes how professionals make sense out of situations that are complex, uncertain, unstable, unique, and value-conflicted (Schön, 1983), Naturalistic Decision-Making is interested in how professionals handle time pressure, uncertainty, ill-defined goals, and high personal stakes (Lipshitz et al., 2001). The researcher maintains that both these theories provide useful practical insights into how professionals, such as the first responders in crisis settings, think and act.

2.2.7.1 Reflection-In-Action

In his book, *The Reflective Practitioner*, Donald Schön (1983) pointed out that practitioners constantly face interconnected messy problems that make their environment turbulent and future indeterminate. He noted that the idea of *technical rationality* – which encourages problem-solving through applying standard scientific theories and techniques to handle novel situations in the everyday life of a practitioner – is deeply rooted in the professional environments. Schön, however, argued, that the practitioners' ability to cope with the untidy world is severely limited in a technical rationality model. In the life of a competent practitioner, therefore, the complexity and uniqueness spark *reflection-in-action* in them.

Reflection-in-action refers to the active evaluation of thoughts, actions, and practices during action (Schön, 1983). It usually activates when a reflective practitioner, confronted with an unusual situation, seeks to discover the particular features of his problematic situation, and from their gradual discovery, designs an intervention. Schön (1983) noted that reflection-in-action allows the practitioner to 'surface and criticize ... tacit understandings ... and can make new sense of the situations of uncertainty or uniqueness' (p. 61). Thus, instead of problem-solving by following the technical rationality model, the reflective practitioner engages in the process to *set* the problem. As Schön (1983) wrote:

In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain. In order to convert the problematic situation to a problem, a practitioner must do a certain kind of work...When we set the problem, we select what we will treat as the 'things' of the situation, we set the boundaries of our attention to it, and we impose upon it a coherence which allows us to say what is wrong and in what direction the situation needs to be changed. Problem setting is a process in which, 'interactively, we *name* the things to which we will attend and *frame* the context in which we will attend to them' [*italics in original*]. (p. 40)

Schön (1983) explained that by framing, the practitioner tries to solve the problem he has set. In the framing process, the practitioner is engaged in an *ongoing conversation* with the situation which involves continuous framing and reframing until a suitable state is reached. A practitioner evaluates the fitness

of the frame by asking the following questions: (1) Can I solve the problem I have set? (2) Do I like what I get when I solve this problem? (3) Have I made the situation coherent? (4) Have I made it congruent with my fundamental values and theories? (5) Have I kept inquiry moving? (Schön, 1983).

Conceptually, Schön's (1983) idea of problem-setting resembles closely with Weick's (1969) description of the enactment process. By definition, both problem-setting and enactment create new features of events and situations in the world. Each begins with noticing a break or change in the flow of experience followed by the processes of bracketing and labelling important cues that are isolated for more detailed attention by ignoring or discarding unimportant features of the surrounding. A similar practice of authoring the situation through bracketing and labelling takes place in fire services also before conducting an operation.

Another conceptual overlap between Schön (1983) and Weick (1969) is the idea of being present and constantly interacting in and with the situation. Akin to what Schön (1983) called '*Backtalk Cycle*' which happens when the designer is (re) interacting with the design medium, Weick's (1969) iterative model of enactment-selection-retention posited that people in organizations are continually engaged in the talk in order to find out what they are thinking and to construct interpretations of what they are doing. Although the former idea focuses more on individual-level conversations with the materials (situation), and, the latter is more interested in organizational-level social interactions, they both are concerned with the interactive and iterative processes of making sense of the situation.

Although some decades old, the theory of Reflection-in-Action has rarely been used in the crisis response contexts. The researcher finds this arrangement odd and intends to employ the fundamental concepts of this theory when designing a solution artefact for the current study.

2.2.7.2 Naturalistic Decision-Making

Gary Klein, a noted cognitive psychologist, pioneered the *naturalistic decision-making* (NDM) framework in the 1980s. While focusing on the cognitive functions such as decision-making, sensemaking, situation awareness, and planning, NDM is an attempt to understand how people make decisions in real-world contexts that are meaningful and familiar to them

(Lipshitz et al., 2001). NDM researchers examined several contexts such as firefighting, healthcare, and the military. These studies contended that instead of generating or comparing option sets, people in practical settings relied on some kind of synthesis of their experiences to make judgments (Lipshitz et al., 2001, p. 457).

There are many significant contributions of the NDM research in providing key insights to the current study. The first is how people make decisions in chaotic real-life conditions. With crisis as the context of this study, it is fundamentally important to understand how human decision-making operates where time to think and act is limited. The second contribution of NDM research is the distinction it makes in the rules of engagement between the more experienced (expert) and the less experienced (novice). This notion is particularly relevant for the current study as there is a high probability of an imbalance in the level of expertise of the crisis responders. These contributions are explored as follows.

The NDM research emerged as a conceptual turn of how humans make decisions. It challenged the prescriptive decision strategies as a means of handling uncertainties and complexities and shifted the emphasis to the role of experience in managing ill-defined tasks and time-pressured situations. As Klein (2008) explained, through NDM, 'the decision-making process was expanded to include a prior stage of perception and recognition of situations, as well as generation of appropriate responses, not just choice from among given options' (p. 457). The added stages of *perception* and *recognition* of situations in the decision-making process links the NDM movement with several components of Weick's sensemaking (1979; 1995).

To provide a fuller account of how people use their experience to make decisions, Klein (1993) developed the *Recognition-Primed Decision* (RPD) model. The premise of the RPD is that without comparing options, people can make good decisions by quickly matching the situation to the patterns they have learned over time – a concept Klein et al. (1988) referred to as 'pattern matching.' Through the fieldwork with fireground commanders (FGCs), Klein (1993) found that while operating in the actual environment the fire officers were not making choices, considering alternatives, or assessing probabilities;

instead, they were acting and reacting based on their prior experiences to generate, monitor, and modify plans to meet the needs of the situations.

Another critical part of the RPD is the evaluation of an option. Klein et al. (1988) fieldwork revealed that the fire officers would evaluate a course of action by using mental stimulation to imagine how it would play out within the context of the situation. They explain the evaluation criteria as follows: 'If the course of action works, it will be implemented. If it runs into problems, it will be modified. If it cannot be fixed, then it will be rejected, and another likely option will be considered (p. 143). Figure 2.7 illustrates the RPD on the scale of complexity in the decision-makers plan of action. As shown in the figure, RPD has the ability to offer simple matching (process labelled as 1 in the figure) where the perception of the situation matches the typical way of doing things. Additionally, as mentioned earlier, RPD tenders pattern matching (process labelled as 2 in the figure) and evaluation of the course of action (process labelled as 3 in the figure), thus, makes it a blend of intuition (pattern matching) and analysis (evaluation).

The RPD is an integral model for the current research to follow, as initially it was keenly interested in understanding how the first responders share information to facilitate decision-making in time-pressed, dangerous, and fast-evolving situations such as crises. The view that suggests how experienced fireground commanders could use their expertise to identify and carry out a course of action without having to generate and analyse a set of options, provides fundamental understanding of decision-making in critical moments. Although the researcher has several years of practical experience in managing organizational crises, those intense moments are not comparable to what first responders face in their routine work. Having been exposed to the RPD model guided the researcher to gain deeper understanding on how fireground communication and decision-making usually takes shape.

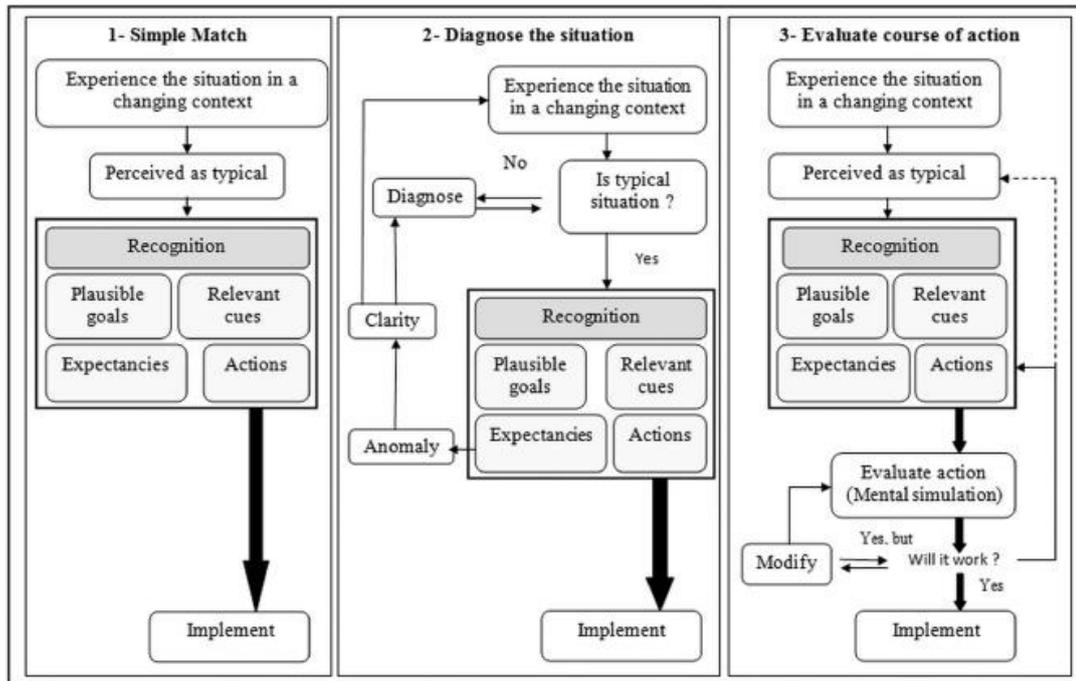


Figure 2.7: The Three Variations of RPD Model (Klein, 1993)

The next significant contribution of the NDM research in this study is the notion of contrast between experts versus novice behaviour of professionals in the same situation. NDM positions that an experienced person will understand (make sense of) a complex problem in terms of plausible goals, relevant cues, expectancies, and typical actions more quickly and efficiently than the novice. NDM asserts that novice decision-making relies on rule-following while experts follow their intuitive understanding to decide in a situation. This study accepts that conjecture and presupposes that reliance on intuition means that: a) experts react to problems automatically without putting in much thought or effort, and b) they generally become inarticulate about the processes they use to make decisions, which leads to major communication issues.

2.2.8 Crisis and Sensemaking

Sensemaking is usually initiated by a sudden loss of meaning, which makes it a suitable discourse for the crisis context. Weick (1993) termed the sudden loss of meaning a 'cosmology episode' as he wrote:

A cosmology episode occurs when people suddenly and deeply feel that the universe is no longer a rational, orderly system. What makes such an incident so shattering is that both the sense of what is occurring and the means to rebuild that sense collapse together. (p. 633)

Weick claimed that people experiencing a cosmology episode find themselves being thrown into an ongoing, unknowable, unpredictable stream of experience (Weick et al., 2005) that forces them to try make sense of the situation (Weick, 1993) i.e., 'a plausible understanding – a map – of a shifting world' (Ancona, 2012, p. 3).

The interplay between sensemaking and crisis has been widely discussed in the contemporary literature (e.g., Combe and Carrington, 2015; Kayes, 2004; Maitlis and Sonenshein, 2010; Weick, 1988; 1990; 1993; Wolbers and Boersma, 2013). Most of these conversations are built on Weick's (1988) paper, 'Enacted Sensemaking in Crisis Situations' which recognized that besides technological failures, there is also a strong element of human cognition (individual) and interaction with others (collective) that plays a significant role in managing crises. Although Weick (1988; 1993) emphasized the need of accounting both the individual and collective sensemaking (i.e., sensemaking within and among groups), the dynamics of creating common understanding in intra- and interorganizational contexts remain unclear (Merkus et al., 2017) making weak collective sensemaking as a major problem during crisis situations (Wolbers and Boersma, 2013, p. 188).

Maitlis and Sonenshein (2010) reflected on lessons learned about sensemaking in turbulent conditions and identified three major themes which 'reflect important individual, collective, and institutional influences on sensemaking processes' (p. 555), thus, making it particularly relevant for crisis response settings. These themes include: (1) role of positivity in shaping crisis sensemaking, (2) issues generating shared understandings and coordinated actions, and (3) influence of institutional contexts.

The first is *positivity*. The role of positivity is highly consequential in shaping sensemaking during crisis (Maitlis and Sonenshein, 2010). When responding to a crisis, positivity that makes an actor believe that everything will work out as planned and make him or her feel overconfident about the skills or the resources that are available, could lead to the failure of noticing important cues that suggest otherwise. This blindness to contradictory cues can instil self-deception by 'prevent individuals from adapting their understanding of an unfolding situation to accommodate new information as it becomes available' (Maitlis and Sonenshein, 2010, p. 556).

Second, Maitlis and Sonenshein (2010) considered the complexities associated with collective sensemaking. They made an early acknowledgement in their review of collective sensemaking that 'if sensemaking in crisis is difficult, we can see that collective sensemaking in crisis is near impossible in the absence of social processes' (p. 557). These social processes are primarily based on certain elements such as, familiarity with and trust in each other's action and reaction, emotional state of the individual and groups, and their abilities to scan, interpret, and share information actions (Curnin et al., 2015; Maitlis and Sonenshein, 2010). However, these elements are not always present or easily managed.

For example, Choo (2006) claimed that forming a plausible interpretation is hard because each person sees different parts of the environment as interesting, depending on the individual's values, position, and experience. Merkus et al. (2017) stated that 'common meaning is not automatic or self-evident but, rather, that it is an accomplishment; creating collectiveness is hard work and requires much effort and interaction. In this view, organizational actors each have their own individual frames of reference which may differ significantly from each other, consequently leading to diverging sensemaking' (p. 231). Thus, successful collective sensemaking depends on the group's skill and efficiency in coordinating their efforts to explain and to anticipate (Maitlis and Sonenshein, 2010).

The next theme represents the connections between the sensemaker and the *organization*. According to Maitlis and Sonenshein (2010), 'sensemaking in crisis is cumulatively influenced by the institutional contexts in which the organization and its members are embedded, and that sensemaking about crises often serves to maintain these institutions' (p. 555). Institutional attributes like their policies, rules, cultures, and mentality affect how their employees make sense which may constrain collective practices (p. 557).

Most significant for the crisis responses context where this research is located is the difficulties in achieving cohesive and agreed-upon meanings within and among groups i.e., collective sensemaking. The current research contends that if groups can converge into equivalent meanings of the situation (Weick, 1995) some degree of coordinated action can ensue which is critical in the context of crisis. For equivalent meaning to emerge, however, people not

only have to make sense of the environment, but equally important is how are they able in influence others' meaning construction through their sensegiving efforts. (Gioia and Chittipeddi, 1991)

2.3 Sensegiving

In moments of equivocality, people attempt to make sense of the situation to determine what is going on and to draw conclusions to inform their actions (Weick, 1995). That is, they engage in the process of sensemaking. If sensemaking is about making things sensible, then *sensegiving* is a deliberate attempt to transfer that sense to others. Gioia and Chittipeddi (1991) define sensegiving as 'a process of attempting to influence the sensemaking and meaning construction of others towards a preferred redefinition of organizational reality' (p. 442). Bartunek et al. (1998) connected sensegiving with *persuasion*. Whereas Weick et al. (2005) viewed sensegiving as 'a sensemaking variant undertaken to create meanings for a target audience' (p. 416). Finally, Maitlis and Lawrence (2007) considers sensegiving as 'an interpretive process in which actors influence each other through persuasive and evocative language' (p. 57).

2.3.1 Linking Sensemaking and Sensegiving

According to Gioia and Chittipeddi (1991), sensemaking and sensegiving evolve together through four phases in an iterative, sequential, and to some extent, reciprocal fashion. First is the *envisioning* phase, which marks the commencement of the sensemaking process in response to an interruption. Second is the *signalling* phase (sensegiving), where the sensemaker attempts to persuade the stakeholder of the new reality that was constructed. In the *re-visioning* stage, its stakeholder's turn to makes sense of new reality and present arguments. Finally, the *energizing* phase (sensegiving) involves rolling out activities that have been agreed on by the stakeholders.

In a longitudinal study, Maitlis and Lawrence (2007) examined the triggers and enablers of sensegiving in sensemaking environments. They found that the leaders' sensegiving was triggered by 'complex sensemaking environments—those that were ambiguous and unpredictable and that involved numerous stakeholders with divergent interests' (p. 80). For the stakeholders, it was the 'sense of bounded responsibility' that triggered sensegiving (p. 80).

Furthermore, Maitlis and Lawrence (2007) found that sensegiving was enabled by 'a discursive ability that allowed actors to construct and articulate persuasive accounts of the world' (p. 80).

Heeding Maitlis and Lawrence's (2007) work, this research maintains that the fact that leaders' sensegiving takes place in 'ambiguous and unpredictable' conditions that are subject to 'divergent interests' makes it a useful sensemaking construct to be included in the study of crisis response settings. Considering the crisis are generally confusing events that are open to multiple interpretations and interest, the concept of sensegiving provides useful insights on how leaders and stakeholders communicate the sense that they individually make in order to guide the situation towards common understanding and action (Hill and Levenhagen, 1995).

2.3.2 Sensegiving Outcomes Through Sensemaking Forms

Maitlis (2005) described four distinct forms of sensemaking (*guided, fragmented, restricted, and minimal*) to show how sensemaking emerges from the combined sensegiving efforts of the leader(s) and stakeholder(s) of an organization. Figure 2.8 provides a summarized account of the forthcoming discussion on the process characteristics and outcomes of each of the four forms of sensemaking. Although Maitlis's (2005) research was conducted in the context of a symphony orchestra where multiple stakeholders with related, yet divergent interest are involved (p. 24), this research contends a similar structure exists within the emergency response services as well. Several different stakeholders such as the fire services, law enforcement, and emergency medical teams are typically involved in responding and managing crisis and therefore, Maitlis (2005) research provided useful insights into how in such settings, leaders (e.g., crisis managers or incident commanders) and stakeholders (e.g., first responders) may make sense and try to influence one another.

Based on her research, Maitlis (2005) noted that in *guided sensemaking*, 'leaders were very active as 'sensegivers,' constructing and promoting understandings and explanations of events and of the process. At the same time, stakeholders were also actively engaged in sensegiving, attempting to shape beliefs about certain elements of the issues and their significance' (p.35).

		High Sensegiving	Low Sensegiving
Leader Sensegiving	Guided Organizational Sensemaking	Process Characteristics <ul style="list-style-type: none"> • High animation • High control Outcomes <ul style="list-style-type: none"> • Unitary, rich account • Emergent series of consistent actions 	Restricted Organizational Sensemaking
		Process Characteristics <ul style="list-style-type: none"> • Low animation • High control Outcomes <ul style="list-style-type: none"> • Unitary, narrow account • One-time action or planned set of consistent actions 	
High Sensegiving	Fragmented Organizational Sensemaking	Process Characteristics <ul style="list-style-type: none"> • High animation • Low control Outcomes <ul style="list-style-type: none"> • Multiple, narrow accounts • Emergent series of inconsistent actions 	Minimal Organizational Sensemaking
		Process Characteristics <ul style="list-style-type: none"> • Low animation • Low control Outcomes <ul style="list-style-type: none"> • Nominal account • One-time, compromise action 	
		High Sensegiving	Low Sensegiving
		Stakeholder Sensegiving	

Figure 2.8: Summary of the Four Forms of Sensemaking (Maitlis, 2005)

This form of sensemaking allows the coordinator or leader to create a unitary view by integrating many opinions and perspectives. This then leads to a consistent series of actions, rather than single actions that are inconsistent and incoherent. Within the crisis context, this would occur in the initial response stage where the crisis managers and the first responders together would assess what is going on and engage in strategic and tactical planning how to deal with the situation (Endsley, 1995).

In *fragmented sensemaking*, ‘processes emerge when stakeholders raise issues, generate accounts of a situation, and argue for potential solutions in the context of leaders who do not try to organize or control discussions’ (Maitlis, 2005, p. 36). Fragmented sensemaking would result in multiple (rather than unitary) accounts that are missing the overarching strategy and may lead to divergent and inconsistent actions. In the context of the current study, fragmented sensemaking could take place when the first responders face unexpected or unplanned scenarios leading them to construct multiple individualist accounts that in turn, effects action coordination.

Thirdly, *restricted sensemaking* results from leaders promoting overarching accounts of issues they encounter which stakeholders tend to accept with relatively few attempts to provide alternative understanding. Thus,

leaders engage in high levels of sensegiving and stakeholders engage in low levels of sensegiving (p. 42). The outcome of restricted sensemaking is often unitary narrow accounts that will tend to lead to a one-time action while preventing multiple views to be taken into consideration for alternative and better solutions. Restricted sensemaking could merge in highly structured response agencies where the ad-hoc solutions proposed by the experienced crisis managers are accepted by the lesser experienced or novice responders without need for a discussion.

In *minimal sensemaking*, 'both leaders and stakeholders await others' interpretations of and reactions to an issue, which typically come in response to some external trigger' (Maitlis, 2005, p. 42). In other words, leaders take little action to collect various views and the stakeholders do not actively engage in discussions resulting in nominal accounts. Thus, the situation lacks synthesis of perspectives and often leads to one-time, compromised actions. In a crisis, this would occur if situational complexities reached a degree that was overwhelming for everyone involved, engagement levels dropped substantially, or plans to move forward becomes murkier.

2.3.3 Sensemaking-Sensegiving Gaps

Bartunek et al. (1998) described sensegiving as 'a complex activity that involves multiple, perhaps conflicting and evolving understandings' (p. 67). Their description is based on the analysis of common differences that they found in a strategic organizational change study between the recipients' *sensemaking* and the leaders' *sensegiving*. They argued that as the environmental cues change or gets updated, leaders may themselves experience intrapersonal differences between their own sensemaking and sensegiving. The same is true when the change recipients will be conducting their own sensemaking, based in part on leaders' sensegiving but also on other cues about the proposed change. Thus, sensegiving does not always result in persuading others of the intended meanings.

Similarly, Corvellic and Risberg (2007) argued that having an intended meaning tends to 'reify sense'. That is, there is this implication in the notion of sensegiving that someone 'gives' something to someone that they 'own' and expects it to be adopted. Corvellic and Risberg (2007) objected to such a 'sender-centric view of sense' and asserted that 'it is non-sensical to speak of

sense without referring to interpretation and, thus, to a living audience' (p. 322). They, instead, proposed *mise-en-sens* – 'a process akin to sensegiving in that it refers to the activity of influencing audiences in the direction of a preferred definition of reality' (p. 322). By focusing on the activity, itself, which involves the use of narrative, rhetoric, argumentation, and other devices for conveying meaning, one bypasses the complications of assessing whether a target audience adopts a particular meaning.

Corvellic and Risberg's (2007) view on sensegiving is particularly useful in the context of this research. In accord with Corvellic and Risberg's work, the current research maintains that influencing processes should not necessarily be limited to top-down hierarchical relations where leaders through their constructed meanings attempt to influence others. Instead, influencing techniques could involve people in positions of various knowledge, practices, and positions perhaps for 'a debate, an evaluation or an official decision' (Corvellic and Risberg, 2007, p. 322).

Maitlis (2005) shows that when attempting to influence others' understanding of an issue through sensegiving, the interactions between diverse stakeholders are relevant and must be considered. Rouleau and Balogun (2011) found two discursive activities central to managers' sensegiving attempts: 'setting the scene' and 'performing the conversation'. By setting the scene, managers 'mobilize the appropriate networks and forums' (p. 973). They surround themselves with the right people and in favourable formats to build strong alliances. By performing the conversation, managers build constructive exchanges using their abilities to 'craft' and 'diffuse' the messages they wish to get across to others to influence the recipients in the way they desire; they use the right words and the appropriate metaphors and symbols. Thus, managers attempt to engage their audience through attempts of persuasion. According to Lee and Jahng (2020), storytelling is a powerful tool to achieve the goals of persuasion. This is discussed next.

2.4 Storytelling

Making words, metaphors, and symbols meaningful is the work of stories (Garfinkel, 1967). Stories are vivid and memorable, and people use them to increase understanding between them by ascribing meanings to their individual and collective experiences (relationships, successes, failures, and emotions),

and past or anticipated life events (Boje, 1991). It is this fundamental understanding that led Boyce (1995) to define storytelling as ‘a symbolic form by which groups and organizational members construct shared meaning and collectively centre on that meaning’ (p. 107).

According to Kaye and Jacobson (1999), stories typically comprise of a three-step sequence. In the first step, one person tells the story, and one or more others listen. In second step, both parties begin to gain a deeper understanding of something that was previously known only superficially. In the third step, groups use the shared meaning of one thing for the broader understanding of other things. This sequence implies that storytelling is: (a) a structured way of communicating, i.e., stories have a beginning, middle, and an end, and (b) a collective act that encourages sharing meanings and establishing cohesion that might otherwise be beyond the reach. Because of the discipline and the collective impact it offers, storytelling is particularly relevant for organizational studies (Liu et al., 2012).

2.4.1 Organizational Storytelling

The art of storytelling is largely seen as a skilful managerial activity to disseminate organizational messages and visions at both individual and collective levels (Gabriel, 2011). As and when organizations face interruptions in their routine works (Weick, 1995), the organizational members engage in giving meaning (interpreting) to such changes to make plausible sense (i.e., sensemaking) of the new reality. Those in leadership positions often try to persuade others’ interpretations by presenting their own construction of events (i.e., sensegiving). Thus, in managing change, language is implicated (Vaara et al., 2016), which often takes a ‘narrative’ form (Dunford and Jones, 2000, p. 1208).

According to Halverson et al. (2015), narratives are simply the ‘system of stories’ that relate to one another. Putnam et al. (1996) explained that:

Narratives are ubiquitous symbols that are prevalent in all organizations. Also referred to as stories, scripts, myths, legends and sagas, narratives are accounts of events, usually developed chronologically and sequentially to indicate causality. [. . .] They are the vehicles through which organizational values and beliefs are produced, reproduced, and transformed. They shape organizational meanings through functioning as retrospective

sensemaking, serving as premises of arguments and persuasive appeals, acting as implicit mechanisms of social control, and constituting frames of reference for interpreting organizational actions. (pp. 386-387)

In this research, the terms stories and narratives will be used interchangeably.

In the context of organizations, stories are particularly useful for (1) communicating leaders' vision, (2) creating a collective sense of shared purpose and meaning, (3) building leadership, (4) enhancing self- and organizational knowledge, and (5) inspiring alignment in support of change initiative (Kaye and Jacobson, 1999). Similarly, Rhodes and Brown (2005) listed five principal areas of organizational research where stories can be impactful. These include: (1) sensemaking, (2) communication, (3) learning/change, (4) politics and power, and (5) identity and identification.

Denning (2006) demonstrated the relevance of storytelling to the exercises of leadership. He found that leaders who tell stories develop more effective relationships with their followers. According to Boje (2011), storytelling can convey knowledge, information, and emotions – both explicit and the tacit and are an influential way to represent and communicate complex thoughts. It enhances organizational lessons learned, communicate common vision, and support a system to capture and share tacit knowledge.

Cunliffe and Coupland (2012) explicated various ways in which stories and narratives have been theorized within organizational studies, including in 'creating a coherent shared experience and aligning employees with corporate values' as means of 'making sense', 'giving sense', 'containing multiple meanings', or as 'storytellers deal with experiences of tensions, trauma and loss'. Thus, in organizational settings, 'collective narratives create shared meanings around events and help individuals to interpret their actions in light of their obligations and to understand how they should/should not act in particular social contexts' (p. 66)

In short, storytelling is a dynamic process used to create shared meanings that shape work of organizational members and the social construction of organization. The fact that storytelling is an effective communication tool and inherently social by which people ascribe meanings to their individual and collective experiences and life events, makes it a powerful

sensemaking device. Similarly, the art of storytelling is useful for purposes of interpreting, influencing and persuading others of the sense that has been made. Thus, storytelling practices also support sensegiving efforts. Given the context under study, the interesting interplay between storytelling, sensemaking, and sensegiving is explored in the following sections.

2.4.2 Stories' Role in Crisis Sensemaking and Sensegiving

Crises usually trigger sensemaking and sensegiving activities (Gioia and Chittipeddi, 1991; Maitlis and Lawrence, 2007; Weick, 1995). Heath and Millar (2008) view crises as inherently narrative. Kopp et al. (2011) explained that 'the power of organizational storytelling lies within its narrative process, which can absorb discordance when constructing a plot around a disruptive occurrence...organizational storytelling is especially suited as a crisis management tool specifically because of its sensemaking prescription of disruption-transformation-solution' (p. 376).

There is a broad consensus among scholars that sensemaking refers to processes of narrativization (Abolafia, 2010; MacIntyre, 1981), that our versions of reality take narrative form (Bruner, 1992), and that stories are a means of interpreting and infusing events with meaning (Edwards, 2012; Gabriel, 2011). Hence, 'a sensemaking lens is closely related to a narrative one' (Sonenshein, 2010, p. 479). According to Cunliffe and Coupland (2012) a narrative approach to sensemaking 'is based on the assumption that we make sense of our experience through narratives, stories or drama. Collective narratives create shared meanings around events' (pp. 65-66).

Weick (1995) gave an account of the connection between sensemaking and storytelling as follows:

If accuracy is nice but not necessary in sensemaking, then what is necessary? The answer is, something that preserves plausibility and coherence, something that is reasonable and memorable, something that embodies past experience and expectations, something that resonates with other people, something that can be constructed retrospectively but also can be used prospectively, something that captures both feeling and thought, something that allows for embellishment to fit current oddities, something that is fun to construct. In short, what is necessary in sensemaking is a good story. A good story holds disparate elements together long enough to energize and guide action, plausibly enough to

allow people to make retrospective sense of whatever happens. (pp. 60-61)

This explanation provides sufficient evidence that stories are crucial for both retrospective sensemaking and prospective sensegiving efforts where both the meaning and action go together.

In a more detailed analysis, Weick (1995) examined the specific functions of stories in sensemaking episodes. He maintained that: (1) stories aid comprehension because they integrate that which is known about an event with that which is conjectural, (2) stories suggest a casual order for events that originally are perceived as unrelated and akin to a list, (3) stories enable people to talk about absent things and to connect them with present things in the interest of meaning, (4) stories are mnemonics that enable people to reconstruct earlier complex events, (5) stories can guide action before routines are formulated and can enrich routines after those routines are formulated, (6) stories enable people to build a database of experience from which they can infer how things work, and (7) stories transmit and reinforce third order controls by conveying shared values and meaning.

According to Colville et al. (2012) sensemaking from this perspective is essentially 'an act of cueing a story in the form of a frame that provides a recipe: a recipe that serves both as a scheme of interpretation (i.e., this is the meaning of the situation) while also serving as a scheme for action (i.e., this is what you should do next)' (p. 8). Thus, in the realm of organizational sensemaking, stories provide the means of organizing and making sense of experiences and in evaluating actions and intentions (Cunliffe and Coupland, 2012, p.66). They enable actors 'to organize confusing cues into more holistic and coherent interpretations of what is going on and how to act' (Boudes and Laroche 2009, p. 337) making it a salient feature of crisis context.

Just like in sensemaking, stories have an equally crucial role to play in sensegiving efforts. Managers, for instance, can attempt to order the practices and thinking of employees through the use of stories (Weick, 1995, 2001). 'To engage in sensegiving, they [stakeholders] must tell sensible stories (drawing on relevant expertise) at the right time and place (opportunity) and occupy a social position that leads others to listen (legitimacy)' (Maitlis and Lawrence, 2007, p. 79).

Boje (2002) explains the three interactive elements of storytelling that explicate the relationship between stories, sensemaking, and sensegiving. He claims that inside storytelling are particular entities called the *grand narratives*. The grand narratives look backwards on life and experiences. These experiences are then turned into narratives about what happened and serve as a sensemaking tool. The second element of storytelling is the present moment web of *living stories*. According to Boje (2002), the web of living stories represents stories that we live by; the daily life stories that are unfolding that do not have a beginning or an end. They are just unfolding in the middle. The third element of storytelling is *antenarrative*. Boje (2011) posits that 'ante' stands for *antecedent* that come in advance of both the grand narrative and the living stories. Antenarratives are story fragments, not fully formed, yet which are used intentionally by sensegivers in the hopes of shaping the future story upon which an organization is constructed, and identities and plot come together (Boje et al., 2015).

Brown et al. (2008) assert that stories are a fundamental tool by which humans communicate their insight to others and hence make sense of conflicting situations, and act as both sensemaking and sensegiving devices to link cause and effect, both within and between different parts of the narrative. Sonenshein (2010) offers his understanding of narrative as 'a discursive construction that actors use as a tool to shape their own understanding (sensemaking), as a tool to influence others' understandings (sensegiving), and as an outcome of the collective construction of meaning (Sonenshein, 2010, p. 480). Such claims show that there is, then, strategy in storytelling and instrumentality in sensemaking and sensegiving (Long, 2016).

2.4.3 Storytelling Challenges During Crisis

Despite the salient role stories play in sensemaking and sensegiving activities, there are certain challenges that they pose when used in collectives such as in mutual-aid crisis response settings. Cunliffe and Coupland (2012) argued that 'narratives are not always deliberate and coherent but are also spontaneous acts of interpretation and meaning-making which are often improvised, situated, contested and responsive performances that are temporally and contextually sensitive' (p. 67). Long (2016) deliberated the 'contested' nature of stories as problematic in group settings and stated that:

There is a polyphonic nature to organizational narratives; there is never a singular narrative or narrating voice. There may be, however, dominant stories, and indeed where they exist, sensemaking possibilities become restricted. Stories have strategic value, and so the instrumental act of sensegiving sees some organizational members or groups attempt to influence the sensemaking of others and come to construct a particular organizational reality. There is power then in storytelling, and it is organizational leaders who typically enjoy the institutionalized privilege of doing so (p. 177).

Thus, in collective storytelling, two issues commonly emerge among the groups, i.e., competing narratives and dominant stories.

2.4.3.1 Competing Narratives

The view on narratives signifies that while collective narratives facilitate the creation of collective meaning by constantly relating and responding to others, it is also a polyphonic process. According to Cunliffe and Coupland (2012), polyphony refers to 'incomplete and uncompletable (sic) arguments within single speech and across emerging, fluid, and multi-voiced dialogues' (p. 67). Thus, narrative performance is open to multiple voices and narrations and, therefore, to contestation. That is to say, the problem with polyphony is when organizational members have different and conflicting stories to tell about the same event, actors must deal with those competing narratives in order to move forward.

Boddy and Paton (2004) listed three sources of competing narratives within the organizational context. They include: (1) culture, (2) structure, and (3) distribution of power. Boddy and Paton (2004) explicated that large organizations are usually composed of cultures and subcultures 'whose members develop distinct ways of seeing their world – with different views and interpretations of events' (p. 227) – possibly resulting in contradictory views each fitting the culture they belong to. Similarly, organizational members that are structured into different departments, business units, and those at different levels in the hierarchy develop different ways of seeing the business environment and develop varying interpretations. Finally, the dynamics of power play a compelling role in developing competing narratives by depending on 'what people believe the change has done, or will do, to their power and hence their ability to influence events' (Boddy and Paton, 2004, p. 227).

Thus, making meaning (i.e., sensemaking) with others is not a straightforward task. The natural occurrence of multiple, conflicting stories in presence of others makes it increasingly difficult to unite the team members towards a common understanding. This hinderance to achieve common understanding can be highly consequential in situations where group convergence is critical for the success of the overall operation such as when responding to a crisis. To reach convergence, however, some stories tend to take lead in the situation and in doing so, become dominant leading to a challenge for the sensegiving activities (Long, 2016).

2.4.3.2 Dominating Stories

According to Rhodes (2000), individual and groups often tend to impose their own monological and unitary perceptions of truth to present a compelling justification for aims and actions. Buchanan and Dawson (2007) suggested that 'within organizations, the persuasive dominant narratives are those which are most plausible, credible, coherent, and attractive; they are often presented by the most powerful, perceived to be effective and legitimate solutions to known problems, and are able successfully to jeopardize the legitimacy of competing accounts' (p. 682). Thus, while narratives are helpful in explaining interruptions retrospectively, they are also powerful tools to prospectively influence others of the explanation the dominant story holds.

Näslund and Perner (2012) argued that typical to dominant stories is the issue of leading the situation that is restricted 'in a direction concordant with the sentiment of that story' (pp. 90-91). That is, dominant stories exercise their power by fixing meaning while silencing, often, 'making alternative stories seem unpalatable or even unthinkable' (Näslund and Perner, 2012, p. 95) contributing to organizational inertia. Although Näslund and Perner's (2012) research is salient in signifying the influence of dominant stories on organizational performance, they did not consider the impact of dominant stories on the groups which this research assumes is more direct and immediate.

Long (2016) brings the ongoing discussion of dominant stories at the level of individual sensegivers which aligns with the goals and context in which this study is located. Long (2016) argued that dominant stories are ought to emerge in presence of multiple actors, especially, in settings where leaders as commanders use coercive powers to influence others of their stories. He further

highlighted the central role for communications in leadership as leaders attempt to manage the sensemaking of organizational members through discursive activity.

Earlier research on collective storytelling suggested 'negotiation' as an effective way of developing coherent stories among competing and dominating narratives (Prins et al., 2013; Regini, 2002). For example, Putnam (2010) asserted that through communicative practices, people build dialectical relationships which allows them to negotiate and transform disputes and promote new understandings and ways of working together (Putnam, 2010). Bulow and Boje (2015) agreed and asserted that collecting the discursive fragments is a practical skill that negotiators can and should acquire, enabling each party in negotiations the ability to foresee and account for the other, defuse objections, and establish the basis for finding common ground. Thus, communication is fundamentally at the core of managing competing and dominant stories which, in turn, facilitates both sensemaking and sensegiving at the level of the collectives.

2.5 Summary

This chapter reviewed, critiqued, and synthesized the sensemaking, sensegiving, and storytelling discussions in the context of crisis management and response. The relationship between these closely related streams of literature is illustrated in Figure 2.9.

In crisis when people struggle to provide objectively valid accounts of what is going on, they engage in sensemaking activities. Sensemaking is a social process by which members of an organization collectively seek and interpret information in order to give meaning to the complex and uncertain situation (Weick, 1995). However, organizational actors each have their own individual frames of reference and different actors may give different meanings to the same information. These different meanings may or may not converge during the sensemaking episodes, thereby, increasing the level of complexity and confusion in the situation. Thus, creating collectiveness is difficult as people are 'faced with challenges of establishing common frames of reference, resolving discrepancies in understanding, negotiating issues of individual and collective action, and coming to joint understanding' (Barron, 2000, pp. 403-404).

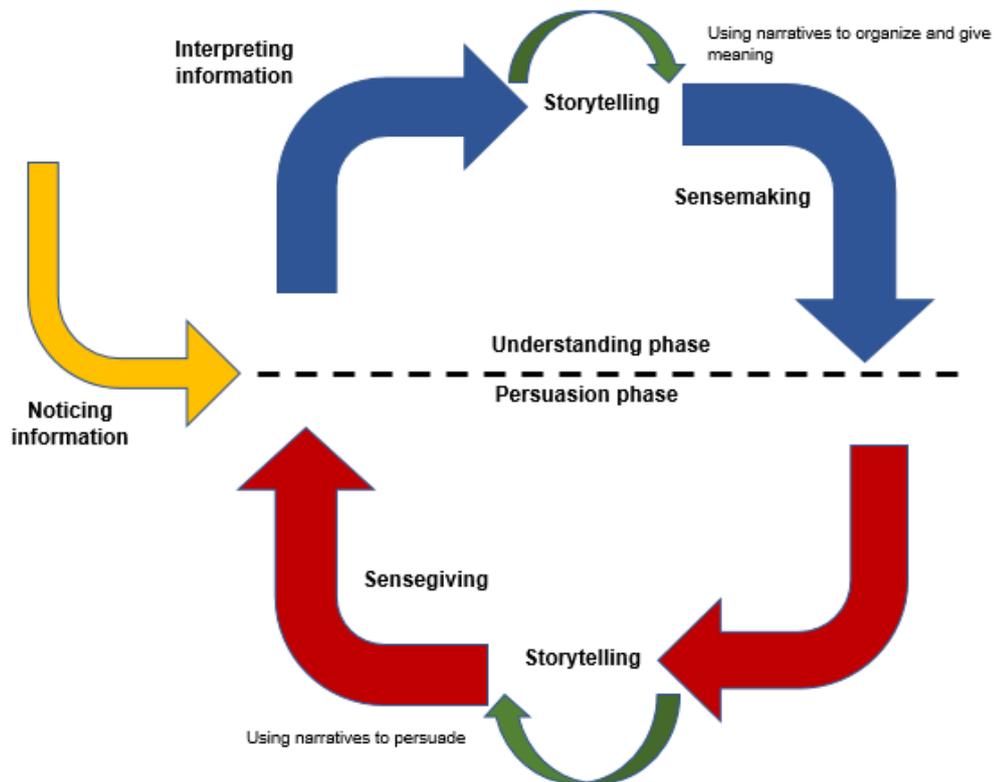


Figure 2.9: Representation of Literature Interplay (Adapted from Collins, 2013)

Alongside sensemaking is the process of sensegiving which is often deployed in order to ‘influence the sensemaking and meaning construction of others toward a preferred definition of organizational reality’ (Gioia and Chittipeddi, 1991, p. 442). As people make sense of the environment, they communicate the new understanding to the stakeholders via sensegiving. The stakeholders then present their arguments in an attempt to understand the new reality and additional rounds of sensemaking takes place (Weber et al., 2014). In short, people tell each other stories as a means of interpreting and infusing events (Weick, 1995) and at the same time, leads others to listen (Maitlis and Lawrence, 2007).

Stories act as both sensemaking and sensegiving devices to link cause and effect, both within and between different parts of the narrative (Gabriel, 2004). However, stories also face issues when told in the presence of others. Scholars have argued that competing narratives and dominant voices within ongoing narratives could restrict both sensemaking and sensegiving activities. To resolve this conflict, storytellers engage in collective bargaining (negotiation) through increased interaction in order to reach a common ground.

This interplay between sensemaking, sensegiving, and storytelling (see Figure 2.9 above) is critical in the context under study. In multi-agency crisis response operations, the creation of, for instance, a common picture of a situation can help to establish shared meaning to a certain workable extent. It is therefore essential to find practical ways of establishing shared meanings among groups so joint decision-making and action can ensue.

CHAPTER 3

METHODOLOGY

This qualitative research uses the crisis context to examine the information-sharing issues that commonly emerge during multi-agency response operations. This practical problem requires a practical solution. The aim of the current work, therefore, is to design a new solution that improves the sharing of information of the emergency response teams at inter- and intra-organizational levels. Since the current research is driven by a field problem with an intent to develop a well-tested practical solution, the Design Science Research (DSR) approach is adopted. The following sections outlines the overall research strategy and methods used in conducting this research.

3.1 Paradigm Selection: Interpretive Research Paradigm

Thomas Kuhn first used the word paradigm in 1962 to mean a philosophical way of thinking. A paradigm represents the worldview (Creswell, 2009). This worldview is the perspective, thinking, school of thought, or set of shared beliefs that informs the meaning or interpretation of research data (Kivunja and Kuyini, 2017). The set of shared beliefs are usually represented by the ontological and epistemological elements that guide the researcher's action in the chosen paradigm (Guba and Lincoln, 1994). Thus, to fully grasp the understandings of the chosen paradigm, the beliefs and assumptions (i.e., the ontological and epistemological positions) should first be made clear.

Crotty (1998) defined ontology as 'the study of being' (p. 10). Guba and Lincoln (1994) suggested that as a researcher, one needs to take a position regarding their perceptions of how things really are and how things really work by defining their ontological position. The ontological position taken in this research is of *relativist ontology* (Denzin and Lincoln, 2005). Relativist ontology assumes that the situation under study has multiple interpretations of experience that results in multiple realities—i.e., there are as many different realities as there are people (Levers, 2013). These multiple realities can be explored and meaning made of them or reconstructed through human interactions between the researcher and the subjects of the research, and among the research participants (Cohen et al., 2018).

Epistemology is a way of understanding and explaining - 'how we know what we know' (Crotty, 1998, p. 8). Guba and Lincoln (1994) explained that epistemology asks the question, what is the nature of the relationship between the would-be knower and what can be known? From an epistemological perspective, this research is undertaken using a *subjective* position. Subjectivism is the belief that knowledge is 'always filtered through the lenses of language, gender, social class, race and ethnicity (Denzin and Lincoln, 2005, p. 21). A fundamental assumption in subjective epistemology is that the researcher and the subjects are continually interacting, which aids the meaning-making process of data – both through a researcher's thinking and the cognitive processing of data informed by their interactions with participants.

Now that the ontological and epistemological positions of this research have been explicated, the discussion now turns to the paradigms options that were considered before the selection was made.

3.1.1 Functionalist vs. Interpretive Paradigms

From an organizational research standpoint, the two paradigms that are often contrasted for a suitable fit are the functionalist and interpretive paradigms (Burrell and Morgan, 1979). Social science researchers who subscribe to the functionalist paradigm believe that the world is relatively stable and organized (Putnam, 1982). These researchers seek to provide rational explanations for social affairs, which they believe are part of a concrete reality that can be discovered through systematic study. Because these researchers see the world as a relatively stable and organized place where human activities are orderly and cohesive, i.e., regulated, they search for regularities and conduct tests in order to predict and control.

The functionalist paradigm was not chosen for this study due to limitations identified by Gioia and Pitre (1990). These researchers argued that:

The assumptions of the functionalist paradigm becomes problematic when subjective views of social and organizational phenomena are adopted or when there is a concern with transformational change. Suddenly, the existence of social "facts" and the assumption of stability are called into doubt. The study of phenomena such as sensemaking, meaning construction, power, and conflict becomes very awkward to handle using any immutable objectivist framework. What is "out there" becomes very much related to interpretations made "in here" (internal to

both the organization members under study and the researchers conducting the study). (pp. 586–587)

Since crises represent unstable and unpredictable circumstances that are constantly changing, measures put in place to mitigate the threats cannot be based on social facts or assumptions that the world is a stable place. Furthermore, since this research is theoretically grounded in phenomena such as sensemaking and sensegiving and empirically informed by the subjective views of the informants and the researcher, an objectivist framework is not the most suitable paradigm for this study.

The interpretative paradigm (Schütz, 1963) —also known as the social constructivist paradigm—on the other hand, possesses specific characteristics that seemed in harmony with this study. These include:

1. The belief that there are multiple realities that people socially and symbolically construct (Gioia and Pitre, 1990);
2. The acceptance that there is inevitable interaction between the researcher and his or her research participants (Lincoln and Guba, 1985); and
3. The assumption that context is vital for knowledge and knowing (Morgan, 2007). Although the interpretative researcher still sees the world as regulated or stable, they have a subjective view of that social reality as opposed to objective.

Guba and Lincoln (1989) posited that interpretive researchers strive to understand the subjective world of human experience. Although interpretative researchers still perceive social reality as regulated, they want to understand human activity at the level of the subjective experience of each person rather than an overall objective reality. They want to view things and make sense of the social world in terms of the individual realm of consciousness. In this view, reality is not objective and merely waiting to be discovered; rather it is created by our subjective perceptions that are collectively shared.

The current research followed the interpretive research process as explicated by Mantere and Ketokivi (2013):

The process of interpretive research can be described as "reflexive narrative," where researchers seek—through a dialogue between their own preunderstanding and the empirical data—a new understanding of theory through

an evolution of their own understanding. Interpretive researchers' encounters with data involve, on the one hand, interpreting data in light of theory and, on the other hand, remaining open to being challenged by the data by continually calling into question their preunderstanding (p. 82).

As an explanation, following the factory fire incident in Pakistan, the curiosity about why emergency services (e.g., law enforcement, fire and rescue services, and emergency medical teams) often fail to coordinate and act together led the researcher to develop some preunderstandings. With several years of working experience in the crisis management domain, the researcher presupposed some contributing factors that could lead crisis response organizations toward coordination issues. These included: unpreparedness of the crisis response teams to handle the situation on hand, information-sharing issues, technical or mechanical inadequacies of the responding organizations, and varying organizational cultures and backgrounds of the team members.

With these preunderstandings, the research journey commenced, and the first interaction with the scholarly world was made. Given the context in which the current research is located, the literature on crisis management was explored. Here the classic and contemporary crisis management studies were reviewed, analysed, and synthesized to provide reasonable explanation to the several propositions that the researcher had made from the onset of this study. Also, during this step, salient phenomenon such as sensemaking, sensegiving, and storytelling were identified and included in the literature review section.

Later, during and after the data collection process, the empirical findings were repeatedly examined considering the preunderstandings. Furthermore, a constant interaction of the empirical data with the theoretical understandings was ensured, appearing as a natural inductive-deductive loop. The going around in an inductive-deductive loop between the data, analysis, and literature helped in categorizing the plausible presuppositions from the implausible ones.

3.2 Research Strategy: Modes of Reasoning

There are three basic modes of reasoning in research: deduction, induction, and abduction (Mantere and Ketokivi, 2013). In deductive reasoning, a known rule is searched in the data to obtain knowledge about the particular case. On the other hand, in inductive reasoning, conclusions are drawn from

the data by making a generalization and then inferring an explanation from it. Abduction refers to informed guessing where conclusions are drawn from the data by making a generalization and then inferring an explanation from it. Using the simple relationship between *rule*, *cause*, and *effect*, the following outline (adopted from Peirce, 1878) helps to make the distinction between the three modes of reasoning.

Rule: If flu, then fever

Cause: Flu

Effect: Fever

Deduction: Given the rule and the cause, the effect is deduced.

E.g., If patient has flu, then it can be deduced that A has fever.

Induction: Given a cause and an effect, a rule is induced.

E.g., If every time patient has a fever when suffering from a rule, a rule can be induced that if flu, then fever.

Abduction: Given a rule and an effect, the cause can be abducted.

E.g., Given the rule, if a patient has fever, it can be supposed that it is because of flu.

Given the distinction between the three research strategies and the aims of this research, i.e., to drive a tentative conclusion about the possible cause(s) that often leaves crisis response agencies struggling to manage and share information, the research strategy most apt for the current research is that of *abduction*.

3.2.1 Abductive Reasoning

Abduction represents a form of logical inference where the aim is to arrive at the best available explanation of a surprise or problem (Peirce, 1878). The selection of 'best' explanation does not refer to any objectively best explanation (Martela, 2015); rather it implies the best subjective explanation from the viewpoint of the researcher. Mantere and Ketokivi (2013) described the selection of best explanation as a process that is fundamentally cognitive, not computational. They cited several interpretative scholars to confirm that 'cognitive reasoning is a legitimate methodology which depicts understanding

as continuous dialogue between the data (usually text) and the interpreter's preunderstanding' (p. 81). Thus, abduction as a research strategy allows the researchers to obtain the environmental data and interpret it to arrive at new ideas. These new ideas explain or better explain something that was previously unexplained or unclear (Reichertz, 2019) – which, in essence, is the main goal of this study.

Although abduction helps to justify an unexpected experience or a problem, the outcome of abduction reasoning is more than that. Characterized as a creative process, Peirce (1878) asserted that abduction is the only logical operation that introduces a new idea. The logical operation begins with one's observation of the surprise. To explain or interpret the surprising facts, the abduction process uses existing knowledge and seeks to find a theory that can facilitate the understanding of the surprises (Ketokivi and Mantere, 2010; Martela, 2015). This iterative process is what Peirce (1878) refers to as the interplay of doubt and belief, which, in turn, fuels the imaginative act of creating new knowledge in such a meaningful way that unexpected experiences do not appear surprising anymore.

Thus, the result of abduction is new knowledge, a new idea, or a new solution (Dubois and Gadde, 2002). However, to operationalize abductive reasoning, i.e., to arrive at a specific solution, certain procedures or techniques are required. Since abductive reasoning is about the conception of new artefacts to explain intended outcomes, it is purely a practical form of reasoning where new ideas are discovered along the way. Therefore, to operationalize abductive reasoning, a practical approach is needed. One such practical approach is *design science research*.

3.3 Research Approach: Design Science Research

Management research is criticized as being purely descriptive in nature. According to van Aken (2004), much work is done to describe and analyse management problems with little focus on offering practical solutions to practical problems. This underperformance, van Aken (2004) argued, has resulted in the problematic situation where management research is either scientifically sound but irrelevant for practice, or practically robust but lacking scientific verification. Management scholars and researchers, therefore, have repeatedly called for a prescriptive way of conducting research to correct the

imbalance caused by most descriptive management research methodologies. One research methodology that acts as a bridge between descriptive and prescriptive research is design science research (hereafter DSR).

DSR aims to construct a new reality by solving practical problems (Hevner and Chatterjee, 2010) rather than explaining an existing reality or helping to make sense of it (Iivari, 2007). At the core of DSR is the concept of 'learning through the systematic building and creation of knowledge, in which the research outcomes should deliver new, innovative, true, and interesting knowledge, designs, or artefacts within the respective community of interest' (Elragal and Haddara, 2019, p. 3). According to March and Smith (1995), artefacts are constructs, models, methods, and instantiations that aim to solve field problem thereby improving human conditions.

3.3.1 DSR Suitability for the Current Study

van Aken (2004) documents two key features of DSR that led to the selection of this research approach for the current study. Firstly, DSR is potentially beneficial in reducing the gap between theory and practice. This gap reduction takes place because DSR not only aims to solve practical problems, but also in doing so, produces new knowledge that can serve as a reference for the improvement of existing or emerging theories. Secondly, the recommendation(s) made in DSR are oriented to obtaining satisfactory, not necessarily optimal, solutions for the problem at hand. Therefore, the focus is on plausibility, rather than perfection.

Both these DSR characteristics are congruent with the goals of the current research. Although designed for the practical world, the pursuit in this study is not only to enhance the practical knowledge of the crisis responders, but at the same time, to inform the theory about these field solutions. This attempt subsequently addresses the identified shortfalls in the sensemaking and other related literatures and offers new insights for academics and researchers to build new and enhanced theories for improved crisis operations.

Given the dynamic nature of a crisis, it is unreasonable to assume a 'one size fits all' solution to all information-related problems in response operations. At the same time, it is not viable to assume that complicated information-processing problems such as the presence of equivocality can be resolved instantly and completely with one intervention. The choice of the DSR

methodology allows for this flexibility where a solution is not expected to change the world of the practitioners but facilitates incremental changes that, if needed, can be refined. Now that the suitability of DSR approach for this research has been explicated, the following sections will now reflect on the procedural elements of DSR in greater detail.

3.3.2 Design Propositions

The logic of applying the solution concept is the design proposition (also called technological rule). According to van Aken and Romme (2012), the design proposition 'puts the solution concept into its application context... It runs like: if you want to achieve a given outcome for this generic problem-in-context, then use this generic intervention' (p. 4). Denyer et al. (2008) view design proposition or design logic as offering 'a general template for the creation of solutions for a particular class of field problems' (p. 395). They claim that design proposition is not as a complete solution for any given business problem, but an input to the designing of the specific solution.

To help in the development of more rigorous design propositions Denyer et al. (2008) provided a practical framework, called CIMO-logic, formulated with the goal of informing practice about how interventions (I) work in different contexts (C), and increasing understanding of the generative mechanism (M) through which certain outcomes (O) emerge (Tanskanen et al., 2017). According to Costa et al. (2018), 'design principles that are formulated according to CIMO-logic indicate what to do, in which situations, to produce what effect, and offer understanding of why this happens' (p. 3).

Heeding Denyer et al. (2008), the current research adopted the CIMO-logic for the solution concept design. Simply put, given the problems of information sharing in crisis context (C), the intervention (I) (discussed in Chapter 6), invoke generative mechanisms (M) of sensemaking and storytelling to deliver improved crisis response within and among groups (O).

3.3.3 Practical Guidelines for Conducting DSR

Hevner et al. (2004) provided seven practical guidelines to follow when conducting DSR. These guidelines include:

1. The research must produce a purposeful artefact in the form of a construct, a model, or method, or an instantiation aimed at addressing the problem;
2. The artefact should be relevant to the unsolved practical problem;
3. The utility and efficacy of the artefact must be thoroughly evaluated;
4. The 'novelty' of the artefact and its verifiable contribution must be determined;
5. Existing theories and knowledge should be considered to support the design and development of the artefact;
6. The designed artefact should be evaluated for optimal result, and the previous steps may be repeated, as needed; and
7. The solution, in the form of the artefact, must be effectively communicated to the intended audience.

The current research follows these seven guidelines. A summary of non-linear steps taken to design the artefact that addresses the identified practical problem is illustrated in Figure 3.1 followed by discussion on each DSR process taken in this study.

3.3.4 Synthesis Between Theory and Data

DSR, in essence, is a synthesis between theory and the empirical data into a solution (Alturki et al., 2011). As the DSR process commences, the preliminary data in form of selected theories or body of knowledge allows the identification of the practical problem in the environment by revealing some sort of abnormality. Later in the process, the collection of empirical data facilitates the designing of a well-rounded artefact that is not purely based on theories and experiences (knowledge base) but derived from the relevant field using available viewpoints and data sources. Thus, in addition to accessing the existing knowledge base, gathering relevant empirical data is fundamental in designing the new and innovative artefacts.

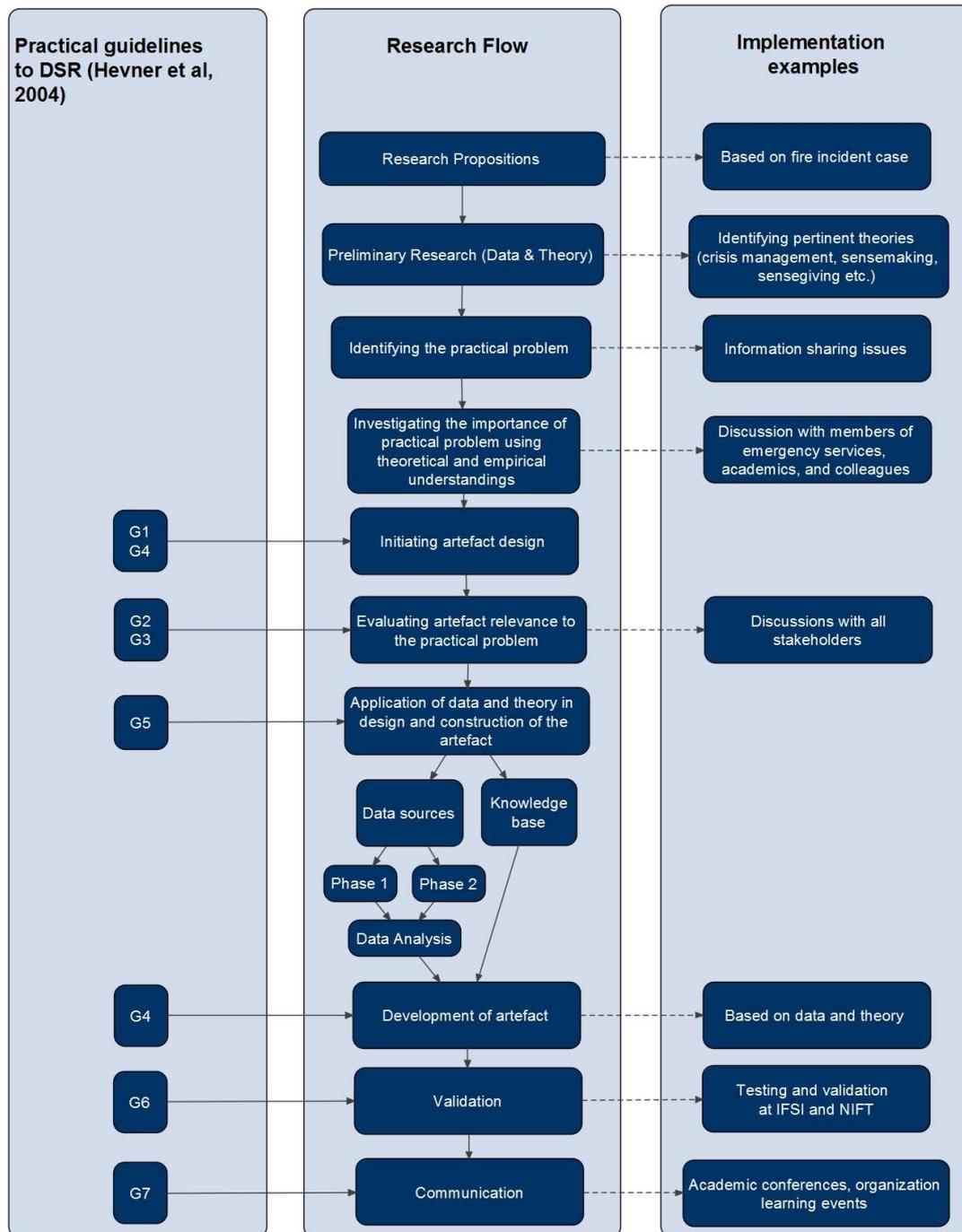


Figure 3.1: Summary of Research Flow

3.3.4.1 Use of Existing Knowledge Base

Walls et al. (1992) contend that existing ‘kernel theories’ – theories from natural and social sciences – provides the basis for the design process of the artefact. According to Fischer et al. (2010), kernel theories are usually characterized as the ‘fundamental theories being used throughout the process of design construction’ (p. 388). These are theories that are drawn from the

literature and are used to support the proposition of the artefact, its design, and its evaluation. In other words, a kernel theory is a type of justificatory knowledge, or knowledge that informs design research, including informal knowledge from the field and the experience of the practitioners (Gregor and Hevner, 2013).

In this research, the existing knowledge base or justificatory knowledge that guided the artefact design process included the sensemaking, sensegiving, and storytelling theories. A review of these distinct, yet related constructs provided key insights into the issues faced by emergency response teams in crisis settings. For example, it became clear on how in crisis situations, one's sensemaking abilities influenced the processing of information, what happens when information is shared with others through sensegiving and storytelling techniques and what information-sharing challenges can erupt in doing so. Additionally, in the later stages of the design process, the knowledge gained from these theories was instrumental in explaining why the final designed artefact works or does not work.

3.3.4.2 Search for Empirical Data

With foundational theoretical knowledge gained from the pertinent literatures regarding the problem on hand, the next step in the DSR process was to search and obtain relevant empirical data to (a) find practical evidence of the problem being addressed and (b) help in designing and developing the proposed solution. Thus, the forthcoming sections depicts the data collection and analysis journey.

3.4 Data Collection

The data collection for this research took place in two phases. The first (Exploratory) phase involved gathering data about the factory fire incident at Ali Enterprises in Pakistan. In this phase, several actors related to the factory fire incident were interviewed. Additionally, archival records, such as, investigation reports, media records, and other documents pertaining to the fire incident were retrieved and analysed.

The second (Main) phase of data collection took place in the United States at a firefighters training academy located in the state of Illinois. This phase primarily consisted of interviews with the fire officers and instructors of

the academy, field observations, and participation of the researcher in multiple live-fire training evolutions to examine possible information-sharing issues during crisis response. During the main phase, the data collected onsite by the researcher was supplemented by data from the National Institute for Occupational Safety and Health (NIOSH) database, which consists of several hundred line-duty fatality and injury reports of U.S. firefighters. This supplemental step not only added to the richness of data, but also served to validate the findings emerging from the main phase data.

3.4.1 Data Sources and Protocols

Yin (2009) articulated six principal sources of data collection in qualitative research. These include: documents, archival records, interviews, direct observations, participant-observation, and physical artefacts. For this research, these data sources are further divided in two categories: primary data source and secondary data source. Primary data is considered that which is as close as possible to understanding the lived experiences of others regarding an event (Yin, 2009). Therefore, data sources such as interviews, direct observations, and participant-observation are viewed as primary. On the other hand, secondary data is assumed to represent someone's analysis or commentary of an event which they did not personally experienced. Therefore, documents and archival records are considered as secondary.

As part of primary data collection, this study conducted interviews by adopting the storytelling technique of 'conversational interviewing' (Boje and Rosile, 2019). According to Boje and Rosile (2019) conversational interviews differ from semi-structured interviews in that in conversational interviewing, both parties are sharing stories, challenging stories, and co-creating stories. This, in Boje and Rosile's (2019) opinion, contrasts with semi-structured interviewing, which is purely interrogative and lacks dialectical flow. During the use of conversational interviewing in both the exploratory and main phase, the researcher noticed that this technique allowed the informants to offer their subjective reasonings and preferences that helped in uncovering field problems that were otherwise not considered salient by the researcher.

Supplemental primary data came from direct and participant observations. Collected primarily at the fire academy in Illinois, direct observations were collected from several classroom training and discussion

sessions, casual conversations with experienced and novice fire commanders, and group meetings. For participant observations, the researcher assumed the role of a fire fighter and actively participated in eight live-fire training evolutions through the course of one week of practical training. This allowed the researcher to gain first-hand understanding of a variety of information-sharing challenges that first responders experience when dealing with emergencies.

The secondary data collected for this research included documents and archival records. This data collection source was used throughout the research process and in conjunction with other sources. For example, in the exploratory phase, relevant and unbiased reports, documents, and records were used to examine the factory fire incident. Similarly, for the main phase data collection, comprehensive search of work-related firefighter deaths in the United States—either due to natural causes or situational factors (collapse, fire etc.) took place by accessing the National Institute for Occupational Safety and Health (NIOSH) database.

In addition to these principal data sources, the researcher's several years of professional training and experiential learning in responding to and managing organizational crises provided copious data to fully understand the design and functionality of the artefact. The collection of these primary and secondary data sources represents a rigorous and practical approach in conducting this research which aligns closely with the principles of DSR.

3.4.2 Exploratory Phase: Data from Ali Enterprises, Pakistan

The journey to investigate the reason(s) behind coordination breakdowns among emergency response organizations commenced with the tragic fire incident that took place at Ali Enterprises in 2012. With deep personal and professional ties to some of those who lost their lives in this tragedy, the researcher was determined to examine the case in detail. After several months of analysing the fire incident, the researcher identified several information-sharing issues among the emergency response teams. This essentially marks the beginning of the idea to design a solution that addresses information-sharing issues in crisis situations such as this one.

Following the steps outlined in Figure 3.1, preliminary data on the factory fire case were obtained by accessing the federal investigation agency (FIA) and Joint Investigation Team (JIT) reports. The FIA and JIT reports helped in

understanding the background of the case and highlighted the deficiencies in the response operation as noted by the independent investigators. The reports also helped in identifying some key data sources that the current research subsequently used to gain critical information on the factory fire incident.

To ensure the utility, efficacy, and reliability of the proposed artefact in improving the crisis response operations, the researcher commenced the exploratory phase of data collection in 2018 and 2019, which took place in the city of Karachi, Pakistan and examined the factory fire incident at Ali Enterprises. During this phase, two data sources were accessed: primary data were obtained from interviews with several actors connected to the factory fire incident, and secondary data came from archival records. Table 3.1 summarizes the exploratory phase data collection followed by brief explanation of the protocols followed in each data source.

Table 3.1: Exploratory Phase Data Collection Summary

Sources	Data Type	Data Size	Notes
Interviews	First Responders	7	<i>Shown in Findings as : PAK-FR-Name Initials</i>
	Incident Survivors	6	<i>Shown in Findings as : PAK-INF-Name Initials</i>
	Family of Incident Victims	5	<i>Shown in Findings as : PAK-VIC-Name Initials</i>
	Journalists	3	<i>Shown in Findings as : PAK-JOU-Name Initials</i>
	Total interviews	21	
Reports	Pakistan Institute of Labour Education and Research (PILER)	120	pages of incident notes and transcripts
	Social Accountability Accreditation Services - Pakistan (SAAS)	50	pages of incident notes and transcripts
	Clean Clothing Campaign (CCC)	20	pages of incident report and transcripts
	Forensic Architecture	10	pages of forensic reports
	Federal Investigation Agency (FIA)	33	pages of investigation report
	Joint Investigation Team	9	pages of investigation report
Total pages	242		
Media	Forensic Architecture Video	17.53	minutes
	GEO TV Footage	7.02	minutes
	CCTV Camera Footage	12.00	minutes
	Samaa TV Footage	3.47	minutes
	Total minutes	40.02	minutes
Grand Total	21 interviews 242 pages and 40.02 minutes		

3.4.2.1 Primary Data: Interviews

Interview subjects. The research informants were mostly identified with the help of Pakistan Institute of Labour Education and Research (PILER), a non-profit, non-governmental organization (NGO) dedicated to promoting a democratic and effective labour movement for the overall advancement of a socially just and equitable society. Additional contact with the emergency responders, survivors, and the relatives of the factory fire victims was made possible with the help of a media journalist who had closely followed this story since 2012. Between PILER and the independent journalist, a total of 46 people were approached; however, only 21 agreed to be interviewed (many of whom

wished to remain anonymous) due to the sensitivity of the case in local and international political domains.

In this first round of data collection, which occurred in April 2018 and then between February and March 2019, a total of 21 one-on-one interviews involving multiple actors were carried out. These actors included the emergency responders (members of the fire and rescue services and law enforcement), survivors of the factory fire incident, and families of the fire victims.

Interview protocol. The interviews were conducted primarily in English, except for three interviews, which were in Urdu (the official language in Pakistan) and later translated into English with the help of an independent and qualified translator. Each interview lasted 20–60 minutes, with the majority being 30 minutes long. Prior to each interview, the informants were provided with a short description of the research (see Appendix A) in their language of choice (i.e., either English or Urdu) with the aims and goals of the interview clearly defined. This process benefitted both the researcher and the informant. Given the sensitivity of the case, providing the scope of the interview helped the researcher to gain the comfort and confidence of the informants. It was observed that the informants came to the interview well-prepared and did not show signs of anxiety or fear, nor did they appear to be holding back any pertinent information.

At the time of the interviews, each informant was provided with a consent form (see Appendix B) that once again spelled out the objectives of these conversations and gave informants the peace of mind that any information that they share will be held strictly confidential and will not be solicited. The informants were also notified in advance that the interviews will be recorded, and their approval was sought. During the interviews, the researcher's focus was to allow the informants to speak uninterruptedly and to only interfere if and when the informants either did not understand the question properly or were distracted.

At the end of each interview, the informants were given the option to amend any part of their responses or to provide any specific instructions to the researcher on how to interpret those responses. This additional step was developed to help mitigate any confusion or misunderstanding that may be

caused by a language barrier. For nearly all the interviews conducted in Pakistan, none of the informants had any special instructions for the researcher.

Immediately after each interview, the researcher made contact notes to record any noticeable feature(s) of the interview that otherwise could not have been observed from recordings or in transcriptions. For example, when interviewing the families of the fire victims in Pakistan, a lot of anger and frustration against the relief agencies and the government officials was found among the informants. Although outside the scope of the current study, journaling these negative emotions was nevertheless useful in gaining deeper understanding of their interplay in the theoretical constructs used in the study.

After completing every interview, the transcribing process was carried out. Each interview was personally transcribed by the researcher to limit the possibility of errors or biases being introduced by an outside transcriber. This allowed the researcher to (a) immerse himself deeply and directly in the data, and (b) analyse the interview protocols and improve them before conducting the next interview. This consequently resulted in a robust interview protocol through self-correction (Boje and Rosile, 2019) that the researcher kept track of and is presented in Appendix C.

3.4.2.2 Secondary Data: Archival Records

To gain access to the archival records relating to the factory fire, several sources were utilized. First were the media records. Access to these records was made possible with a help of a few media specialists and journalists who had covered the factory fire incident at the time. These media professionals assisted in accessing media files held in the database of some of the most credible news outlets. The records retrieved because of this arrangement included media reports, closed-circuit television (CCTV) footage of the fire as it spread across the building floors, and a forensic report that included an architectural analysis developed with the help of local and international forensic experts. Additional archival data that included witness reports, investigation reports, and other significant information were retrieved from the database maintained by the National Trade Union Federation, Pakistan (hereafter NTUF), a national organization that fights to protect the rights of Pakistan's workforce.

3.4.3 Main Phase: Data from Illinois Fire Service Institute, USA

The second and main phase of the data collection took place at the Illinois Fire Service Institute (hereafter IFSI) in Champaign, Illinois. As the statutory fire academy for Illinois, IFSI serves firefighters throughout the U.S. and beyond. Instructors deliver more than 14,000 class hours annually to students online, on campus, and at regional training centres throughout the state. Spread across 28 acres of real-life training props, the IFSI-Champaign campus is one of the few locations in the U.S. that still uses live-fire structural burn training.

Affiliated with the University of Illinois, the IFSI-Champaign campus houses the Learning Resource and Research Centre where research projects are carried out. These scientists conduct applied research that addresses real-world health and safety challenges facing first responders. The Learning Resource and Research Centre hosts the Incident Command Training – a department dedicated to training command tactics to the fire officers. Among several dozen programs hosted by the IFSI for fire officer training, the Fireground Company Officer School program – operated under the Incident Command Training is perhaps the best in its league.

The Fireground Company Officer School program is designed to help fireground officers gain the knowledge and practical skills required to effectively lead and manage a fire company during emergencies. The program is composed of classroom discussions on leadership, responsibilities, and tactics coupled with several days of demonstrations and hands-on practice of directing live-fire evolutions for training. The researcher joined the program in the spring of 2019 to conduct the main phase of data collection. Three primary data sources were accessed—conversational interviews with several fireground company officers (hereafter FCOs) attending the program from different fire departments across the region, direct observations of in-class trainings, and participant observations from the researcher's active involvement in eight live-fire training evolutions as a fireground officer (see Appendix D-K). The live-fire evolutions are effective fireground activities in which unconfined open flame or device is used to propagate fire to the building, structure, or other combustible materials. Although not a part of regular firefighting training, live-fire evolutions are effective in creating real-life scenarios to enhance firefighters' preparedness

and readiness to deal with unexpected challenges. As secondary source of data, National Institute for Occupational Safety and Health (hereafter NIOSH) database that maintains over 650 records of firefighter line-of-duty deaths, was accessed. Table 3.2 summarizes the main phase data collection followed by detailed explanation on each data source.

Table 3.2: Main Phase Data Collection Summary

Source	Data Type	Data Size	Notes
Primary	Interviews:		
	<i>Fire Chiefs</i>	4	<i>Shown in Findings as : IFSI-FC-Name Initials</i>
	<i>Battalion Chiefs</i>	3	<i>Shown in Findings as : IFSI-BC-Name Initials</i>
	<i>Fireground Officers</i>	5	<i>Shown in Findings as : IFSI-FF-Name Initials</i>
	<i>Program Instructors</i>	3	<i>Shown in Findings as : IFSI-PI-Name Initials</i>
	<i>Informal Conversations</i>	25	<i>Shown in Findings as : IFSI-IC-Name Initials</i>
	Total Interviews and Conversations:	40	
Primary	Direct Observations:		
	<i>Class participation and field notes</i>	1850	minutes of classroom discussions and 180 pages of fieldnotes
	Participant-Observation:		
	<i>Evolution 1</i>	85	minutes of evolution and debrief session
	<i>Evolution 2</i>	78	minutes of evolution and debrief session
	<i>Evolution 3</i>	68	minutes of evolution and debrief session
	<i>Evolution 4</i>	125	minutes of evolution and debrief session
	<i>Evolution 5</i>	96	minutes of evolution and debrief session
	<i>Evolution 6</i>	57	minutes of evolution and debrief session
	<i>Evolution 7</i>	75	minutes of evolution and debrief session
	<i>Evolution 8</i>	89	minutes of evolution and debrief session
	Total Minutes:	2523	
Secondary	Archival Records:		
	<i>NIOSH Database - 48 reports</i>	150	pages of firefighter fatality reports
	Total Pages:	150	
	Grand Total	40 interviews, 2523 minutes of audio recordings, and 150 pages of reports	

3.4.3.1 Primary Data: Conversational Interviews

The first source of data included conversational interviews with several FCOs. Interviewees included current and former fire chiefs, battalion chiefs, and firefighters belonging to several fire stations thus representing different hierarchical levels, geographies, and tenure. In addition to these FCOs, several program instructors and course coordinators working at the IFSI were engaged in discussions to record their viewpoints on information-sharing aspects in crisis response operations.

In total, 15 formal and one-on-one interviews were conducted at IFSI. Each interview followed the same protocols that were developed and exercised during the exploratory phase data collection in Pakistan and lasted about 20-30 minutes each. Additionally, 25 informal conversations (each lasting between 5 to 15 minutes) took place between the researcher and other officers and program instructors who were not part of the formal interviews. These informal

conversations were also recorded, analysed, and transcribed by the researcher.

3.4.2.2 Primary Data: Direct and Participant Observations

The second data source consists of several hours of direct observations of classroom training. The in-class training used several teaching methods to explore the fundamentals of effective incident command. These methods included lectures, training manuals, interactive discussions, presentations, and real-life scenarios to gain deeper understanding of the issues that can erupt while acting as an incident commander.

For direct observation that took place during classroom sessions, detailed field notes were maintained. These field notes recorded conversations, level of involvement of each student, the language used during role-playing, and most importantly, the protocols these students used to share information with one another during in-class fire communication drill and issues that emerged as a result. Altogether, the researchers spent close to 30 hours directly observing the fire officers in this setting and recorded over 180 pages of field research notes. To test the validity of the observations and to address any unintended bias, the researcher consistently shared his field notes with the program instructors' team and incorporated their feedback.

The third data source at IFSI comprised participant observations from active participation of the researcher in eight live-fire training evolutions. These live-fire training evolutions were designed to provide the course participants with practical, hands-on training by stimulating life-like emergencies and scenarios. Participating in various live-fire training simulations helped the researcher to gain valuable insight into the routine of the fire fighters and the information-sharing challenges that they face under extreme circumstances.

For the live-fire training evolutions, where the researcher played an active firefighter role, a voice recorder was turned on at the commencement of each evolution to effectively record field notes. After each evolution, the audio recording, including each post-evolution debrief conducted between the instructor and the evolution participants, were manually transcribed and relevant data were marked to be considered during the coding process. The transcription pertaining to each evolution was later reviewed with the program instructors for accuracy and to assess their understandings and feedback. This

process allowed the researcher to improve the quality of data and to identify data elements that could be considered critical.

3.4.3.3 Secondary Data: NIOSH Database Records

To supplement the primary data collected from IFSI, the NIOSH database was utilized. This database was established by the United States Congress in 1998 to address the problem of work-related firefighter deaths either due to natural causes or situational factors (collapse, communication failures, unexpected fire behaviours etc.) For the current study, the researcher retrieved data on the line-of-duty injuries and deaths only, and not natural deaths.

A total of 48 reports (approximately 150 pages) related to firefighters' fatalities and injuries were retrieved using the NIOSH database. These reports provided useful data for developing comprehensive understanding of the issues related to information sharing from a broad range of investigations performed in this subject. Each report was read several times, and major contributing factors that led to either the death or injury of the firefighters were identified. The contributing factors were then categorized in separate codes and sub-codes that represented the various problems the firefighters face during crisis response. Using the content data analysis technique (discussed in the next section), a coding table was prepared, and commonly occurring issues were underlined.

3.5 Data Analysis

The method of analysis that was used on both the exploratory and main phase data is *content analysis* (Holsti, 1969). Content analysis is 'a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use' (Krippendorff, 2004, p. 18). Used either qualitatively or quantitatively, the goal in content analysis is to deliberately move from the original text to analysis of the information extracted from it, focusing on the meanings of texts and their constituent parts (Gläser and Laudel, 2013). Thus, content analysis is concerned not just with words but also on the concepts and ideas that are being communicated (Newby, 2014).

According to Cohen et al. (2018), content analysis follows some primary processes including (1) examining the data, (2) data coding, (3) calculating the

frequencies of the codes, and (4) making speculative inferences. Heeding Cohen et al. (2018), the data analysis process in this research commenced by examining the data in a reading and rereading process to build familiarity. This step was also in accord with Creswell's (2009) recommendation and enabled the researcher to get a sense of the text as a whole and helped in start formulating an idea of what the main points are. Table 3.3 provides an illustration of the content analysis conducted on the NIOSH reports retrieved during the main phase data collection.

The next step was *coding* the data, which represents the process of giving a name or label to a piece of text containing an idea or a piece of information (Gläser and Laudel, 2013). First *open coding*, which is the analytic process through which concepts are identified (Strauss and Corbin, 1990), was performed. Here the empirical data was broadly grouped into first-order concepts represented by statements that imply some meanings of the data.

The next step in the coding process involved *axial* coding. Axial coding is that 'set of procedures which the researcher follows whereby the data that were originally segmented into small units or fractions of a whole text through open coding are recombined in new ways' (Strauss and Corbin, 1990, p. 96). By performing this step, first-order constructs were connected to a larger category of common meaning that is shared by the group of constructs or codes. That is, constructs or codes that are related to each other through their content or context were combined in theoretical categories. This step essentially marked the firm involvement in the 'theoretical realm, asking whether the emerging themes suggest concepts that might help us describe and explain the phenomena we are observing (Gioia et al., 2012, p. 20). The result of this step was a list of 'more abstract', 'larger-narrative' theoretical themes.

For the final step in the coding process, selective coding was performed. Selective coding is the ‘process of identifying the core category in a text, i.e., that central category or phenomenon around which all the other categories identified and created are integrated’ (Strauss and Corbin, 1990, p. 116). Thus, in this step, similar theoretical categories were gathered into several overarching dimension – the aggregate dimension – which represents the major themes or main understandings that emerged during data analysis. (Corley and Gioia, 2004). The tables below illustrate the coding structure used to arrange the aggregate dimensions of sensemaking (Table 3.4), sensegiving (Table 3.5), storytelling (Table 3.6), and information management (Table 3.7) along with the data quotes that were used to reach these aggregate themes.

The key to reading these four tables is:

NIOSH	<i>Firefighter fatality reports retrieved from NIOSH database</i>
Factory Fire	<i>Interviews + archival records obtained from the Ali Enterprises fire incident</i>
IFSI (1)	<i>Interviews + conversations conducted at Illinois Fire Service Institute (IFSI)</i>
IFSI (2)	<i>Evolutions + field notes obtained at Illinois Fire Service Institute (IFSI)</i>
HS	<i>Evidence of highly significant data (appeared in 10+ data sources)</i>
MS	<i>Evidence of moderately significant data (appeared in 7-9 data sources)</i>
LS	<i>Evidence of less significant data (appeared in 4-6 data sources)</i>
NS	<i>Evidence of non-significant data (appeared in 1-3 data sources)</i>

Table 3.4: Coding Structure Representation of Sensemaking Dimension

Data Evidence				Data-Driven Codes	
NIOSH	Factory Fire	IFSI (1)	IFSI (2)	First-Order Concepts	Theoretical Categories
HS	LS	HS	HS	Statements that indicate the creation of meaning from conversations and relationships.	Social context
Example: <i>The more we talk on the fireground, the more we know about our enemy. There is no such thing as information overload for a firefighter. (IFSI-FF-SS)</i>					
HS	MS	HS	HS	Statements that represent common and shared understandings	Identity
Example: <i>We knew...all of us knew from the beginning that the fire was too big. We knew that more resources will be needed than just one or two fire trucks. (PAK-INF-ST)</i>					
MS	MS	HS	HS	Statements that represent the perception of roles and responsibilities in the group	Ongoing
Example: <i>My number one responsibility is the safety of my men. They put their lives in my hand when they respond to my call. (IFSI-BC-MG)</i>					
HS	HS	MS	HS	Statements that urge group members to respond and act with continuous changing reality	Retrospect
Example: <i>Within minutes, the fire changed its course from the first floor to the second and then through the shaft to the third. We tried to keep up and run the hose. (PAK-FR-AJ)</i>					
HS	HS	HS	HS	Statements that represent how member of the group interpreted what has occurred	Salient cues
Example: <i>We had never seen anything like this before. The fire was overwhelming. (PAK-FR-MF)</i>					
HS	LS	HS	MS	Statements that represent members' abilities (or inabilities) to take cues and expand them into explanations	Plausibility
Example: <i>If you find a mother in the room, look for the baby because you know what, a lot of times the mother and the baby are together. (IFSI-EVOL-03)</i>					
HS	HS	HS	HS	The credible sense that the group makes of salient cues and ongoing events within the social context	Enactment
Example: <i>The other guys did a poor primary search. I can say this because they stayed quite on the radio. I could just tell that I need to order a secondary search right away. (IFSI-EVOL-07)</i>					
HS	HS	MS	HS	Statements that indicate action	Sensemaking gaps
Example: <i>The moment I saw the inferno, I called for backup. There was no way we could have handled that fire with half water tender. (PAK-FR-SR)</i>					
HS	LS	HS	HS	Statements that indicate learning to inform further action	Perception of issue
Example: <i>Did you see how Kevin had that blank look on his face? Keep it simple guys. Don't come up with words that only you know. We have to know what you are saying. (IFSI-PI-LL)</i>					
HS	MS	HS	HS	Statements that represent difficulty, or incompetency to perceive important issues	Perception of issue
Example: <i>When I saw dozens of factory workers trapped on the second floor, I was shocked. Unit 1 did not tell us what to expect so we could something different. (PAK-FR-JA)</i>					
HS	HS	MS	HS	Statements that indicate perception-actuality gap(s)	Perception of issue
Example: <i>No one in my department had a clue how big this fire was. I mean...looking at people jumping off the windows told us the real story. It was like a movie. (PAK-FF-ANO)</i>					
HS	LS	HS	MS	Statements that promote or block construction of shared and coherent accounts of a situation	Perception of issue
Example: <i>I mean...looking at people jumping off the windows told us the real story. It was like a movie. It was very emotional and we didn't know what to do. (PAK-FF-ANO)</i>					

Table 3.5: Coding Structure Representation of Sensegiving Dimension

Data Evidence				Data-Driven Codes	
NIOSH	Factory Fire	IFSI (1)	IFSI (2)	First-Order Concepts	Theoretical Categories
HS	HS	HS	HS	Statements that clarify or obscure focus	Goal orientation
Example: <i>The Fire Commander kept insisting to break the back wall of the building but we didn't have the approval.</i> (PAK-FR-QI)				Statements that violate understandings	
HS	HS	MS	HS	Statements that give instructions	
Example: <i>Our firefighters assumed that the back wall access was underway, but the police had denied request.</i> (PAK-FR-ANO)				Statements that give instructions	Instructive
HS	LS	HS	HS	Statements that advance or impedes a future state	
Example: <i>We were told to not to access the third floor until the air drop was confirmed which took ages and never arrived.</i> (PAK-FR-JA)				Statements that advance or impedes a future state	Attempts to influence
HS	LS	HS	HS	Statements that attempt to change current state of mind	
Example: <i>Always ask questions...question the next instruction...the next move and you will see how it pays off.</i> (IFSI-PI-JH)				Statements that attempt to change current state of mind	
HS	LS	LS	HS	Issue-related expertise	
Example: <i>Always look behind the door, under the bed, inside the closet...Your search isn't complete without this.</i> (IFSI-PI-SB)				Issue-related expertise	Attempts to influence
HS	LS	HS	HS	Opportunities to express	
Example: <i>Take home with you one thing...keep communication simple. Don't complicate things because you think you can.</i> (IFSI-PI-SB)				Opportunities to express	
HS	MS	HS	HS	Organizational authority	
Example: <i>Tell you Incident Commander what you see. There is no other way for him to know except what you tell him.</i> (IFSI-EVOL-04)				Organizational authority	
Example: <i>An Incident Commander goes through a lot of shit you see. So, in my opinion, they ought to be mean...just man up!</i> (IFS-PI-TB)				Organizational authority	Powerplay
LS	HS	LS	MS	Statements that are dictatorial or indicate bullying	
Example: <i>I'm working to keep up with you guys but not getting enough prompts. Not fuckin cool.</i> (IFSI-EVOL-01)				Statements that are dictatorial or indicate bullying	
MS	HS	HS	HS	Statements that indicate rank to play power games	
Example: <i>No visibility...people yelling...and who are those things in the front yard? That's your Chief...you have to talk to that guy.</i> (IFSI-EVOL-05)				Statements that indicate rank to play power games	Stewardship
HS	LS	HS	HS	Statements that represent perceived responsibility to address the issue	
Example: <i>We can't let that happen to us again next time...go after your men and don't leave them behind.</i> (IFSI-EVOL-08)				Statements that represent perceived responsibility to address the issue	
MS	MS	HS	HS	Statements that confirm the importance of participation	
Example: <i>With your own boys, you don't have to talk much. But when with new guys, your game has to be a lot more communicative.</i> (IFSI-EVOL-02)				Statements that confirm the importance of participation	

Table 3.6: Coding Structure Representation of Storytelling Dimension

Data Evidence				Data-Driven Codes	
<i>NIOSH</i>	<i>Factory Fire</i>	<i>IFSI (1)</i>	<i>IFSI (2)</i>	<i>First-Order Concepts</i>	<i>Theoretical Categories</i>
HS	LS	HS	HS	Use of words, symbols, or language to reach collective agreements	Discursive Ability
Example: <i>I just painted the whole picture in two sentences...each less than six words. That's all it takes guys, but you have to talk. (IFSI-EVOL-02)</i>				Statements that facilitate or impede collective understanding through exchange of information	
HS	MS	HS	HS	Statements that reflect engaging in conversation and dialogue	
Example: <i>When you talk on the radio, everyone is listening so be mindful of that. Your words have consequences on others. (IFSI-EVOL-07)</i>				Statements that use experience to create meanings	
HS	HS	HS	HS	Statements that indicate the authority of one explanation or story over another	Knowledge Meaning
Example: <i>We had to explain the medical teams that they can't remove bodies from the scene. They first had to be documented. (PAK-FR-QI)</i>				Statements that reject other's viewpoint without even thinking	
HS	HS	HS	HS	Statements that reflect engaging in discourse to shape a future state	
Example: <i>You don't see this now but I'm telling you that our firehouse culture is plagued with entitlement and ego. (IFSI-FC-RR)</i>				Statements that reflect engaging in discourse to shape a future state	Dominant Stories
HS	HS	HS	HS	Statements that reflect engaging in discourse to shape a future state	
Example: <i>We kept telling the firefighters that they need more trucks, but they cared less. They simply followed orders. (PAK-INF-AL)</i>				Statements that reflect engaging in discourse to shape a future state	Negotiation Skills
HS	HS	HS	HS	Statements that reflect engaging in discourse to shape a future state	
MS	LS	MS	MS	Statements that reflect engaging in discourse to shape a future state	Negotiation Skills
Example: <i>The Supervisors later agreed that calling the operation off was the only option they had to save the lives of their men. (PAK-FR-ANO)</i>				Statements that reflect engaging in discourse to shape a future state	

Table 3.7: Coding Structure Representation of Information Management

Data Evidence				Data-Driven Codes	
NIOSH	Factory Fire	IFSI (1)	IFSI (2)	First-Order Concepts	Theoretical Categories
HS	HS	HS	HS	Use of same information with different meanings	Misinterpretation
Example: <i>I thought the Chief ordered standard evacuation, so I first did the search. I didn't know it was emergency evac.</i> (IFSI-EVOL-04)					
HS	MS	HS	HS	Modes of communicating information	Information quality and delivery
Example: <i>The new guys...they don't know how to talk face-to-face. All they know is how to use the radio and TICs.</i> (IFSI-BC-RH)					
HS	LS	HS	MS	Statements that promote completeness or incompleteness of information.	
Example: <i>The prompts from Mike didn't give me any clue about the team movement. It was dark and I couldn't see so I just went the other way.</i> (IFSI-FF-JQ)					
HS	HS	HS	HS	Effectiveness or ineffectiveness of information.	Common frames of reference
Example: <i>The management should have told us how many workers were trapped inside the building so we could have prepared ourselves accordingly.</i> (PAK-FR-JA)					
MS	HS	MS	MS	Statements that indicate convergence or divergence in understanding information	
Example: <i>Clearly, the fire brigade wanted to break the backwall to rescue the trapped from the outside. It doesn't make sense why the police could see this as the only option at the time.</i> (PAK-INF-MY)					
HS	HS	HS	HS	Statements that indicate avoidance to relearn or unlearn	Trust
Example: <i>In today's Karachi, there are still factories where workers are not trained on how to use the fire extinguishers. There are still no efforts from the government to train the first responders. We have the same condition today like it was 9 years ago.</i> (PAK-JOU-ZK)					
HS	HS	HS	HS	Statements that knowingly or unknowingly block information.	
Example: <i>You should have asked which room to search. I thought I said left from the C side, but I didn't know you were on the A side so that wouldn't have helped you.</i> (IFSI-EVOL-06)					
HS	HS	HS	HS	Statements that demonstrate importance of trust.	
Example: <i>When someone tells that 'Hey Chief, you've my back'... what they are essentially saying is that his life is in my hands. I have to be there for him just like he is there for me. It's a huge responsibility but we trust each other with it every time.</i> (IFSI-FC-RH)					
HS	HS	HS	HS	Statements that engender trust.	
Example: <i>I told this firefighter as he was running out of oxygen that we are in this together and we will survive...I can assure you...and, we did.</i> (PAK-FR-ANO)					
HS	HS	HS	HS	Statements that question trust.	
Example: <i>It wasn't the right time to question our work as we tried to move the bodies to the mortuary. The police should have waited. I mean...did they think that we will steal the dead bodies.</i> (PAK-FR-SU)					

After coding was completed, the next process in the content analysis was counting the frequency of the themes that fit the first-order constructs identified in the open coding process. The process included mapping all the first-order constructs in a Microsoft Excel spreadsheet and conducting a detailed analysis across all pieces of data to identify the themes that were more significant than the others. Finally, the inference where the researcher, on the basis of the presented evidence, posited some explanations for the situation, some key elements, and possibly even their causes. This essentially is the process of proposition generation or the setting of working propositions that feeds into finding the practical solution for the problem on hand (Cohen et al., 2018).

In summary, the data analysis proceeded through moving back and forth between the data and abstract concepts found in the literature. The readings on sensemaking, sensegiving and storytelling led this study to notice in data the rich presence of sensemaking triggers, the attempts to influence sense to others through sensegiving efforts, and the facilitating or impeding role of discursive skills in such activities. Additionally, in the data analysis process, the major theme of information managed emerged as salient in explaining the information-sharing and communication issues that are common to mutual-aid crisis response settings.

3.6 Data Validation

The trustworthiness of results is the bedrock of any research. By adopting credible data validation techniques, the potential for researcher's bias, imposed by his or her personal beliefs and interests on all stages of the research, can be reduced (Lincoln and Guba, 1985). One way to achieve validation of data results is by actively involving the research participants in checking and confirming the results – a technique known as the *member checking*.

Creswell (2005) described the member checking process as follows:

Member checking is the process in which the researcher asks one or more participants in the study to check the accuracy of the account. This check involves taking the findings back to the participants and asking them (in writing or in an interview) about the accuracy of the report. You ask participants about many aspects of the study such as whether the description is complete and

realistic, if the themes are accurate to include, and if the interpretations are fair and representative. (p. 252)

Building on Creswell's (2005) procedural explanation, Birt et al. (2016) suggested that member checking covers a range of activities including returning the interview transcript to participants, a member check interview using the interview transcript data or interpreted data, a member check focus group, or returning analysed synthesized data to the participants for validation.

The activity chosen by the research was the member check of *synthesized analysed data*. According to Birt et al. (2016), 'when the purpose of the member check is to explore whether results have resonance with the participants' experience, it might be appropriate to undertake member checking using the analysed data from the whole sample' (p. 1805). Given that the exploratory phase data collected in Pakistan involved recollection of a retrospective incident that took place several years back, the researcher kept in consideration the memory deficiencies of the informants and the difficulties associated with it in articulating their past thought processes. To ensure the validity of the original data as well as to give the informants another opportunity to add to the synthesized analysed data, the researcher again visited Pakistan in early 2020 and re-engaged several participants in the study. In a series of one-on-one interviews, participants were given the copy of the transcribed interviews synthesized in themes and given the time, space, and instructions to add anything further to their original accounts, if needed. Subsequently, the results of the interpreted data were shared to add to the trustworthiness of the final data set.

A similar activity was performed with the main phase data collected at IFSI. Several weeks after the training ended, several participants were consulted over phone interviews and given the opportunity to add or edit any part of their original accounts. Thereafter, the analysed data were shared with the participants to confirm correct interpretation of their accounts. In addition to involving the participants from IFSI, several active duty and retired members of the United States Fire Administration (USFA) were approached for data testing purposes. The main reason for making such supplementary contacts was to account for any potential biases or interests that the IFSI informants may have had intentionally or unintentionally included during interviews that were

otherwise not recognized salient across other fire academies and fire departments operating under the USFA. These additional conversations not only helped in verifying the authenticity of the original main phase data, but also provided auxiliary confirmation to the synthesized analysed data.

Although member checking is a robust data validation technique, it has certain limitations, Morse (1994) and Angen (2000) includes some of these limitations as:

- The member checking process may only lead to confusion rather than confirmation because participants may have changed their minds about the issue;
- Respondents may disagree with researcher's interpretations;
- Members may participate in checking only to be 'good' respondents and agree with an account in order to please the researcher; and
- Members may tell stories during an interview that they later regret or see differently. Members may deny such stories and want them removed from the data.

The current research acknowledged these limitations in the early stages of the data validation phase and planned accordingly. As stated earlier, each member was given the opportunity to edit any part of the interview or discussion they have had with the researcher in case there was a change in their opinions. In cases, although rarely experienced, where the participants disagreed with the researcher's interpretation, subsequent discussions between the two took place to either correct, accept, or remove the questioned interpretation. Furthermore, nearly all the participants were invited to re-engage in the research for validations purposes via all possible methods including, emails, phone calls, and through indirect sources who helped to identify these participants at the first place. This action step ensured that there was no selection of good or preferred participants. Finally, any request of removing an interview or part of an interview was immediately fulfilled by the researcher and not included in the final data set.

3.7 Artefact Development

The preceding sections outlined the methods used to collect and analyse the research data. The next step in the research involved the actual development of the artefact based on a pragmatic design logic previously covered under the section of Design Proposition.

The core activity involved in the artefact design phase was the *synthesis-evaluation* iterations (van Aken and Romme, 2012). Since the research adopted the DSR approach, three streams of data were (re) introduced in the synthesis process to set the foundations of artefact design. The first stream included the empirical data collected from phase 1 and phase 2. The second stream of data that guided towards the artefact development was the theoretical knowledge gained from the distinct, yet related literatures of sensemaking, sensegiving, and storytelling. Additionally, the researcher's professional experience in managing organizational crisis and dealing with crisis actors across organizational boundaries provided useful insights into the development of the artefact. Combining the research empirical data, theoretical understandings, and researcher's professional experiences not only ensured research rigor but also favoured a well-rounded design of the artefact.

The solution design that began to emerge from the listed steps went through rigorous evaluation before the final artefact was developed. In accordance with van Aken and Romme (2012) the design was first evaluated by the researcher to judge the extent to which it met the desired specifications. In a supplementary step, the pilot testing of the artefact was performed by approaching the instructors and the directors of the Fireground Company Officer program at the IFSI. Here the research participants were introduced to the fundamentals of the artefact design including the operational details and the intended outcome. Although the results of evaluation step were recorded as satisfactory, the extent to which the feedback was provided helped address minor design issues which were then resolved. Afterwards, another round of evaluation was conducted to ensure that the participants' feedback was correctly understood and implemented.

3.8 Summary

This chapter outlined the actions that were taken to investigate issues that are prone to emerge in multi-agency crisis response settings. The chapter began by explicitly stating the philosophical stance the researcher took followed by a discussion on the abductive research strategy adopted to conduct this study. With the aim of designing a solution concept (artefact) for the practical research problem, the next section introduced the Design Science Research (DSR) approach followed by the rationale for its application in this research. Moreover, the practical guidelines for conducting DSR were summarized using a research flow diagram.

The next half of the chapter detailed the sources of data for the two phases. The first, *exploratory phase*, represented the data collected pertaining to the factory fire incident at Ali Enterprises located in Pakistan (see Appendix L). The exploratory phase data consisted of interviews and archival records as primary and secondary forms of data. The second, *main phase*, involved data collection from a fire training academy based in Illinois, USA (see Appendix M). For the main phase, the data sources included interviews, field notes, researcher's participation in live-fire training evolutions, and archival records. Later, specific procedures and techniques used to analyse and validate the data were documented. Finally, the steps taken to design the solution concept were explained.

CHAPTER 4

FINDINGS AND ANALYSIS

Large-scale crises such as the September 11 attacks in New York or Hurricane Katrina in New Orleans usually require mutual aid provided by different emergency response teams (ERTs). In such situations where multiple teams across different organizational boundaries are involved, the possibilities of coordination issues can increase significantly. These coordination difficulties commonly arise because each organization has their own processes, information, applications, and technology. One way to bring coherence among these distinctive organizational functions is through effective communication.

4.1 Exploratory Phase: Ali Enterprises, Pakistan

This section reports the findings of the data collected during the exploratory phase of this research. The exploratory phase was primarily conducted in the city of Karachi, Pakistan, and examined the factory fire incident that took place at Ali Enterprises. Given the initial reports of coordination breakdown within and among the emergency response teams, the goal of the exploratory phase was to understand the reasons that led to such a failure. Therefore, the focus of the exploratory phase was to assess the operational functioning of the emergency services that included teams from the fire brigade, police, and medical emergency. The key findings of the exploratory phase data include (1) environmental assessment and responsiveness, (2) inadequate resources, (3) cross-training deficiencies and (4) stress which are discussed in detail in the following sections.

4.1.1 Environmental Assessment and Responsiveness

During crises, the speed and accuracy with which the response and recovery efforts takes place usually determines the operational efficiencies of the emergency services such as, fire brigade, police, and emergency medical teams. These operational efficiencies, however, heavily depend on how well these organizations evaluate the surrounding environment before they act. Any inability to assess the requirements and dangers embedded in the situation could mean facing a myriad of challenges and, in most circumstances, adverse operational outcomes. The data from the factory fire incident indicated the

failure of the first responders (also referred as emergency response teams or ERTs in this research) to collectively understand and cohesively plan and manage the incident. The following section explicates the quality of environmental assessment made by the ERTs in the factory fire incident at Ali Enterprises and the impact of their assessment on the rescue and recovery operation.

The first place where environmental assessment and responsiveness shortfalls of the ERTs were noticed is the inquiry report published by the Federal Investigation Agency (FIA) in Pakistan. Operating under the federal Home Ministry and headed by the inspector general of Police – the FIA published its findings on October 3, 2012. To conduct the inquiry, the FIA investigators interviewed 32 witnesses, including Ali Enterprises owners, managers, employees, fire station officers and sub-officers, law enforcement officers, government officials, engineering consultants, and insurance providers. In addition to this exhaustive list of informants, the FIA report based its findings on a forensic review of closed-circuit television (CCTV) footage retrieved from the factory site.

The beginning sections of the report examined the response of the fire department and found significant delays in their reaction to the incident. The report documented that from the outset of the operation, the management of Ali Enterprises showed their discontent on the late and substandard response of the local fire brigade. One investigator wrote:

During the examination, the owners of the factory had complained about the late response of the fire brigade. As per their statement, the fire brigade reached the scene at 7:30 pm - almost an hour after the fire was first reported to the nearby fire station. (FIA report, 2012, p. 10)

According to the FIA report, the fire brigade officers dismissed such allegations and instead blamed the traffic congestion and road conditions as reasons for their delayed reaction. With the help of several data sources, however, the FIA investigators addressed the discrepancies found in the statements of the factory's management and the responding fire brigade officers. After detailed data gathering and analysis, the report concluded its findings as:

The response of the fire department was slow. It did not respond on the phone call. It only responded when one

of the employees reached the station and informed about the fire. The initial response was inadequate to the blaze. By the time backup could arrive the damage in terms of loss of precious human lives was done. (Federal Investigation Agency, 2012, p. 23)

The FIA findings sufficiently support the claim of a slow reaction time, which fundamentally infers poor initial assessment of the situation by the fire brigade. The current study, however, gathered additional data to remove possible biases that could have led to the inconsistency in the accounts of Ali Enterprises owners and the fire brigade officers. Thus, access to independent data sources was gained to derive equitable findings. As an example, the local press reports that described the timeline of when the fire station was informed about the fire and the time it took for the first fire tender to arrive at the scene were examined. Zehra Khan, a senior correspondent at ARY News—a leading news channel in Pakistan—agreed to share her findings with the researcher. She stated:

The management made the call to Lyari fire station at around 6:37 p.m. – about five minutes after the fire broke out. Our investigators retrieved the factory’s call log to confirm this. At around the same time, a factory employee was sent to the nearby S.I.T.E fire station approximately 3 kilometres from the factory. The employee testified in the court that he arrived at the station at about 6:40 p.m. and the fire station officer calmly responded that he was already aware of the incident. Our news reporters [who arrived before the fire trucks could] showed live on TV the trucks arriving at 7:09 p.m. – approximately 32 minutes after the fire was first reported. But the irony is...the fire trucks didn’t start their work for another 20-30 minutes after their arrival. So, in reality, the operation didn’t start for about an hour after the fire broke out. (PAK-JOU-ZK)

Another senior journalist at GEO News, Zubair Ashraf, reported:

We witnessed a lack of priority basis in this process by the rescue services and the local government due to which we still do not know the truth. The truth is that the rescue services did not show any priority because they could not sense the situation the way it should have been. They did not even arrive on time. When they arrived at the scene, maybe dozens trapped were already dead as per the survivors. (PAK-JOU-ZA)

The description and timeline of the fire brigade’s response by Zehra Khan and Zubair Ashraf closely related to the FIA findings. For instance, the

FIA report set forth accounts of two senior fire station officers who received the initial information about the incident. According to the FIA report:

At 6:37 p.m. the call was received at Lyari fire station which was forwarded to the concerned SITE fire station. At about the same time (6:39 p.m.) an employee of the factory reached S.I.T.E. fire station. Two fire tenders were dispatched immediately... but due to deplorable road conditions, it took us longer to arrive at the scene. (Federal Investigation Agency, 2012, p. 10)

The FIA report further stated:

It could be seen in the footage that the correspondent of Samaa TV reported presence of fire brigade on the scene of fire by 7:03 p.m. (Federal Investigation Agency, 2012, p. 10)

As can be seen from two independent sources (i.e., the FIA and news channel reports including ARY and GEO news), the fire tenders arrived at the scene between 7:03 p.m. and 7:09 p.m. However, the FIA report overlooked the details of when the response operation started. As per the study's informant, Zehra Khan, it took firefighters between 20-30 minutes before they responded to the situation. She mentioned in her report that the firefighters clearly showed no sense of urgency until they noticed that the trapped factory workers were jumping out the windows of the burning building trying to save their lives.

In addition to the overarching evidence of poor environmental assessment provided by the FIA and news channel reports, the current study added to the richness and completeness of its finding by interviewing some first responders who were directly involved in the incident. For example, firefighter Janjua Ahmed stated in an interview with the researcher:

When we heard about the factory fire and that people were trapped inside, we did not request back up immediately. After arriving at the scene is when we recognized the scale of the fire and requested additional help. By the time help arrived, it was too late. I agree that we wasted valuable time. (PAK-FR-JA)

Two law enforcement officer, Qamar Iqbal, and Syed Raza, added to this description:

People [*referring to the researcher*] do not know many things that went wrong that day...This incident changed so many lives forever because we failed that day. We misjudged the monster we had to deal with. (PAK-FR-QI)

The fight on that day was not about how skilled we were to fight the fire; it was about our mindset and the assumptions that we made. We knew something was wrong the moment we got there, but we refused to accept the threat. When we do not accept that we have a threat in front of us, we cannot prepare ourselves to fight it.
(PAK-FR-SR)

These statements clearly show signs of weak assessment and inconsistent response plans of the ERTs to understand the dangers of the situation. These shortcomings severely impacted operation response time and related efficiencies.

Table 4.1 lists the accounts of additional actors who were interviewed by the researcher. These actors include the family and relatives of the victims of the fire incident, survivors, press correspondents, and the first responders. The information provided by these actors signal fragmented coordination within and among the ERTs.

For example, the accounts of distraught family members allude to how the first responders apparently 'downplayed' the dangers of the situation. Similarly, the accounts of the survivors suggest how the responders were 'unaware' of their surroundings and the situation, which added precious time to their operation.

Table 4.1: Data Representation of Environmental Assessment and Responsiveness

Accounts of family and relatives of the fire victims	Accounts of survivors of the fire incident	Accounts of investigators and journalists	Accounts of the first responders
<p>The fire was getting bigger and bigger. The fire fighters thought that the fire had occurred in the basement and that they can contain it with one fire truck. But they didn't know that the fire had erupted on the ground floor and it was much more serious than they were thinking it was. (PAK-VIC-SK)</p>	<p>No one could even fathom that the fire would be so huge. But most saddening about this is that those who came to help us were equally unaware of what was happening. (PAK-INF-AW)</p>	<p>I remember reporting how they [the firefighters] were arguing and the driver of the second tanker refused to go back to fill more water. He said to his truck commander that I told you at the first place to fill the tanker completely but that he didn't listen to him.</p>	<p>We did not have any idea it [the fire] would get so big, so quickly. Because if a floor as big as the one in that factory (about a 1000 sq. yds. covered area) catches fire, it takes the fire a while to spread. But that day the fire took off as if fuelled by petrol. (PAK-FR-JA)</p>
<p>We kept telling them [first responders] that we know the construction of this factory. This fire is not your usual fire. Hurry up! Call for more help but not one listened.' (PAK-VIC-KK)</p>	<p>The first responders wanted nothing more than to rescue everyone trapped inside. If say there were 50 people trapped in one part of the building, there were four rescuers. They couldn't rescue all 50 at the same time. Everyone seemed helpless. (PAK-INF-SH)</p>	<p>The driver stayed back, and the truck commander drove the tanker back to the station. (PAK-JOU-AK)</p>	<p>In 28 years of my career as EMS, I had never seen anything of this magnitude. It was within minutes that the whole building was in flames. By the time we realized what we need to help, it was already too late in my opinion. (PAK-FR-AA)</p>
<p>The police and fire brigades were present along with other private relief agencies. But they completely downplayed the dangers of the situation. They could have saved many lives . . . they could have saved my son if they had understood how big the fire had become. (PAK-VIC-MA)</p>		<p>If you look at the video footage of my channel, you will notice one police car at the fire site. There should have been 10 of those there to manage the crowd. (PAK-JOU-ZA)</p>	
<p>The reality is that no one knew what was happening. They had no information how many people were trapped inside. They had no clue. On top of all that, they had no coordination. We lost everything we had that night. (PAK-VIC-BA)</p>			

4.1.2 Inadequate Resources

On September 12, 2012 – a day after the fire incident at Ali Enterprises – the British Broadcasting Corporation (BBC) published a story titled, ‘Deadly Karachi blaze was waiting to happen.’ The story begins by depicting gruesome accounts of distressed family members urging rescue workers to save their loved ones. The story voiced the dissatisfaction of these families over the insufficient rescue attempt by the ERTs. Later in the story, the BBC reporter hinted at the inadequacy of resources as a probable reason for this shortfall. The BBC report led the current study to further investigate the link between inadequate resources and disjointed response effort of the ERTs during the response operation at Ali Enterprises.

The current study finds that the ERTs not only arrived at the fire site late and assessed the situation incorrectly, but that they were also underequipped. While bringing insufficient resources to combat the fire relates to poor assessment of the situation, it also underlines the inadequacies of essential resources that needed to handle the situation. For example, the BBC story that initially uncovered this issue documented the account of the city’s fire chief as follows:

The Karachi’s fire chief admitted to reporters that the rescue effort had been hampered by a lack of resources. At one point the fire engines ran out of water... Eventually, the navy’s firefighting team was called in – but by then it was too late for most of those trapped in the building.

The FIA report was in line with the BBC story. The FIA report confirmed the inadequacies of the fire brigade resources and stated:

The vehicles [fire trucks] were not adequately equipped [with the needed tools] and when the water was consumed it took a lot of time to get them refilled. The backup vehicles took a long time to arrive and by then the damage had been done. (Federal Investigation Agency, 2012, p. 12)

The informants in the study confirmed shortages of necessary firefighting apparatus (e.g., hose line, power tools, proper attire), communication devices (e.g., radios), and even enough response workers to deal with the situation efficiently. For instance, a member of Edhi Foundation, the largest operating

emergency medical services (EMS) in Karachi, stated in an interview with the current study:

We waited helplessly for the fire trucks to bring back more water. We couldn't help much until the fire was brought under control. It was not until Wednesday morning (almost 14 hours later) that we were given access to the site. *(PAK-FR-AA)*

The informant further added:

We saw firefighters waiting for extrication suits to come from another fire station. Their delay in rescue also delayed our work to move bodies or injured to the hospital. *(PAK-FR-AA)*

Another respondent who worked in the Karachi Fire Department as the time of the event declared in an interview:

In Pakistan, specifically in Karachi, we report that the fire brigade personnel and equipment is either under trained, or else, their trucks are not functioning properly or there is lack of water. I completely agree with this statement. *(PAK-FR-MF)*

A journalist provided similar details during a separate interview:

About the resources, the city district government and the mayor of Karachi say that this is because they don't get the funds from the provincial government for maintenance. The Government of Sindh (provincial government) says that we have released the funds, but they have not been utilized properly. So, the working, tax paying citizens of Karachi suffer the most as they get caught in this political crossfire. Hence why fires like these were not subdued due to this lack of resources and before you know it, it destroyed the whole factory in two days. *(PAK-JOU-AK)*

The statements from the first responders, information that BBC acquired from the city's fire chief, and the findings of the FIA: all provide useful evidence of the lack of resources available to the fire brigade and other response agencies to mitigate the crisis on hand. From running out of water within minutes of the operation to having limited tools needed to break the barred windows and locked exit doors, the fire brigade clearly fell short in delivering what was expected from them. Under these acute resource shortages, the fire brigade struggled to carry out the assigned tasks. Table 4.2 documents some examples areas where the ERTs struggled given the resources that they had.

Table 4.2: Data Representation of Inadequate Resources

Accounts of family and relatives of the fire victims	Accounts of survivors of the fire incident	Accounts of investigators and journalists	Accounts of the first responders
As our loved ones perished, they [the firefighters] brought only two fire trucks and one didn't even have enough water. It had to go back to the station and came back after two hours. (PAK-VIC-)	The government could have helped us. The responders could have helped us with helicopters, with more fire trucks, with more water. They could have helped us, and our children could have been saved, but everyone failed us. (PAK-INF-AW)	With the lack of resources, even after their [first responders] efforts, we lost lives. (PAK-JOU-AK)	Until the arrival of fire brigade, we pushed people away from the scene to prevent any other casualties. But we were short of hands. I called the control room again and asked for reinforcement. After about 15 minutes of waiting, they sent only one mobile vehicle with 3 men. I needed at least 20 police officers more to manage the crowd and traffic at the scene. (PAK-FR-ANO)
The fire trucks initially came with no ladders, hammers, or the proper attire. They for the most part watched helplessly as the fire ravaged the building. (PAK-VIC-MA)	Was it the heat or the smoke or the rush of people running all over for help? I do not know what it was. I only know that when I asked a firefighter to help me break the window so myself and other co-workers can jump off the building, he told me he does not have the tool to break the barred window. He looked angrier and more disappointed in himself than we could have felt for him (PAK-INF-CS)	Our newspaper published a report that revealed the shortage of technology and equipment among Karachi's fire services. Less than 50% have radios and some stations have only 2 engines. The lack of interest and funding from the government means no training for these responders to perform well in their jobs. (PAK-JOU-ZA)	There are only 20 fire stations in Karachi city. About 12 of these fire stations have the capacity to tackle a mid-to-large-scale fire. The other 8 only work as backup stations. (PAK-FR-JA)
I heard people asking a fireman that why isn't he going inside the factory to help. He replied that his fire truck doesn't have enough hose line to go close to the building and because the streets are too narrow to park the truck closer to the scene. (PAK-VIC-BA)		There were places the rescue personnel did not bother going into due to lack of proper equipment We had to highlight that in the media so that they can start to carry out their duties diligently. (PAK-JOU-SH)	The entire city's fire brigade has only 22 working engines to address fire related events. Most of these engines are over 30 years old and have been only minimally serviced. (PAK-FR-MF)
Yes, one tanker came, used for a while, and then ended and then went for a refill and then, everything was stopped. (PAK-VIC-KK)			

Apparent from the statements in Table 4.2 are the coordination challenges and obstacles that the ERTs experienced due to lack of resources. According to Faisal Edhi, Managing Director at Edhi Foundation, the fact that the fire brigade and the law enforcement were unprepared and underequipped, hampered the EMS operations significantly. He sharply criticized the government's lack of funding and interest in equipping the fire brigade with the necessary resources required to deal with frequent fires in Karachi.

The findings of this research are in line with previous work (cf. Waheed, 2014), who a few years after the Ali Enterprises fire incident, conducted a study at The Nadirshaw Eduljee Dinshaw (NED) University of Engineering and

Technology, in Karachi. The study explored the conditions of the city's fire services and the insufficient circumstances under which the city's fire brigade operates. Waheed's (2014) analysis depicts the scarcity of resources Karachi fire brigade had at the time they responded to the call at Ali Enterprises. For example, the study reports:

The firemen and their equipment are not even capable to survive in critical conditions due to lack of manpower and proper machinery. The fire tending vehicle is also not properly managed; only 2 vehicles are available in each station for fighting. Karachi is under the outbreak of unplanned slum areas. 55 % ... of Karachi is under this menace because of which the fire brigade doesn't have ideal path accessibility towards the emergency spot in majority of the cases. (p. 63)

In sum, the BBC story, FIA report, and the accounts of various actors that the researcher acquired infer the deficiencies of the resources and the impact of this inadequacy on the operational efficacies of the ERTs in mitigating the fire incident at Ali Enterprises.

4.1.3 Stress

In part caused by the first responders' slow response, inadequate environmental assessment, and inadequate resources, and in part contributing to these factors, high levels of stress within and among the response team members also impacted interorganizational coordination. Operating under myriad complexities and associated time pressures, the responders not only suffered from physical exhaustion but also endured mental stress due to the conditions beyond their control abilities. The intensity of the stress influenced the psychological and physiological conditions of the first responders, not only affecting their performance, but also impacting their team-level response to the situation.

4.1.3.1 Stressful Conditions

The current study relied on multiple data sources to ascertain conditions that could have contributed to the psychological and physiological breakdowns within and among the ERTs. The first such source was the FIA report. The report documented that by the time the fire brigade received enforcement and

commenced a full-swing operation, the fire had already spun out of control. The report stated:

At 7:29 p.m. it could be seen that the top floor of the factory was completely engulfed by the fire. The fire was declared category 3 fire and the other fire brigades started coming after 7:30 p.m. By this time, the factory was completely on fire and few survivors were rescued by breaking the windows through a crane. Some workers jumped from the floor through the broken window in order to escape from the spreading fire. (Federal Investigation Agency, 2012)

The FIA report demonstrated that the fire incident at Ali Enterprises was an extraordinary event. With hopes fading fast, those trapped inside the factory had no other choice than to jump out the windows to save their lives. Herald, Pakistan's leading magazine in investigative reporting and coverage of current affairs, illustrated the intensity of these scenes through the words of a witness:

We saw a young boy trying to jump out of an upper-story window that was unbarred... [The boy] got caught in the window. Because the fire brigade had not arrived by then, we saw him slowly burn to death. (*Herald Newspaper, September 17, 2012 retrieved from PILER*)

The horrific images of people begging to be rescued and eventually opting to jump off the burning building were difficult to experience for many witnesses, including the first responders. Syed Raza, the police officer who was present at the fire site, recalled in an interview with the research:

It was like a day of judgement for those trapped inside the building. For us, [the responders] it wasn't anything less than that either. The fact that I stood there helplessly while men, women, and children screamed and jumped from those windows shook the ground under my feet. Those screams and images still haunts me. (*PAK-FR-SR*)

Another responder who served in the Karachi fire brigade for nine years shared his experience from the incident. Wished to stay anonymous in the current study, the firefighter recalled:

There were bodies everywhere...some beyond recognition. When I tried to rescue a victim, her flesh melted in my hands. The feeling that I experienced at that time was something never before. It was too much for me to handle at the time and even now. The situation was so

intense that I could not do anything anymore. (PAK-FR-ANO)

As evident from these quotations, the first responders who witnessed such gruesome scenes of people burning alive and others jumping out of windows in desperate attempts to save their lives, turned out to be overwhelmingly poignant for them. As a result, they struggled to maintain their composure and experienced serious interruptions in performing their routine functions.

Further in the research, the member of Edhi Ambulance confirmed this point in an interview:

At one point I asked a firefighter how many more bodies he thinks are still in there. He did not reply. I asked him again and he stayed quiet. When he removed his mask, I could see his entire face covered with tears. He then broke down like a child in front of me. He replied may be several dozens more and then he said... 'I cannot do this anymore' (PAK-FR-AA)

A similar picture was painted by a family member of a victim who volunteered to work with the firefighters. He shared in an interview with the researcher:

The fire fighters could use all the help they could, so I volunteered. When they took me close to the building to help them clear the hose line, I felt my body will burn from the heat. In thick smoke, I could tell that they were struggling a lot. They seemed to be running around looking for those who were screaming for help but could not trace their locations. The fire fighters were literally yelling at one another as they were in a fight. Seeing them helpless and frustrated made it clear to be that only a miracle from God can save us today. (PAK-VIC-WA)

The preceding testimonies provide details of the impact of the situation on the responders. The firefighter experiencing stress, for example, stated the situation was '*too much to handle*', followed by the perception that he could no longer assist in the operation. Similarly, the police officer assigned to facilitate the fire brigade in their operation explained how the overwhelming stress of the situation affected his work. As he stood '*helplessly*', his abilities to think and act came to a halt. Moreover, the eyewitness accounts that depicted the vulnerabilities of the first responders suggest that the overwhelmingly stressful

conditions influenced the abilities of the ERTs to perform their duties as the situation demanded.

Table 4.3 lists several analogous accounts depicting emotional fatigue within and among response teams. These accounts offer valuable insights into how the negative emotions of stress gradually, but eventually, took over the control of the situation from the self-assuring response teams. For example, one informant mentioned that before the start of the operation, the firefighters looked confident in managing the situation. However, as time progressed, the members of the fire brigade started to realize that this fire was beyond their control. At that point, some of the firefighters who experienced extreme stress in the fast-evolving situation, grounded to a halt. The research acknowledges that although emotional reactions are generally subjective and based on many factors like life experiences, training, and behavioural health conditions, they tend to be highly contagious as well (Barsade, 2002; Smith and Mackie, 2015; 2016). Watching their colleagues battling with the situation and showing clear signs of a physical and emotional meltdown, other members of the response team started to bear similar emotions. As a result, many first responders started feeling under stress and struggled to perform on a collective level.

A related viewpoint that emerged from these accounts was the reported failure of the ERTs to work in harmony. For example, the quotes from (VIC-SW and INF-MY) in Table 4.3 seemed to show their concern on how the ERTs had no coordination among them. These accounts led the researcher to inquire further on whether the high-level of stress that was reported at the scene contributed to this shortfall or was there addition issue(s) that negatively impacted the work of the ERTs.

Table 4.3: Data Representation of Stress Among ERTs

Accounts of family and relatives of the fire victims.	Accounts of survivors of the fire incident.	Accounts of investigators and journalists.	Accounts of the first responders.
<p>First, they [fire fighters] looked overconfident before entering the building and then their over confidence turned into a complete lack of confidence within minutes. They looked confused about what to do. (PAK-VIC-RS)</p>	<p>The firefighters were overwhelmed with the ravaging fire. You could tell the higher levels of stress they were dealing with. They were constantly on their radios trying to give information back to the station from the inside of the building but struggled to turn instructions into actions. (PAK-INF-OR)</p>	<p>The first responders were not only stressed and exhausted, but also faced the fear of an attack from the mob who showed extreme anger towards the unpreparedness of these responders. Family members and other workers had at one point started questioning the responders of why they came ill-prepared and aren't doing anything to control the fire and to save lives. The fear of getting attacked by the mob impacted their performance significantly. (PAK-JOU-ZA)</p>	<p>Hauling the hose in boiling temperatures was punishing. I couldn't see anything in the heavy smoke. I told myself at one point that this is it. . . I'm not going to live through this. The mind just went blank. (PAK-FR-MF)</p>
<p>All the agency people were confused and shocked by the size of the fire. Even they were running around as if they are in a movie scene. (PAK-VIC-KK)</p>	<p>It was apparent that those who came to rescue us needed to be rescued themselves from the situation. They were tired, unskilled, and did not even know how to work in harmony. (PAK-INF-MY)</p>	<p>Everyone was emotional (every eye was wet). I saw the firefighters wanting nothing more than to subdue the fire and to safely rescue everyone, but they struggled battling the fire. You could see that they were drained and exhausted within minutes of the operation (PAK-JOU-SH)</p>	<p>We faced a mob at the time of the incident. People were yelling at us. They were restless because their loved ones were inside the burning factory. I think that the all the rescue services and the police did whatever they could then. (PAK-FR-SR)</p>
<p>The police and firefighters were almost yelling at each. They showed their frustration and anger with each other very clearly. They were clearly upset. (PAK-VIC-SW)</p>			<p>Until the arrival of fire brigade, we pushed people away from the scene to prevent any other casualties. But people would not listen, they would come again and again. We were stressed because the situation was getting out of control. (PAK-FR-QI)</p>

4.1.4 Cross-Training Deficiencies

The research found that cross-training deficiencies among emergency services contributed to the stressful conditions that the members of the ERT faced. Usually, in a high-impact event, emergency services manage the situation jointly and heavily rely on their cross-training capabilities to achieve such goals. In case of Ali Enterprises, however, the lack of prior cross-training in managing roles and responsibilities, effectively communicating, and appropriately planning for the situation led the ERTs into coordination problems from the very onset of the rescue operation.

The data that led to this finding primarily came from an interview that the researcher conducted with Dr. Carolijn Terwindt, a Business and Human Rights program activist at the European Centre for Constitutional and Human Rights (ECCHR). ECCHR is an independent, non-profit, and non-governmental organization dedicated to enforcing civil and human rights worldwide. In pursuit of justice for the victims and survivors of the factory fire incident at Ali Enterprises, Dr. Terwindt shared useful information on the case. During the interview, Dr. Terwindt stated:

I spent several months in Pakistan researching this case and one thing that always caught my attention was that the first responders did not have any planning or coordination. Everyone had the right intent, but not the right focus. The responders worked very hard, but their individual efforts were just not good enough. This was a fire that was spread across three floors within minutes so it is hard to even fathom what must have been going on in the minds of those trapped or, for that matter, in the minds of the first responders. Their lack of cohesive planning and action made things a lot worse and this I think is a clear proof of the lack of prior training to handle such disasters. There were obvious training lapses between the law enforcement and the fire services and plenty of evidence is available to prove it.

Dr. Terwindt's valuable insights led the researcher to gather additional data. Some of the additional resources agreed with Dr. Terwindt's research giving further support to the issue of cross-training deficiencies among the members of the emergency services reporting at the fire incident at Ali Enterprises. For example, senior journalist, Zubair Ashraf, shared his insights in an interview with the researcher:

I reported about how hundreds of anguished relatives gathered at the site impeded the rescue operation. This is the time when the fire trucks needed to approach the building. The communication and coordination to make this happen was awful. Members of both the services seemed baffled on what to do. (PAK-JOU-ZA)

Zubair Ashraf shared a photo (see Figure 4.1) that he took during his reporting. As evident, the fire brigade truck and the crane are surrounded by a huge crowd people blocking the access of other emergency services vehicles to come close to the fire site. Zubair reinstated that this essentially was the responsibility of the police to disburse the crowd and make way for the additional fire trucks and ambulance vans to access the building. However, there was no sharing of roles and responsibilities that reflects poor working relationships among the emergency services.



Figure 4.1: Representation of Blocked Access. Picture courtesy: Ashraf (2012).

A senior firefighter, wishing to stay anonymous during an interview with the researcher, shared similar experience:

When we got there [incident scene] we could not go past the sea of people. The narrow streets were packed with people. How could have we gotten close to the building and started our work if we had no help? This isn't our job, you see. The police were there, but they did not give us any support. They assumed their help starts only when we get to the scene...no, it starts by helping us well before that. (PAK-FR-ANO)

The firefighter's frustration with the police in not clearing the way for the fire trucks to commence their operation promptly indicates the negative impact of undefined roles and responsibilities. Furthermore, his comments on the misconception that police had about facilitating the work of fire brigade only after it had arrived at the scene indicate confusion and unclarity on many fronts.

In response to the firefighter's statement, police officer, Qamar Iqbal, argued:

I don't think it is fair to ask us [law enforcement] to do everything. We know we should have acted fast and not let people gather there, but no one told us that we need to clear the route for fire trucks as well before they even started their work. (PAK-FR-QI)

Qamar Iqbal's response provides a significant example of how inadequate interorganizational training can be highly consequential. Building on these comments, it appears that the members of both the organizations (i.e., fire brigade and law enforcement) erroneously expected the other to perform certain tasks during the operation without any prior communication taking place. This confusion over who is leading a task and what consequences that task will have on the other party signifies lack of mutual understanding which is usually achieved through training.

The apparent coordination issues because of cross-training deficiencies not only influenced the fire brigade and law enforcement functions but also impacted the performance of emergency medical teams. Since the only agency providing emergency medical care in case of fire incident at Ali Enterprises was a private relief organization, it had no prior relationship or training with the fire services and the local police, which added to the onsite coordination problems. Asim Jabbar, a volunteer driver of Edhi Foundation – Pakistan's well-known philanthropic organization, which carries the largest fleet of private ambulances in the country, informed the current study:

We were initially denied access to the site by police because they thought it was too dangerous for us to go closer to the building. It was not until 20 to 25 minutes after our arrival that a firefighter approached and told the police officer that they have been eagerly waiting for the EMS so they could remove the injured immediately. (PAK-FR-AJ)

These testimonials of the firefighter, police officer, and medical team personnel significantly identify the training deficiencies among the emergency response organizations. The data demonstrate how shortfalls in training led to communication breakdowns and delayed exchanges of critical information among the responders, resulting in an unsynchronized operation.

Table 4.4 details the accounts of various other actors who witnessed signs of inadequate training and broken communication strategies among response organizations. Table 4.4 data illustrates the issue of cross-training deficiencies and their negative impact on the rescue operation in the fire incident case of Ali Enterprises. These deficiencies included vague roles and responsibilities, ineffective communication, and poor planning. Together, these elements played a critical role in hampering coordination efforts and ultimately led the situation to spiral out of control. Agreeing with the current study's conclusion pertaining to cross-training deficiencies, police officer, Qamar Iqbal spoke of his agency and the firefighting brigade like this:

If either of the response agencies were trained on how to effectively communicate in times when unfavourable circumstances develop - and they do occur all the time - the operation perhaps would have seen better coordination between us. We all are trained to do things our way. (PAK-FR-QI)

This section reported the findings of the exploratory phase data that examined the factory fire incident at Ali Enterprises. The data pertaining to the incident came from various sources. These included: archival records, federal and private investigation reports, and several interviews with different incident actors such as the members of the ERTs who were part of the actual operation, survivors of the fire incident, family members of the victims, and media personnel. Together, these powerful accounts helped in identifying poor environmental assessment, inadequate resources, high degree of individual and group stress levels, and cross-training deficiencies among the emergency services as contributing to the failed response operation that took place at Ali Enterprises. A detailed analysis on the possible causes and impact of these findings in crisis response settings are provided in Chapter 5.

Table 4.4: Data Representation of Cross-Training Deficiencies

Accounts of family and relatives of the fire victims.	Accounts of survivors of the fire incident.	Accounts of investigators and journalists.	Accounts of the first responders.
<p>The police and the fire fighters who came to rescue that day were not trained. They were fearful to go into the building. The fire was fierce, and nothing could escape it. They were not trained to communicate with each other so they couldn't work together. There was no team effort from anyone. (PAK-VIC-SK)</p> <p>Train the fire fighters, the police, the ambulance staff. They over-and-over again fail to work together. They don't even communicate with each other. We hear about factory fires all the time in this town and also hear stories of how these agencies fails to save lives and belongings. (PAK-VIC-RS)</p> <p>They [the firefighters] had no water first and then the Police didn't allow them to go inside the building because they didn't have the orders from their superiors. The police had closed the area. (PAK-VIC-WA)</p>	<p>If they [first responders] broke off the side wall, many lives could have been saved. Only if they had coordinated their efforts. When we approached the police to break the side wall, they said that the instructions have to come from the fire brigade. When we went to the fire brigade, they said that the police have to first clear the path and supervise our work. No one was willing to work as a team. They had no training whatsoever how to communicate or work with one another. They kept blaming each other. (PAK-INF-OR)</p>	<p>The factory owners only care about themselves. So, this is one part of the problem. But the bigger part of the problem is that these first responders need to do what they are supposed to do. The fire brigade needs to know that their tankers must have waters in it all the time, they must be trained to go inside the burning factories while it is still possible, and they must be able to get the victims or burning people out of the facilities. The police need to know how to control the crowd and how to service them. The emergency medical teams need to facilitate. If you do not train these organizations, the failures and loss of lives will always be there. (PAK-JOU-SH)</p>	<p>Dozens of people escaped only by helping themselves, the reporters helped some out, the fire fighters helped some out, the police, the rangers, helped some out as well. Everyone helped but there was no teamwork. Everyone had their agenda, and everyone worked on it in their own way. (PAK-FR-JA)</p> <p>My radio only works with the police mobile units. I did not know how to communicate with them. How do I know I was supposed to tell them that? (PAK-FR-SR)</p> <p>The police were constantly monitoring our movement to make sure we don't remove any evidence from inside the building. Every time I went inside or outside, they would body search me. It was absurd. (PAK-FR-MF)</p>

4.2 Main Phase: Illinois Fire Service Institute, USA

This section reports the findings of the main phase of data collection. As described in Chapter 3, the data for this phase were gathered at the Illinois Fire Service Institute (IFSI) in Champaign, Illinois, and examined the routine operations of the fireground officers as they received training to respond to emergencies. The aim of this phase was to collect empirical data that can help understand the common operational issues that the first responders face within and outside their organizational boundaries. The key findings of the main phase

data include (1) use of inconsistent terminologies, (2) firehouse culture, (3) training inadequacies and disparities, and (4) complicating communication which are discussed in detail in the following sections.

4.2.1 Inconsistent Terminologies

Interviews with the research participants suggested that sharing of information in mutual-aid settings is commonly stymied using unfamiliar professional terminologies. As one fireground officer stated:

One of the biggest dangers for us on the fire ground is when we don't understand each other as we exchange information...nothing else messes up more than this. (IFSI-IC-DO)

A quote from a senior fireground officer clarifies what those 'dangers' could possibly mean in the following statement:

Unknown words, codes, or jargons don't help...they only create confusion and confusion leads us to catastrophes. (IFSI-IC-SS)

In finding that the use of uncommon and unfamiliar terminologies during response operation could be problematic, the researcher decided to explore the issue further. Some of the insights offered by additional research participants are as follows:

The most important thing for us is communication. It is unreal how many lines of duty deaths in our work are because of communication lapses. I remember my days when we would talk to the police on the radio and go... what? What did they just say? They need to do a 'one roll'? What does that even mean? It is dead important in our work to know what people are trying to say. (IFSI-BC-JK)

I think the idea is just to make sure everybody is on the same page, for instance, police... because police have their own jargon, which we don't even understand. And they have their own radio channels, and they don't like to communicate with us [laughter] So this is a big problem between the fire services and police. We don't know what they mean a lot of the time. (IFSI-IC-MG)

Don't ask about sharing information. It's confusing. It's a nightmare. I mean we work in boiling hot temperatures with only seconds to act. When someone talks to me in their own words that I have trouble understanding, it pisses me off. (IFSI-PI-TT)

These first-hand accounts describe that the use of terminologies that are not commonly used or understood can be highly consequential leading to situations where serious operational and safety issues can occur. Comments such as 'dead important', 'big problem', and 'creates confusion' – all represent negative impact that inconsistent terminology can have on information-sharing efforts. The following section expands on this issue.

4.2.1.1 Regional Jargons

Several research informants suggested that the use of regional jargon significantly influences communication. Some excerpts from these interviews are presented as follows:

We have our own lingo – jargon problem in the fire services that is still a carryover from what we have always done. And I think as the time progresses, some of that will get better. It is all part of the culture of who we are and where we come from and it's going to take work and it's going to take time before this is changed. No matter what it takes, it has to be fixed because its use causes us the world of problems. *(IFS1-BC-SS)*

Down here in Chicago they call their ambulances 'rescue'. So, the terminology is different. Even though 90% of the time we can immediately decipher what they are saying and act accordingly. Other times we do not understand because they say... 'hey, I got a rescue in staging' okay! Bullshit, it is an ambulance. Different terms add to our difficulties to fight our enemy. *(IFS1-BC-MH)*
Talking about a term... I think it was 'streetscape.' Now, they don't use this term at all in New York. Another thing was when the smoke is right in the front . . . we use the term 'we got a header' Others will be like, what are you talking about? You know, so it's just different terms that can cause confusion. *(IFS1-FF-JY)*

The simplest common terminology for the first floor is called the first floor. Why call it division one? Why call it something else other than what it is. Division one to somebody else can mean the 1st Infantry in the army. Division 1 in college football means you play at the highest level. It can probably mean something totally different to someone else. There is nothing else in the world you can call the first floor except the first floor. *(IFS1-IC-JH)*

And there's jargon like that there's sometimes they would I've noticed the problems guys go to a new class. And the

new class teaches on a set of jargon and set a term like 'I'm bumping up left, I'm moving alpha, I am doing this'. And, you know, sometimes that one person knows what he's talking about, but the rest of the group doesn't. (IFSI-FF-PG)

Table 4.5 lists some additional data providing useful insights into the common use of regional jargon and how it can cause information-sharing problems within members of the same organization. These accounts indicate that basic terminological differences could cause major misunderstandings. Besides these accounts, the researcher experienced real-time episodes where regional jargon was seen as highly problematic. The following communication between two firefighters during an evolution (IFSI-EVOL-01) debrief explicates this observation:

FF1: *You [referring to another firefighter] used the term 'streetscape' Now in our area, we have never heard of this term. I'm like what is he saying?*
FF2: *Are you serious? What shit did you think I meant by it?*
FF1: *No fuckin' idea. And then Mike here is looking at me as I'm supposed to know it all [laughter].*

A similar experience was recorded during another evolution (IFSI-EVOL-08) in which the researcher participated to examine the flow of information among the firefighters. The evolution was staged as a burning standalone tower requiring forcible entry. Soon after the evolution commenced, the flow of information between the company officer from inside the tower and the incident commander situated outside experienced disruption due to lack of common terminology. The conversation between the actors of the evolution is documented below:

Command: *I'm not getting many prompts from anyone.*
FF1: *Engine 1, now stretchin with the Halligan*
Command: *What?*
FF1: *Engine 1, now stretchin with the Halligan*
Silence...
Command: *Repeat, what do you mean by Halligan?*
Silence...
Command: *What is it?*
Silence...
FF2: *Command, Engine 1 stretchin with Pro-tool.*
Command: *Ok! Message received.*

Table 4.5: Data Representation of the Impact of Regional Jargons on Fireground

Accounts of Fireground Officers	Accounts of Fire and Battalion Chiefs	Accounts of Program Instructors	Informal Conversations with various actors
<p>For the most part, our jargons can be understood. We can try to understand what an unfamiliar term means or at least assume what it means. But assumptions can be problematic on the firegrounds. Especially when we don't have the time to ask what a term means which is new to us. (IFSI-FF-SW)</p> <p>One of the things you probably seen with this class is that when we break down incidents, we keep it simple as we can. We keep it simple to where everybody can understand, and we do not get too crazy with terminology and everything else. We try to keep it simple. Other regions don't do this and that is why it is difficult to work together. (IFSI-FF-NN)</p>	<p>From the outside, there was a little bit of confusion at first as to who was who, on the radio. I had seven...I had two...I had one. I didn't know who was initially. Matt, you used a code word to tell me who you were. I had never heard that in 20 years. Where did you get that from? (IFSI-BC-BM)</p>	<p>When we first started coming down here as students...as instructors, we were also confused at times. Where we are from, you know, the thing with the big ladder on top, we call it a truck and the one with all the hose is called the engine. Well, everybody down here would call it a truck and we were like, 'no, a truck does not go there' They will be like, 'what are you talking about?' That is an engine versus a truck, but everyone called it a truck. For us, the terminology is completely different. Now if you tell or explain me what he is doing with that equipment, we will know what it is exactly. (IFSI-PI-LL)</p>	<p>Under some Incident Command Systems, they will call the first floor of a building 'Division One', second floor, 'Division Two' front-side building is 'Side A', and the rear side is 'Side C.' Within some divisions they will call a fire attack group or a fire attack branch. (IFSI-IC-BB)</p> <p>First floor is a common term. Everybody knows what the first floor is. Everybody knows what the roof is. Everybody knows what the basement is, but as soon as we start attaching other terms to it, it is where you get the room for misinterpretation. (IFSI-IC-TC)</p>

These two examples from the live-fire training evolutions indicate that using a regional terminology such as 'Halligan' instead of a common term 'Pro-Tool' (both terms used to refer to a prying bar used as a forcible entry tool) caused confusion that subsequently developed misunderstandings among the firefighters and the incident commander. This finding led the researcher to explore the regional divide of the fire departments and the impact of this on the fireground when teams from multiple regions either train or work together.

Using the available archival resources held at IFSI, the study collected pertinent information on percentage distribution of fire departments by U.S. regions. According to the Federal Emergency Management Agency (FEMA), the USFA currently hosts 27,179 registered fire departments divided into four main regions. The Southern and Midwestern states account for 36% and 31% of the registered fire departments, respectively, whereas the North-eastern and Western states have 21% and 13% of the registered fire departments,

respectively (FEMA, 2020). The research data suggested that fire departments operating within each region are inevitably exposed to the culture of that area which subsequently influences the communication styles of the department's workforce. In situations where members of the fire departments from different regions are expected to work together, information-sharing issues can erupt.

As stated by two research participants:

Depends where you come from but if you say water tender in California, you are going to get an airdrop with 20,000 gallons of water and the same water tender in West Virginia is an 18-wheeler fire truck with under 3,000 gallons of water. *(IFSI-CI-GZ)*

The second participant provided the following example:

A fire hydrant in some areas is called the fire plug and in others, a pump or in other areas as the johnnie pump. So, with three different names of one thing, we need to be careful what we say. *(IFSI-CI-DL)*

The data that included the researcher's observations during and after the evolutions as well as the interviewees with several informants signal regional jargon as problematic during fireground communication. In emergencies where first responders such as the firefighters require fast, reliable, and complete information, the use of regional jargons that influence information-sharing efforts.

4.2.1.2 Recognition and Avoidance

Despite its significance and recognition, the issue of regional jargons remains largely unresolved. For example, several informants reported a dearth in the measures taken to mitigate the dangers of uncommon terminologies. District Chief Scott Stykel of the city of Freeport, IL, was among the first informants who called attention to this avoidance. He stated in an interview:

I know how things can quickly go wrong when we have communication issues with the police or with other services. I whole-heartedly recognize that when we can't understand each other on the fireground, it causes us problems... a lot of problems. But frankly, this what has been happening for decades and this is still the case. *(IFS-BC-SS)*

Other participants, when asked about their views on this topic, added:

Within the city of Chicago, the police, EMS, fire department have different styles of communication and uses terms that we have never heard of. This creates confusion on the fireground. I know this is obvious that it will happen but there are no tangible steps being taken to fix this problem and this annoys the hell out of me. (IFS-IC-SW)

We hardly ever talk to these guys [referring to the members of other emergency management organizations] until we meet them at emergency scenes. There are so many things that are different between us. I mean, we don't even use the same radio language to share information. I mean this is crazy if one thinks about it. (IFS-IC-EM)

When training with police, fire, ambulance . . . all the chiefs get together and they talk about what kind of jargon they're going to use so the information exchange between them is clean and clear. The idea is to try to bring everyone on kind of on the same page so our organizational jargons are well understood. That's the goal because it is critical for all of us. But I tell you [referring to the researcher] we hardly ever accomplish that goal (IFS-PI-JM)

These quotes not only signified information-sharing issues that the use of uncommon terminology could evoke, but also depicted the element of surprise found within the fire services for not adequately addressing this problem. To confirm and further explore this finding, the researcher turned to some senior-level fire officers to collect additional data on the under-discussion issue.

Robert S. Hoff, Fire Chief of the Carol Stream (IL) Fire Protection District – Station 27 and a senior instructor at IFSI is a third-generation firefighter whose family has served in the U.S fire service for over 103 years. Chief Hoff, in an interview stated:

When I was in the city [referring to Chicago] as the fire chief, we worked tightly with the Police. We had marathons. We had immigration marches. We had July 4th stuff. We worked together, so we had a command setup. Because of this we took care of a lot of uncommon terminologies so we could talk and understand a lot better. We probably interacted better than most big city's fire and police do. We had a great working relation between us – only because we both [fire and police chiefs] recognized the importance of working together. A

lot of the fire departments don't think that way today and may be that is the reason they fail to work together. (IFSI-FC-RH)

Similarly, Lake Lewis, Program Director for Officer Training, and a field instructor at IFSI expressed his opinion as:

I don't know why we don't we fix the problem of different terminologies. I really don't. But I can tell you this much that we in the fire services are caught up doing other things that are not important and ignore fundamentals of our work. We have made communication way too hard on ourselves. We use words on the fireground that we don't use in our daily lives. We don't make an effort to talk with people that we should be talking to a lot more. There is lack of funding, lack of equipment, I do know anything about it, but all I know is that we need to talk a lot more before bad things happen. (IFSI-PI-LL)

Both Chief Hoff and Program Director Lewis accentuated the importance of building prior relationships to mitigate the challenges posed by uncommon terminologies. As evident from Chief Hoff's personal experience, the interpersonal relationships with the Police department helped him and his team to work with one another in harmony and without dealing with common problems. Program Director Lewis seemed to be advocating the same point. His concerns that fire departments do not interact with other emergency services, yet again indicates the reason why agencies struggle to work together in emergencies.

4.2.2 Firehouse Culture and Subcultures

The main data from IFSI revealed that the novice firefighters usually subscribe to the philosophy of their seniors from the early stages in their careers. The command and control, strategical and tactical principles, and operational techniques that they learn from the leadership of their fire departments becomes the part and parcel of their work lives. As one fireground officer stated:

Straight from the academy, we land in the hands of the senior officers. After a while, we start to talk like them, walk like them, and act time them...my wife makes fun of me that I've started to eat more meat like the chief [laughter]. (IFSI-IC-VK)

This inclination of personalities and behaviours towards the seniors is understandable. In fact, it is quite common in places where the chain of command is an integral part of the organizational culture such as the fire services (Buck et al., 2006). However, adopting ways of doing things that specific to a particular firehouse(s) can impact sharing of information on the fireground. For example, Lake Lewis stated in an interview:

What causes me to interpret a term differently than others... my background, my training, my biases, my likes or dislikes of that particular term, okay. When you heard me in a classroom talking to this other Battalion Chief and he said: 'that I do not like to have a high-rise response, we are going to do it this way instead, we are going to do it my way. You could damn with terminology, we are not going to call it that because I do not like it that, I am just going to call it this' It is biased. Biased-pro or biased against. The Chief could simply not like a term, and this means that people under him will hesitate to use it. (*IFS/PI-LL*)

To cross-check the validity of this claim, a career firefighter was asked to comment on the issue of terminological preferences of the senior officers. He responded:

The drill we did this morning. We have a safety officer. Safety officer moves into a rescue spot. Rick from Bellevue Park station says: 'why do you say so? what do you mean by that? I never heard that, what does that mean?' So, interpretations, quite frankly, come down to whom do you train with. If my firehouse uses a certain term, for me, that's all that I know. (*IFS/IC-JT*)

As further data were collected, the inadaptability of the senior officers to change the ways they have been doing and calling things appeared as contributing to the problem of subcultures within the United States Fire Administration (USFA). The data indicated that the underlying reason for this tenacity is the ego and pride that exists in the top ranks within the fire department. The senior officers such as fire chiefs, assistance chiefs, and other departmental seniors suffer from unchecked ego and pride that leads them to the false assumption that they are self-reliant and fully prepared to deal with any challenge. John Hojack, another FCO School instructor, states:

Our biggest obstacle in the fire service, our biggest clutch, 'ego and pride'. I am a fire chief, so I am the king of my domain. I do not care whatever outside influences

try to influence my guys because I am a chief, I am like the supreme, I am like the commander. What I say goes, if I want it this way, then it is going to be that way. It is going to be said in this way, it is going to be performed this way. So now what happens when you try to get in intra-agency cooperation. *(IFSI-PI-JH)*

The issue of ego and pride is highly consequential for professional development of the firefighters. In follow-up discussions with the IFSI instructors, the researcher was informed that because of the ego and pride, it is common for the fire chiefs not to communicate or even train with members of another fire station (discussed more in forthcoming sections). This shortfall in intra-organizational communication and training further aggravates the issue of distinct style, techniques, and in many cases, language that could lead to fireground coordination issues.

There are fire chiefs in Illinois that border each other. They refuse to talk to each other because of pride and ego, okay. So, if you want to care you are going to call it this and this is what means. You are kidding me, call it this, this is what is means. We do not have an overarching philosophy within the fire service what everything is supposed to be called. *(MP-PI-JM)*

4.2.3 Training Disparities and Inadequacies

Training is an essential part of any emergency response service. Through consistency and repetition, training allows emergency responders to achieve proficiency in their routine work. Given its importance, the training programs in USFA have constantly evolved in both complexity and sophistication to prepare fire officers deal with myriad of professional and personal challenges. To make these initiatives conveniently accessible, nearly every state in the U.S. has some type of fire service training and certification system in place. As confirmed by a senior IFSI instructor in an interview:

There is no one person in the State of Illinois or in the United States of America who says this is how things have to be in regard to the fire service. There are places that do their own thing. Have their own biases. They set their own expectations. *(IFSI-PI-TM)*

Similarly, a fireground officer acknowledged in an interview with the research:

Our training in Wheeling or Effingham [referring to two separate towns in the State of Illinois] is mostly all the

same way. It isn't like completely crazy from the way we all do it. You know, we all do it pretty similar. But there is also definitely an issue when we get trained in different places. *(IFSI-FF-KT)*

As further data were obtained, the issue of discrete training methods and how it inevitably leads people to develop diverse personalities, attitudes, and skill sets, started to emerge. For example, a program field instructor stated:

We [referring to the fire service] are not like the U.S Marine Corps where every officer goes to Quantico, Virginia and they go to their basic school for officer training, everyone. So, every marine officer is taught the exact same philosophy at the exact same school and they come out with the exact same skills. We don't have that luxury. We sometimes don't even agree on basic functions of our job and that's when shit starts hitting the fan. *(MP-PI-AE)*

Similarly, a senior program instructor, Brian Scott, stated:

We see different training methods in our academies. How things are done here at IFSI could likely be different from other academies. Our job descriptions are clear and so is our training goals but how we get to that goal could vary. This, by the way, allows things to be done or called differently from others when it comes to real action. *(IFSI-PI-BS)*

The preceding quote helped in recognizing that heterogeneous methods of training are also common within the USFA and, thereby, could lead to communication issues on the fireground. The research anticipates that in the absence of nationally accepted procedures, most facilities have adopted unique training methods by putting their own spin on how to respond on the fireground strategically and tactically. The Program Director for Officer Training, Lew Lake, explained this in an interview with the research:

In the State of Illinois alone for fire departments, there are 56 different teaching agencies. They can teach guys how to be a fighter. They can teach guys how to be an officer, how to be a chief. Each one of those 56 entities, they train firefighters in their own styles. The instructors in these academies call a term or phrase differently from one another [the bias from the instructors] and this adds to the problem of common terminology. *(IFSI-PI-LL)*

Firehouses training together could solve many of these cross-firehouse disparities, while not doing so exacerbates the problems. As Chief Hoff, commented:

In my 36 years of service, I whole-heartedly believe that if I as a fire chief do not talk or train with my own department's deputy and battalion chiefs, we will see different expectations on the ground because we have different personalities. Imagine the impact of not training with other fire stations who we most of the time don't even know well. We face challenges all the time because we don't know their expectations and personalities. *(IFSI-FC-RH)*

Chief Hoff's comments indicate that training with others mean: 'better understanding, planning, and decision-making in times when these elements matter the most'.

4.2.3.1 Unfamiliarity and Inefficiency

An important part of training is building relationships and becoming familiar with other firefighters' strengths and weaknesses—which can be crucial to teamwork on the fireground. Battalion Chief Rutter from Palos Fire Department stresses this point in saying:

That's where the training and working together day in and day out helps within our fire department and with those who are in our district. Because then I know if he's lacks in something... you know. Whether he gets winded really quick, or he's not strong. And then I know, hey, I gotta...I gotta do something for him on the fireground. Or he knows, hey, I suck down the air bottle way too fast. So, we all kind of know what we're good at, and what we're not so good at. So, we can compensate to do to make sure the team is effective. So, we don't go in or we just suck in doing things. *(IFSI-BC-AR)*

These comments underscore the benefits of cross-training in building relationships and influencing role it plays in recognizing the personal and professional characteristics of the fellow firefighters. Although it cannot be assumed that a lack of prior knowledge or experience of working together would necessarily bring fireground communication or coordination to a halt, it does, however, suggest operational inefficiencies.

For example, company officer, John Tourtelot, at Glenview Fire Department maintains:

I am a company officer and when I get brand new guys... I mean, like, straight out of the academy [probationary fireman] or those from other fire departments that I don't know well...I can tell you they're going to be on my heel. I'm going to make sure they're like off my on my hind parts. Whereas if I had, you know, known these guys or have worked with them then it's different. Now it's just kind of getting the lingo down, and I can, I can let them work farther, because they know how to handle themselves, you know, they don't need my mother-hand on them. It saves time and communication on the fireground. *(IFS1-FF-JT)*

An additional group of informants – comprised of experienced and novice firefighters – accentuated the importance of trust among those working on the fireground. It appeared from the conversations with these informants that trust plays a huge role in their profession and one of the most effective way to develop trust is through training. Fire Lieutenant, Pete Mensching, from Northbrook Fire Department asserted in a post-evolution debrief:

You have to do things to build up trust which is central to our work. We all are trained with the same fundamentals. I mean...we've never worked together until five minutes ago and we did okay. But we will do better five days from today because by then we had trained together which helps us with building trust. I can trust this guy [referring to his colleague] more by then because I know he's got me covered. *(IFS1-IC-PM)*

As apparent from these accounts, the problem of cross-training deficiencies can negatively impact mutual-aid work in many ways. According to these accounts, misunderstandings, miscommunication, and mismanagement are some obvious operational challenges that could emerged due to the dearth in cross-training among the fire rescue teams. Although mostly resolvable with the help of a centralized incident command system or, in some cases, through face-to-face conversations clarifying the roles and objectives of the operation, these operational challenges use up precious time under major conditions. And that is problematic because of the dangers that result.

4.2.3.2 Increased Danger

Dr. Jamie McAllister, chief author of the FireTox report was asked in an interview to give her comments on the findings of this research on common cross-training deficiencies within the fire services. Based on her decades of

consulting experience with fire departments across the U.S., Dr. McAllister responded with the following example:

A house or apartment fire in a relatively smaller town is typically met with one or two fire stations responding to the incident. In these situations, the fire houses are usually in sync with each other through the standard operating procedures that the fire stations have already worked out. These fire houses talk and train with each other frequently and prepare in advance their actions plan for the next emergency. However, this scenario could be quite different in a large-scale incident where additional fire houses operating at the city, or sometimes, county-level are required as reinforcement. In such situations where multiple units respond, lack in intra-departmental training could severely impact the fire rescue operation. There are several dozen examples of these.

Dr. McAllister's illustrative quote not only underscores the importance of training and interaction among firehouses but also indicates the dangers of a shortfall in this area. She explicated in her discussion that the way firehouses usually communicate with one another depends primarily on the well-defined standard operating guidelines (SOG) that the different fire departments have in place. However, there are several fire stations that either do not have these SOGs or their operating procedures do not align with the firehouses in their neighbouring jurisdictions. When fire houses do not train sufficiently with their counterparts from other jurisdictions, the absent or misaligned SOGs lead to serious operational issues.

Other informants also spoke to the dangers of what happens when intra-disciplinary training deficiencies persist. For example, John Hojack, an IFSI instructor, in a group interview stated:

There are fire departments that are volunteered. They might get 16 hours of training a year. When these volunteer firefighters are called in a mutual-aid operation, they have no prior knowledge of their teams they will be working with. They don't know the goods and bads... their strengths and weaknesses. *(IFSI-PI-JH)*

Similarly, Fire Lieutenant Patrick Dubs, from the Pleasantview Fire Protection District, participating in the same interview commented:

You [referring to the researcher] are familiar with that factory fire in Pakistan. That does not work for house fire, but unfortunately, in our fire service, we try to squeeze all the stuff into a day-to-day operation. It does not work.

Our training is very limited with other groups and if we train with them on a house fire, we expect the same results when it's a high-risk commercial fire. It simply doesn't work like that. *(MP-FF-PD)*

4.2.4 Complicating Communication

In the world of emergency management services, the success of an operation heavily depends on effective communication. It has been proven over the years that effective communication means better teamwork, increased safety, and efficient use of time for the first responders. These encouraging results have led emergency management organizations to persistently look for new and innovation methods of communication for their workforce. While these efforts have proven to be beneficial in many ways, they sometimes overlook the fundamentals of effective communication i.e., to keep it simple and clear.

This research found that like other emergency response organizations, effective communication is considered central in the fire services as well. This significance comes from the fact that communication related problems are the most common cause of firefighters' fatalities and injuries in the United States. To ensure safety and operational efficacies, the USFA places great emphasis on the issues that may affect communication on the fireground. The data collected at the IFSI indicates the widespread focus in the U.S. fire services in improving the technological capabilities of their workforce to warrant better communication with one another. Several firefighters confirmed this finding when asked about their thoughts on advanced technology as means of communication:

We add new stuff in our fire department all the time because our regional departments know how crucial it is to have the latest devices for communication. *(IFSI-IC-MT)*

In my fire department, we spent a great deal of time in getting used to the new technology that we get. You want to be fully aware of how it works before we enter the fire ground you see. *(IFSI-IC-JL)*

We run a Smart Firefighting Workshop in our district which is more about how to fight a fire with the help of so-called smart technology than to fight the fire smartly [laughter]. *(IFSI-IC-DM)*

The data also shows that while acquiring new and reliable technology is highly desirable in the fire service, there is also great concern over specific communication challenges that accompanies new technology. As informed by the data, the paradox is that the new technology is not always perceived as the right and best option to the challenges that the firefighters routinely face. This perception stems from many conversations with several fireground officers who denounced the idea of regularly adding new technology.

You [the researcher] would agree with me that technology is meant to make our lives easier not difficult. So, for many of us it does not help when we have to keep learning about new things and not use the one that we already have. (*IFSI-IC-AL*)

Our jobs are demanding... sometimes working for 24 hours with no sleep. When they bring me new gadgets, I hardly get time to play with them and this makes me very nervous on the fireground if others are using it and I don't know much about it. (*IFSI-IC-DC*)

Supplementary data from IFSI guided the researcher to some surprising and interesting findings. The data shows that although equipping the firefighters with new and advanced technology (e.g., personal location equipment, hand-held thermal imaging displays, mobile technology etc.) has its obvious benefits on fireground operations, there are certain unintended consequences of this strategical focus that are often harmful. One highly consequential effect of technology is the increased degree of complacency found mostly among the new generation firefighters. The following excerpts from informal conversations with several fireground officer, fire chiefs, and program instructors helps clarify the point:

When my great grandfather was a fireman, our society was a lot different. Our fire departments had World War II veterans, Korean War veterans, Vietnam veterans...they people made up our society and made-up fire departments. The other sides in this generation were tradesmen, carpenters, electricians, plumbers and that is all the stuff we did before we became firemen. The kids today... they are not carpenters, plumbers, or know anything about what happens in a war, so they do not have the practical skills. Their practical skills are limited to the technology that they heavily rely on (*IFSI-PI-LL*)

I think a lot of that [referring to poor fireground communication skills of new generation firefighters] has

to do with too much emphasis over the last 20 years that has been put on education and technology... too much emphasis as opposed to practical skills. Too much college, and not enough kindergarten, I would say (*IFSI-PI-BS*)

I have in my fire department 19-year-old who doesn't know how to use a manual can opener. I'm serious. A 19-year who doesn't know how to open a manual can opener. Why do you think we have such an uptake in the police department fire shooting? Yes, there are bad people out there. But these kids don't know how to fight... they know how to shoot but not to fight. So, they just fire at people (*IFSI-PI-JM*)

A lot of our brothers and sisters have become complacent on their jobs. They need to realize that technology is just one tool in their toolkit but what saves the day is their attitudes and the deep relationships they have with their work and one another. (*IFSI-BC-KT*)

When I was a Lieutenant or a Captain, I'd a young fireman at my station to whom I had to teach how to start a lawn mower to mow the grass. And his response was that we had a lawn service at home, so I never had to cut the grass. (*IFSI-FC-RH*)

When I first came into the fire department as the probationary fire fighter, I was told the most important thing is to 'know the job.' So, I started reading ... reading a lot of the fire manuals and procedures. But that's only half of it. The other half is actually experiencing firefighting. How to force the door? How to climb a ladder 100 feet in the air? How to pull the line within a minute? Tacit knowledge of how things are done. Today, we don't do all this. We spend more time training on how to use our radios and this new piece of equipment that is hung to our belts. (*IFSI-FF-PM*)

These illustrative quotes exemplify the problem of complacency in the fire services because of the paradigm shift from learning practical skills to the increased reliance on technology.

Another negative consequence of the over-dependency on technology is the growing levels of impersonality among the firefighters. Several interviewees showed their dissatisfaction on how the dynamics of social skills have been impacted by using technology in their routine works. The concern of depleting social skills among the firefighters was mostly shared by the senior

fire officers who believe that human factors of communication are more effective than the technical aspects of fireground communication. For example, a fire chief in his interview stated:

Leadership is not about giving orders. It is about sharing information...sharing the dangers. I as a fire chief have the pressure of responsibility. This sharing requires social skills which we learnt when we trained by our seniors. We were excellent in doing that. I'm not saying that technology is bad... but we need to remember that our social skills are a lot more important than our devices.

Similarly, Chief Rielage, in his interview stated:

Our communication has become a lot more impersonal than ever before. In our jobs, trust is critically important which we develop through personal interaction. The young generation firefighters are too caught up in their own world of cell phones, tablets, and social media these days and they hardly believe in interpersonal communication.

As apparent from these statements, the increased focus and overreliance on technology within the fire services has unintentionally and negatively impacted the interpersonal communication skills of the fire services workforce. Chief Rielage's closing comments on how people in his workforce have lost touch to interact with another directly (face-to-face) rather than through a device has been the consistent message through this main phase of data collection. Several informants of this research seemed disturbed by the lack of face-to-face communication among the firefighters which according to them, contributes to more chances of misinterpretation of the message. For example, it was observed during an evolution debrief:

I want you to make every effort to do a quick face-to-face with the company officer . . . it is key. I'm here . . . I'm Interior . . . what you need? . . . what have you got? This helps with all the overall operation. This one-minute direct conversation pays off in many different ways. Remember, the preference is face-to-face versus the radio. (*IFSI-EVOL-04*)

These suggestions from the FGO program instructors do not imply replacing radio communication with face-to-face, but certainly suggests the benefits of having direct face-to-face communication with others when there is an opportunity to do so. As Instructor Jeff Mackay summarized:

Although it is not always practical to directly communicate, we can find many opportunities to do so but we don't. In my opinion, it is still the most optimal way of communication when the choice is available.

An evolution debrief noted:

You were talking on a radio when the forcible entry was completed. There's a lot of talking back and forth on the radio and you guys are within 10 feet of each other. Once we stopped that thing, you start moving really quick.

This concept is best explained by an FGO instructor, Roger Lunt, who spent several years examining communication breakdowns in fire and rescue services:

As an incident commander, I've frequently instructed my deployed companies to stay within a shouting distance and be able to see one another. Not only this makes them to communicate more directly which helps in better understanding but also assists in noticing the state of their physical well-being. So many times we can't tell if a person is stressed or fatigued but seeing him up close tells a lot more. The problem is that the younger incident commanders don't have practice in drills anymore let alone actual incidents which leads to many communication issues.

A subsequent and closely linked problem to the impersonal and indirect communication among the firefighters is their increasing inability to explicate information in its simplified form. In analysing the data, the research found with little emphasis placed on developing the humanistic (social) communication skills of its workforce, the firefighters often find it difficult to use simple language (words) to convey the idea or the message. This problem was mostly observed during the live-fire training evolutions where firefighters seem to thoughtlessly use complicated words or sometimes lack of words to explain their circumstances. For example, the following portion of an evolution debrief by the Incident Commander stresses the importance of explaining the situation in greater detail to facilitate support and decision-making from the command:

You need to tell your Incident Commander what are you going to do? What's the priority? These guys [referring to fireground commanders] need to know that because I guarantee any one of these . . . the three chief right here . . . don't know that you got all this going on. They're supporting everything you're doing but they can only support what they know. You need to be better able to

explain them what you are see so they can support you. Don't rob them off critical information because you don't like to talk.

Similarly, a company officer, after a live-fire evolution shared:

I think there's some things I gotta do to better orientate myself in the building in terms of being able to describe where I am in the building. I just said we're going to do a right-hand search. And if I'm saying, hey, first room on the right. But that's where we're at and that doesn't mean anything to anyone. We need to learn to describe what it means to be on the right side... is it the first room from the entry or exit point? Alpha side or delta? Where is it? What it means for me has to mean the same for others otherwise we just opened ourselves up for confusion. I have this problem of being too short in doing that. When we go back to communicating amongst the groups. I saw a couple other groups as they were going through the building ... like, yeah, there's another company in there. Well, who is it? I wouldn't know who it is. If I'm the officer, I want to know what group it is. If it's 10 I want to know it's 10. If shit hits the fan and things go bad. And now they're starting to call group 10 on the radio, and they're not answering. Now in my mind what I just saw, I just saw them there in that Southwest group. OK, so now you got to start getting bigger picture. Short sweet. Hey, this is a group seven we're doing a primary right-hand side we're doing a primary left-hand side. All right, we'll meet someone and you go short sweet nothing very long at all guys but figure out who each other are and you do this figuring out my going in detail with each other.

The need to explain the situation, what it means, and how consequential it is for the operation simply and concisely also emerged in conversations with other program instructors and fire officers. Sean Burke, Assistant Program Director at IFSI, makes the following two comments in an interview to express the importance of using simple words to explain the meaning of information:

You need to recognize that you have to explain why you are asking to do certain things. It's just basic stuff that we're doing to fine tune how we run our command. Command part is pretty basic, right? It is basic if we know what you want to do when you're head on with the fire and why. But if you don't give me what I need to know, my command is futile.

And let's agree with the size of it's going to be that. So, what is it? What's it gonna hit? I would say stories. Conditions. You know, commercial residential

occupancy, type of occupancy? Yeah. Keep it simple. Yeah. Give me the three big things. What is it? How big is it? And what's going on? Okay.

In brief, simple and clear communication is essential for effective fireground communication. While technology has its advantages, the over-dependency on modern equipment is found as problematic making users complacent, detached from others, and unintentionally inclined in complicating simple communication. These findings are further illustrated in Table 4.6.

In summary, this section reported the findings of the main phase data that examined the routine fireground operations. The main phase data consisted of interviews and informal conversations with different members of the USFA, researcher's active participation in live-fire training evolutions, class discussions, and analysis of several dozen reports retrieved from the NIOSH database. These data sources allowed to gain deeper understanding of the issues that commonly erupt in emergencies and their consequences on within and across team efforts to mitigate such situations. The most prominent of these issues is the use of inconsistent terminologies, the growing division between the firehouse culture and subcultures, training disparities and inadequacies among the firehouses, and how communication is made more complicated than it ought to be. A detailed analysis on the possible causes and impact of these findings in crisis response settings are provided in Chapter 5.

Table 4.6: Data Representation on Complicating Communication

Accounts of Fireground Officers	Accounts of Fire and Battalion Chiefs	Accounts of Program Instructors	Informal Conversations with various actors
<p>Don't get fooled by the veneers. There is a difference between a brick veneer and a brick house. Just tell me clearly and simply what you are up against so I can support you. Remember, I can only support you if I know what you need support with. (IFS-FF-DO)</p> <p>The average response time for the fire fighters is less than 5 minutes. The challenges are many but one that adds to our challenges the most is when people make things more complicated because of their working styles and training. It bothers me...it pisses me off. (IFS-FF-KR)</p> <p>I think the communication can be simpler. No one else was on that communication network. Fire fighters would function on the direction of their company officers or their leadership. We have expanded that capability to everybody just recently, but we still haven't caught up with that new communication style. Our firefighters still struggle with simple way of communicating. (IFS-FF-DS)</p>	<p>You know communication is a perishable skill. Our job is a perishable skill. If I do not run a fire for a year's time, I am going to be rusty in running the fire. If we don't talk enough, we forget how we ought to talk to others on the fireground. (IFS-BC-RR)</p> <p>In our profession, it seems like a whole bunch of smart guys try to get together and say, 'well, this is what we are going to call everything because it sounds like really technical or really important' But the simpler you keep it, the more common understanding you will have. (IFS-BC-ST)</p> <p>When reporting me the fire, keep it simple. Yeah? Give me the three big things. What is it? How big is it? And what's going on? Okay. Don't make it harder than that. It's simple! (IFS-FC-RH)</p> <p>For some reason on the radio, we try to sound smart. Right? Does anybody ever go on the radio and say 'School is on fire' . . .No, they say the 'Education facility is on fire' . . . [laughter]. (IFS-BB-SS)</p>	<p>The communication has to go back and forth between the firefighter and the company officer. Tell your office, 'hey command, engine one is up here, we have the water on fire, can we open up the building?' (IFS-PI-BS)</p> <p>Systematic evacuation is different from emergency evacuation. You can't just say, 'All companies withdraw from the building or evacuate. This was an emergency evacuation or not just withdrawal.' We could have been toasted inside right now because you aren't talking with us clearly. (IFS-PI-BB)</p> <p>One of the things you probably seen with this class is that when we break down incidents, we keep it simple as we can. We keep it simple so where everybody can understand, and we do not get too crazy with terminology and everything else. We try to keep it simple because here we recognize how complex terms make our jobs harder and limits our understandings. (IFS-PI-JH)</p>	<p>Implicit communication means that even though everybody may understand what the mission is, even though everyone may understand what our objectives are, we use the exact same terminology, so we take away the chance of it going wrong based on interpretation, okay! (IFS-IC-SW)</p> <p>So, it's just . . . it's all about painting that picture when you're on the inside. Because as we said, on the outside, I only know what you're telling me. Right? So, you guys are painting that picture. And that's an interesting job. Keeping it . . . keep it as simple as that saves the day. But paint the picture right...explain it well. (IFS-IC-CL)</p> <p>Use simple language guys. 'We have a standalone McDonald's on fire' Everybody instantly gets a picture when you say that . . .right? I got a lightweight type to fast food restaurant. Okay, I got an idea. But when you say the name, because you know your areas, right? Its instantly . . .it's coming in your head where it is how it looks. (IFS-IC-MT)</p> <p>I'm a Chief but I don't agree how my men feel when they use those big words to explain small things. It's the heroism within them that forces them to say all that shit. (IFS-IC-CT)</p>

CHAPTER 5

DISCUSSION

5.1 Exploratory Phase: Ali Enterprises, Pakistan

This section discusses the findings of the exploratory phase data regarding the factory fire incident at Ali Enterprises. The exploratory phase guided the research to recognize the problems that contributed to an ineffective response from the emergency response teams (ERTs) leading to adverse outcomes. The following section lists and explicates those problems in detail.

5.1.1 Environmental Assessment and Responsiveness

Emergencies are inherently complex and dangerous situations. Often, the inability to assess hazards embedded in the emergency becomes the root cause of poor decision-making and inaction. As a result of these shortfalls, the safety of all those involved in an emergency could be at stake. To manage the situational hazards, therefore, it is critical to be aware of one's surroundings to determine what is going on and what actions are required to ensure safe and effective incident response.

The ERTs attending the fire incident at Ali Enterprises underestimated the intensity of the situation. As a result of their misdiagnosis, the first responders met with a range of unexpected challenges from the very onset of the operation. The unexpected challenges negatively influenced their work which subsequently resulted in the heavy loss of human lives and resources.

The fire brigade, for example, was the first agency to be notified about the fire incident at Ali Enterprises. The initial response from the fire brigade, however, was inadequate. They opted to wait for additional confirmation on the news which resulted in unnecessary response delays. Similarly, the nearby fire station did not distribute pertinent incident information to the other fire departments and relief agencies. As a result, not only did the first responders arrive late at the fire site, but they also came unprepared. For instance, the police initially arrived at the scene with only one mobile unit to handle the huge crowd of people that had gathered outside the burning factory. Unprepared and under-staffed, the police struggled to disperse the crowd and clear the blocked access for the fire trucks.

The ERT's shortfall in identifying the environmental dangers and complexities are a case of developing poor situation assessment. Situation assessment can be considered as the process of seeking information from the environment which may either correlate well with expectations or serve to create new ones. (Pew, 1994; Wesson et al., 1981). Considered as an important approach in crisis management, the emergency actors use their situation assessment skills to prepare themselves for the unforeseeable factors that are inherent to crises (Ley et al., 2012).

In mutual-aid crisis response settings, achieving team situation assessment involves gathering many pieces of information from multiple data sources (Fracker, 1988). As group(s) of data collectors engage in this process, the collected information is then actively constructed to develop a common perspective regarding current environmental events, their meaning, and the projected future (Wellens, 1993). Thus, situation assessment not only includes the process of gathering information, but the integration and sharing of multiple-source, multi-member information that is crucial to facilitate coherent team assessment of the situation. The following section explicates this point further.

Typically with emergency services, the first step towards developing situation assessment begins with the information that an event has occurred. This step is represented by the collection of adequate event-related information (e.g., event call received by an emergency call-attendant or the emergency dispatcher) to the passing on of the information to alert the response organizations (e.g., fire services, law enforcement, and the emergency medical teams). Once alerted, the existing information can then be used to draw preliminary understandings on what kind of response strategy and resources will be required to manage the problem on hand.

Found in the data is clear evidence that initial information regarding the fire incident was sufficiently available to all stakeholders. For example, the fire brigade not only received the emergency call from the factory's management within minutes after the fire erupted in the building, but also received first-hand confirmation from a factory employee who arrived at the nearby station with the news. Similarly, as soon as the police mobile unit arrived at the fire site, they were updated on how many workers were anticipated to be inside the factory at the time of the incident. These two pieces of evidence indicate that it was not

the dearth in information that impeded the first responders' in collectively assessing the dangers of the situation or to plan for resources needed to address the fast-moving fire.

The research data demonstrated, however, that developing team situation assessment to drive coordinated decisions and actions involves additional steps than simply collecting information. These may include: (a) merging disparate pieces of data for sharing purposes and (b) developing shared interpretation from the structured data. According to Artman (2000), teams that work closely together learn to know each other's needs, knowledge, and tasks and can adjust their information sharing and interpretations to those needs. However, when heterogeneous teams are involved in dynamic and intense conditions, information distribution and more specifically, interpreting the meaning of the shared information can be problematic.

Clearly, the ERTs operating at Ali Enterprises failed to merge and, subsequently, share the disparate pieces of information that they held. As found in the data, the fire department received the information that the fire was in a textile and apparel factory located in a densely populated area. However, they did not have the information that many workers were trapped in the burning building. This information was provided to the police mobile unit that arrived first at the fire site. According to both the Federal Investigation Agency (FIA) and the Joint Investigation Team (JIT) reports, despite having this crucial information, the police neither called for further reinforcement nor informed the fire brigade on the severity of the matter. Not knowing how intense the situation was, both the additional police squads and the fire brigade arrived with inadequate resources needed to battle the blazing fire and rescue those trapped in the inferno.

Developing shared interpretation of data or information is another key component of team situation assessment. According to Daft and Weick (1984), interpretation is the process of 'translating events, of developing models for understanding, of bringing out meaning, and of assembling conceptual schemes' (p. 6). They claim that interpretation of data or information on a team level is facilitated by the activity of *sharing*. Through sharing of information, organizational members discuss their respective observations and findings with others that allows them with the opportunity to 'converge upon an approximate

interpretation' (Daft and Weick, 1984, p. 4). However, the data from the factory fire incident did not suggest so.

The research data demonstrated the failure of the ERTs to develop shared interpretation of the available information. For example, even after their arrival at the scene, the fire brigade showed earlier signs of confidence – both in their abilities and resources – to mitigate the situation. Conversely, the police and the emergency medical team (EMT) from the early stages of the operation recognized that the demands of the situation were beyond their means and hence, difficult to manage. These interpretation differences and the inability of the ERTs to converge to a shared or collective understanding led the situation to a state of chaos and subsequent poor response.

Wolbers and Boersma (2013) suggest that developing shared interpretation is facilitated by the *sensemaking* process. They argue that during the collective sensemaking process, 'organizational members combine different cues, roles, scripts, and actions' (p. 188) to find out what is going on and to work towards a collaborative time critical response. To show how emergency responders can develop shared interpretations using collective sensemaking techniques, Wolbers and Boersma (2013) used the metaphor of the *trading zone*. In the trading zone, 'actors exchange ideas, learn from one another and make sense of each other's position and institutional background' (p. 189). Thus, central to developing shared interpretation is engaging in dialogue to share knowledge and expertise and to work out alternatives that allow the synchronization of actions.

The data on the fire incident at Ali Enterprises shows failure of the ERTs to make collective sense of the information which led them to draw different meanings from the same data. As mentioned in the recent example, the first responders spent most of their resources i.e., time and effort in gathering information from the environment with little to no effort made to share it with others. Their inability to share information with the goal of exchanging ideas and negotiating a plausible plan of action left these distinct teams to interpret the situation either individually or within their own respective organizational boundaries without accounting for other viewpoints. As a result, a poorly coordinated and unsynchronized response action emerged.

Fischer et al., (2016) posit that it is common for the members of emergency relief organizations to focus on their own organization-specific tasks in crisis response which can impede the sharing of information. Other studies, e.g., Rietjens et al. (2009), found that sometimes different skills, personalities, working methods, norms, terminology, and preferred means of communication could create barriers to interorganizational information exchange during crisis management. In such circumstances, interventions that could allow the narrowing of such gaps become vital. Day et al. (2009) suggests one way to develop narrow such gaps and to facilitate common interpretation by effective information exchange is made possible by cross-training initiatives – which leads this section to the next research finding.

5.1.2 Cross-Training Deficiencies

Crises are inherently threatening in nature (Coombs, 2015a). For emergency services (e.g., fire and rescue, police, and emergency medical teams) who usually attend to such threats jointly, the importance of cross-training can never be underestimated. Volpe et al. (1996) define cross-training as a strategy in which ‘each team member is trained on the tasks, duties, and responsibilities of his or her fellow team members’ (p. 87) with the goal of providing team members with a clear understanding of how the entire team functions and how their particular tasks and responsibilities relate to those of other team members. Volpe et al. (1996) demonstrated that task-related cross-training was effective in improving teamwork, team task outcomes, and aspects of communication behaviour. Given its salient role in crisis management, cross-training with other emergency services is crucial in situations that require developing common understanding among the first responders

There were clear signs of cross-training deficiencies among the members of the emergency services attending to the fire incident at Ali Enterprises. The lack of prior working relationships at the organizational level led the ERTs to work in complete isolation with minimum efforts to coordinate planning or action. For example, the fire fighters did not request help from the police when their access to the building was blocked by the angry protestors. Instead, the fire fighters themselves decided to clear access and wasted valuable time and resources. The lack of cross-training among the ERTs also inhibited their capabilities to request or exchange information as the event

unfolded. Not knowing what their counterparts are doing and what information they have, the members of each response organization made important strategical and tactical decision on their own leaving others uninformed.

The main benefit of cross-training is that it facilitates coordination. Okhuysen and Bechky (2009) explains coordination as the 'integration of organizational work under conditions of task interdependence and uncertainty' (p. 469). Extreme circumstances, such as crises, where actors are required to swiftly react and adapt, integrating activities becomes increasingly challenging (Faraj and Xiao, 2006; Wolbers et al., 2018). Integration challenges are mitigated when ERTs recognize each other's objectives, roles and responsibilities, and expertise, in the presence of shared mental models as outcome of cross-training initiatives (Endsley and Jones, 2012).

Cannon-Bowers et al. (1993) define shared mental models as 'knowledge structures held by members of a team that enable them to form accurate explanations and expectations for the task, and, in turn, to coordinate their actions and adapt their behaviour to demands of the task and other team members' (p. 228). In crisis management, where multiple teams act jointly, shared mental models facilitate the development of *common operational picture* that the ERTs then use to collectively make decision and move ahead. Comfort (2007) define common operational pictures as 'a way to achieve a sufficient level of shared information among the different organizations and jurisdictions participating in disaster operations at different locations, so all actors readily understand the constraints on each and the possible combinations of collaboration and support among them under a given set of conditions' (p. 191).

Thus, shared mental models aid team members in their abilities to anticipate information needs of other members, increase coordination between individuals, and reduce the need for explicit communication. That is, shared mental models helps in developing shared interpretations which, in turn, leads to shared situation assessment (discussed in Chapter 2). Whereas, in the absence of shared mental models, team members are likely to process information differently, arriving at a different interpretation of what is happening as experienced in the case of the factory fire at Ali Enterprises (cf. Endsley and Jones, 2012).

Clearly, in the case of the fire, the ERTs struggled to converge their ideas and objectives in the absence of shared mental models. For instance, at the climax of the operation, the firefighters had no information that the police had ordered to cease any attempts to break the rear wall of the building where several dozen workers were trapped. While the police thought it was a risky step to take that could potentially jeopardize the safety of those inside the building, the firefighters regarded this as a matter of extreme importance and urgency. When the fire incident commander questioned the reason for not following his instructions, he was informed that it was the police chief who had interrupted the operation by denying bulldozer access to break the rear wall. This frustrated the fire incident commander who had not received any such instructions directly from the police and needed the urgent support in the matter.

This indicates how the same information was interpreted differently by the firefighters and the police. While the fire chief viewed this as a crucial step in rescuing those trapped inside the building, the latter group interpreted the situation as a matter of safety for those on the ground. The researcher proposes that when members of the different organizations are trained together, the possibilities of common understandings through shared interpretations increases. The experience of training together allows member of different organizations to achieve such goals and subsequently guide them to improved and coordinated decision-making without too much deliberative thinking.

Previously in Chapter 2, the Recognition-Primed Decision (RPD) model developed by Klein (1993) was reviewed. The model described how people use their experience to make rapid decisions under conditions of time pressure and uncertainty. The model posits that good decision-making skills depends on the domain expertise of the decision-maker. As domain-specific decision-makers engage in practice and seek learning opportunities, they overtime build metacognitive skills that help them make effective decision-makers (Pliske et al., 2001). However, in circumstances where experts from each domain are needed to reach effective group decisions, the question then becomes of 'how can we turn a team of experts into an expert team?' (Cannon-Bowers et al., 1998, p. 92).

Common understanding developed using shared mental models promotes team effectiveness in high workload conditions such as crisis. Training team members about the roles and responsibilities of their teammates will provide higher degrees of shared knowledge. This knowledge can then be used to generate predictions about teammate performance and reduce the need for overt communication (Duncan et al., 1996). Through cross-training, team members can learn about the demands of the task from the perspective of their teammates (Cannon-Bowers and Salas, 1998). The activity of cross-training enables different team members to better anticipate the behavioural and information needs of other team members, thus, potentially improving team decision-making and performance.

In case of the fire incident at Ali Enterprises, examples of how domain-specific decisions were made without realizing their consequences on other teams were obvious. For example, to ensure that no evidence was removed from the fire site, the police were instructed to conduct vetting (body search) on every individual that entered or left the building. An ugly altercation erupted between the police and fire fighters when the latter complained about how the vetting process was hampering their rescue efforts. The hindrance in rescue efforts caused by the decision to inspect the fire fighters was also observed by the anguished crowd. Frustrated with an ongoing inadequate response operation, the crowd not only criticized, but also urged the police to immediately suspend the vetting process and to let the firefighters perform their duties without any interruption.

The data further revealed that the performance and time pressures to follow the operational protocols combined with no support from counterparts (i.e., the firefighters) led the police officers to suffer from extreme mental stress. Already overwhelmed with the situation, the fact that at one point they feared for their personal safety from the charging crowd further influenced their psychological and behavioural conditions. Thus, it can be inferred that the police and other first responders experienced high degree of stress as they battled a fire beyond their control.

5.1.3 Stress

Closely related to poor environment assessment and cross-training deficiencies is the outcome of stress. Unexpected challenges arising from initial

misjudgements, quickly became overwhelming for the first responders. The unrestrained raging fire exerted tremendous time pressures on the first responders to save those trapped inside the building and to bring order to the situation swiftly. As the time and control pressures mounted, the response team members started to experience high levels of stress. The intensity of the stress influenced the physical and psychological conditions of the first responders and negatively impacted their response to the situation.

5.1.3.1 Stress Definition and Classification

Although several definitions of stress exist, the one most suitable in the context of crisis management is stipulated by Salas et al. (1996). They define stress as: 'a process by which certain environmental demands evoke an appraisal process, in which perceived demand exceeds resources and results in undesirable physiological, psychological, behavioural, or social outcomes' (p. 6). Stress can be classified into two types that are explained as follows.

The first is *eustress*. Commonly known as productive stress, *eustress* represents a state that drives people towards achievement and success. For example, someone competing for a heavy-weight championship may use his desires (a form of positive stress) of winning the championship to practice harder and push to excel in the game. If not for the desire to win the championship title, the player would probably not subject himself to the rigors of continuous practice and workout. Thus, it can be said that in some individuals, heightened stress elevates their performance.

The second type of stress is *distress*. Contrary to the first type of stress, *distress* diminishes performance. People in *distress* usually faced with fear (a form of negative stress) in which they pay more attention to the potential harms and consequences present in the situation rather than identifying ways that something can be done (Balters et al., 2020). Put simply, situations where the subject is in control of understanding what is happening and deciding what actions should follow are usually driven by *eustress*. In such situations, the desire overcomes the fear, and the actor feels compelled to do something to gain advantage over the situation. Conversely, when the environment or someone else within that environment is in control of the subject, *distress* prevails. This state of *distress* injects fear or anxiety that something bad is going to happen and that things are no longer in out of control of the subject.

5.1.3.2 Stress and Emotion

The feeling of desires, fear, or anxiety represent negative emotions. Lazarus (1999b) argues that although scholars have tried to distinguish stress and emotion, the two are interdependent. He explains the relationship between stress and emotion as follows:

We cannot sensibly treat stress and emotion as if they were separate fields without doing a great disservice to both. There are more communalities than divergences in the way these embodied states of mind are aroused, coped with, and how they affect psychological well-being, functioning, and somatic health. It should be obvious that certain emotions— for example, anger, envy, jealousy, anxiety, fright, guilt, shame, and sadness— could be called stress emotions, because they usually arise from stressful, which refers to harmful, threatening, or challenging conditions. (p. 36)

Lazarus's (1999b) viewpoint aligns with the empirical findings of this research. The research found that the high levels of stress experienced by the first responders inevitably led them to feel certain emotions. Some responders showed signs of anger, some experienced fear as the fire became overwhelming, and others just felt frustrated as they could not do enough to save those trapped inside the building. In short, where there was presence of stress, there were emotions that consequently influenced their performance.

Emotions and human performance are interrelated (Gaillard, 2008; Lazarus, 1991a; Rafaeli et al., 2012). Salas et al. (1996) offers a four-stage model to explain this notion. They explain their process 'as being activated by a stimulus such as noise, threat, or by other potential stressors' (Salas et al., 1996, p. 11). Upon noticing the stimuli, the appraisal process begins which entails the evaluation of the stimuli and labelled as positive (challenging) or negative (threatening). After the appraisal comes the formation of performance expectation. 'If the demand exceeds perceived resources, negative performance expectations are formed. If the perception of available resources exceeds the perceived threat, positive performance expectations result' (p. 12). The final stage is where cognitive effects and performance outcomes of stress are reported. Given that the ERTs attending to the fire incident at Ali Enterprises were faced with negative (threatening) circumstances where the demands of

the situation clearly outweighed their resources, the outcome of their stressful experience led them to tunnel vision and time distortion.

5.1.3.3 Tunnel Vision

Tunnel vision is a known phenomenon that usually accompanies stress. It is understood as one's tendency to focus on a single goal, target, or viewpoint (Cao and Nijholt, 2008). Arias-Hernandez and Fisher (2013) performs a synthesis of related but different explanations of tunnel vision with respect to emergency management and offers three main perspectives. The first perspective views tunnel vision as a lower-order cognitive phenomenon represented by channelized attention and perceptual narrowing of audio-video perception. The second perspective regards tunnel vision as higher-order cognitive phenomenon that represents human tendency to favour information that confirms our beliefs or hypotheses and to downplay or ignore information that disproves them. The third perspective conceptualizes tunnel vision as a social and organizational phenomenon which is agency-dependent and task-oriented bias (p. 197).

These three perspectives of tunnel vision are useful in explicating how the ERTs performed during the fire at Ali Enterprises. For example, earlier in the Findings (see chapter 4), the data indicated fire brigade's high positivity and confidence level in their abilities and resources to swiftly overcome the fire. However, as the event unfolded and became overwhelming, the positive emotions quickly transformed into negatives emotions of stress, fear, and anxiety. In both cases, the fire brigade neglected important cues and lost complete focus of what their counterparts were doing or suggesting. According to eyewitness accounts, the fire fighters were seen working as individuals and not as teams. They hardly communicated with one another causing important event information to not flow. Furthermore, their lack of correspondence with one another subsequently affected the alignment of their planning and actions which is critically important during emergencies responses.

The research also noted instances where the first responders showed reluctance to either attempt to make sense of the available information or to embrace new information to update their explanations of what was going on. Chater and Loewenstien (2016) refer to this phenomenon as *confirmation bias* – a known outcome of tunnel vision. They define confirmation bias as 'tendency

for people to seek out and interpret information in a fashion that tends to support existing beliefs, rather than requiring those beliefs to be updated' (pp. 146-147). Thus, people experiencing tunnel vision often tend to information that fits their existing viewpoint(s) rather opening themselves up to new and perhaps, more useful information. For example, it was noted that the fire fighters, even after arriving at the fire site and watching the intensity of the fire, were convinced that handling the situation would not take much time or resources. Ignoring all the cues and clues that were suggesting otherwise, the fire fighters remained calmed and assumed that the situation was in alignment with their original perception.

The third perspective of tunnel vision that Arias-Hernandez and Fisher (2013) stipulated is particularly relevant for this research. Although it is crucial in a multi-agency response for each organization to perform their designated duties responsibly, it is also at times favourable to be aware of what and how other organizations are performing in order to assess the trajectory of the response. The fire incident at Ali Enterprises became challenging as the fire fighters and police each neglected the importance to communicate with one another throughout the operation. Each organization spent most of their efforts in performing tasks that aligned with their organizational goals while neglecting other equally important tasks such as sharing or requesting information that could have helped them and others in responding to the emergency effectively. As a result of this organizational tunnel vision aspect, major coordination breakdowns were reported.

The fact that initial positivity, followed by intense negative stress, limited the responders' abilities to notice and integrate important cues in order develop a plausible understanding of the situation aligns with Maitlis and Sonenshein's (2010) reflection on the salient role emotions plays in sensemaking activities. As discussed in Chapter 2, Maitlis and Sonenshein (2010) claimed that positivity that makes an actor believe that everything will work out as planned and make him or her feel overconfident about the skills or the resources that are available, could lead to the failure of noticing important cues and may delay or avoid sensemaking from ever occurring.

On the other hand, negative emotions of stress, fear, or anxiety are usually triggered in response to a situation in which one feels that his or her

well-being is at stake. Such intense negative emotions 'may forestall sensemaking processes because of their tendency to interrupt thought processes, consume cognitive capacity, and redirect attention away from the triggering event to the emotion itself. (Maitlis et al., 2013a, p. 227). The fact that negative emotions consume cognitive capacity may result in a reduction in the number of cues that can be processed from the central activity underway at the time of the interruption (Maitlis and Sonenshein, 2010; Ohman et al., 2001). That is, negative emotions reduce attention and increase the possibility of tunnel vision in which only some cues are considered, while other salient ones, remain unnoticed or unmanaged as observed in the case of response operation at Ali Enterprises. Furthermore, the fact that negative emotions can reduce attention, they may lead to situation where time-tracking or management becomes problematic (Dougherty and Drumheller, 2005).

5.1.3.4 Time Distortion

Attention is reduced by the presence of stress (Zakay, 1993). When attention is reduced, time estimation becomes reliably low (Zakay and Block, 1996). Scholars have opinionated that when attending to demanding conditions such as crises, stress can cause sensory and perceptual deprivation (Wickens, 2005). The sensory and perceptual deprivation represents a state in which attentional resources are drained to a level where dominating social and environmental cues no longer remain noticeable (Hancock and Weaver, 2005). Being in this state subsequently and systematically influences the perception of duration. Hancock and Weaver (2005) explicates this concept as:

In addition to draining attentional resources, stress prevents the efficient production of such resources. The stress-depleted resources which remain are directed to task- relevant activities and consequently attention to time-based cues is minimized resulting in distortion effects for both time-in-passing and for time recollection in memory. (p. 193)

Following Hancock and Weaver (2005), others research have asserted that stressful stimuli such as threat, fear, or frustration tend to give rise to a feeling that time is either slowing down or expanding depending on the context one is in (Craig, 2009; Droit-Volet and Gil, 2009). In other cases, stress can

lead to losing track of the passage of time because the attention is on multiple things rather than one.

Examples of inaccuracy in time judgments experienced by the first responders are evident in the fire incident case at Ali Enterprises. For example, the emergency medical teams attending to the injured workers experienced the slowing down of the clock speed as they waited for additional support. The attentional resources of the medics, under the stress of transporting the injured to the nearby hospital as quickly as possible, diverted from patient care to the movement of clock. They not only complained about the lack of resources they had at the moment but also the time it took for additional support to arrive which in reality was only a short period of time.

Similarly, the emotion of stress overtook the first responders' abilities to track the passage of time as they suffered from extreme attention deficit. As the fire advanced rapidly across the building floors, the fire command and control unit ignored the time it took for the first team of firefighters to report the situation from inside the building. Usually, it is critical for those who are managing the rescue operation to receive relevant and reliable information as quickly as possible. The information they receive is typically used to guide decision-making and action. In this case, the fire commander who should have asked for updates from his team members battling the fire from the inside, wasted valuable time before realizing that his crew was in serious trouble. For example, an eyewitness account reported the line-of-duty death of a trapped firefighter who was perished in the fire as he waited for backup. The researcher later found out that the standard operating procedures (SOP) of the Karachi Fire Brigade clearly instructs to send backup within five minutes of no response from the first deployed team of the fire fighters. In Ali Enterprise's case, the backup was sent after 17 minutes. (JIT report, p. 3; retrieved from PILER).

Based on this discussion, it can be inferred that stressful encounters directly impact attention and the processing of time. Both loss of attention and time processing abilities translate to loss of meaning in a situation. As attention to the peripheral cues, such as what others are saying or doing decreases, it becomes difficult to construct plausible meanings of what is going on in the environment. As attention decreases, time estimation becomes difficult as well. This difficulty further impedes the cognitive processing and makes it challenging

for people to make sense of the situation as proven by the data from the factory fire incident at Ali Enterprises.

Based on the exploratory phase findings and pertinent discussion included in this chapter, the researcher contends unmanaged information equivocality – which represents the existence of multiple and conflicting interpretations of same information – as contributing to the failure of the ERTs to collectively understand and engage in joint decision-making which, evidently, led to an ineffective response operation at Ali Enterprises. Before discussing this point further, it is important to acknowledge that multiple and divergent understandings are not the key reason why teams fail to develop common understandings or end up making poor decisions. Instead, multiple interpretations or meanings can serve as a potential source of novel ideas and actions and, therefore, should be encouraged. However, critical problems start to erupt when these different understandings (interpretations) are not managed or negotiated as evident in the case of Ali Enterprises.

In brief, the fire brigade and the police, responding to the fire incident at Ali Enterprises, perceived the situation differently leading to high equivocality from the onset of the operation. To make matters worse, the cross-training deficiencies hampered the ERTs abilities to openly interact or share these interpretations with others to reduce equivocality and to develop equivalent, if not shared, meanings of the situation. Threatened by the overwhelming fire, the members of ERTs felt extreme levels of stress which widened the communication gaps among them. As a result, a disjointedly planned and ineffective response operation took place resulting in the heavy loss of valuable lives and resources.

This inference aligns with Weick's (1979) reflection on the importance of utilizing cycles of communication to manage high equivocality (discussed in Chapter 2). Weick (1969) suggested that to converge on an interpretation among several competing or contradictory interpretations, people organize. Organizing occurs through activities that are repetitive, reciprocal, contingent behaviours that develop and are maintained between two actors (Weick, 1969, p. 91). In other words, people organize by processing information through cycles of communication (Weick, 1979). High equivocality demands the

application of multiple cycles of interaction and information sharing. Thus, by working together, equivocality can be managed.

5.2 Main Phase: Illinois Fire Service Institute, USA

The main phase data guided the research to recognize that information-sharing is an ongoing issue for the members of the emergency response teams (ERTs). Events that are characterized by complexity and time pressures, such as crises, requires information that is fast, relevant, reliable, and easy to understand (Walle et al., 2016). However, information exchanges within and between the response teams are often made difficult by specific internal and external factors. This chapter unpacks some of those factors by examining routine information-sharing and communication challenges experienced by the fireground officers during crisis response episodes.

5.2.1 Inconsistent Terminologies: The Root of IFSI Communication

Problems

The ability to share information among the first responders is critical in mutual-aid response settings where different emergency management organizations are involved. Using standard or common terminology ensures that information is clearly understood without any confusion or misunderstandings. If inconsistent terminology is used, i.e., a term or definition either means different things to different people or is simply not understood across different services, serious communication breakdowns can occur which is determinantal in dynamic environments such as crises.

Found in the data are copious examples where information-sharing issues among the first responders were directly linked to the use of inconsistent terminologies. For example, several fire officers and program instructors at Illinois Fire Service Institute (IFSI) shared their usual struggle to understand the terms and jargons that are specific to the police departments or the emergency medical teams only. A number of these informants categorically labelled the confusion and misunderstandings arising from these different organizational-specific terms as a 'big problem', 'creates confusion', and the 'most scary thing' on the fireground.

Empirical evidence of the dangers posed by inconsistent terminologies was obtained during the live-fire training evolutions at IFSI. The researcher

noticed that the fireground communication would occasionally get interrupted by the use of jargon, codes, and acronyms that were not familiar to the recipient of the information. This unfamiliarity often left team members confused and in chaos. To address this confusion, in some cases, the receiver would initiate additional rounds of communication with the sender until the piece of information was understood as intended. In other cases, however, the fireground operation continued with some amounts of confusion persisting between the team members. In either case, crisis response was impacted.

The use of inconsistent terminology during routine fireground communication at IFSI led the researcher to suppose that inconsistent jargons, codes, and terms not only appear in situations where different organizations are involved, but equally widespread in intra-organizational settings as well. It is generally perceived that information-sharing issues erupt from the use of organization-specific language which is not easily understood by others. However, the observation that semantic differences can also exist among homogenous teams, makes the main phase data findings atypical. With the help of pertinent data collected during the training at IFSI and subsequently through additional resources outside IFSI that included interviews and conversations with several experienced and novice fireground officers, the research infers the following possible causes of inconsistent terminologies that exists within the fire services.

5.2.1.1 Regional Jargon

The use of regional jargon is a long-standing problem for the fire services operating under the United States Fire Administration (USFA). The following quote from a report published by the USFA in collaboration with the United States Department of Labour sheds some light on the use and dangers of regional jargon in routine information exchanges:

Fire service terms vary depending on where you are in the U.S. For example, this document uses the term aerial apparatus to describe a fire service vehicle with an extendable ladder or articulating boom mounted on top. Common terms for this same type of vehicle include truck, ladder, aerial, ladder truck, tower, or tower ladder. Some of these terms indicate specific types of aerial fire apparatus. In some regions, the term truck refers only to aerial apparatus, while in other areas this term could also include pumper apparatus. The term tanker means a road

vehicle in some areas and a water-dropping aircraft in others. In another example of potentially confusing terminology, fire apparatus drivers in different regions may be referred to as driver/operators, chauffeurs, or engineers. To those in the building design community, the term engineer means a person who does building design. Understanding local terminology variations is important to avoid misunderstandings. (OSHA, 2015)

In short, depending on the region, a single term within the same organization can be referred in many distinct ways. This issue of multiple representations of the same is highly consequential in moments where it is critical to share clear and commonly understood information. When group members ignore the dangers of using regional dialect, serious communication breakdowns can occur. Evident in the main phase data are several examples of how regional jargon can evoke such breakdowns.

For instance, during his participation in the live-fire training evolutions, the researcher identified three critical functions where the use of regional jargon was deemed as harmful. The following section lists and briefly outlines those areas.

5.2.1.2 Organizational Roles and Functions

Depending on the scale or complexity of a disaster, it is quite common in the emergency services to improvise organizational roles and functions. For example, in some complicated live-fire training evolutions, the Incident Commander (IC) was seen either in need of additional help (e.g., a safety officer) to ensure safety of the crew or was replaced with a new IC to assume control of the situation. This role transfer, however, was not done in isolation rather communicated across the teams. The purpose of this communication was to ascertain common understanding of who oversees the situation and who should everyone report to. In such cases, using common and simple language that was free from regional dialects was essential in making sure that the team members correctly and completely understand the transition has taken place.

5.2.1.3 Resource Description

Using common language when identifying major resources such as equipment and facilities is crucial. As shown in the findings, fireground officers using unfamiliar regional jargons to identify equipment led to serious

information-sharing issues at the team levels. Different names given to a fire hydrant, such as, 'fire plug' or 'johnnie pump' can only add to the confusion and information-sharing problems. Similarly, when describing the evaluated problems confronting within a fire situation (referred to as conducting a 'size up' in U.S. fire services), it is significant to use language that is commonly understood across teams. For instance, in another live-fire training evolution, a fireground officer was designated the role of conducting a size up. In doing so, however, an uncommon regional jargon was used that caused confusion among the receivers of the information.

5.2.1.4 Action Planning

At the heart of any successful crisis response operation is action planning. Regardless of the scale or severity of an incident, it is crucial to integrate all the moving parts of an incident to keep everyone on the same page. This difficult task is often facilitated using common and simple language. For example, based on the size up information which usually starts with the receipt of an alarm and continues until the fire is under control, those in charge of the situation are engaged in parallel action planning. The incident objectives, tactics, and assignments for operational and support activities are then shared with others on the team. In such cases, use of unfamiliar regional jargons can cause misunderstandings and confusions among the team members.

5.2.1.5 Firehouse Culture and Subcultures

Related closely to the previous finding is the observed diversity in firehouse cultures and its impact on intra-organizational information-sharing episodes. In conversations with several members of the fire services, the researcher found evidence of distinct subcultures within the firehouses that sets one apart from the other. The underlying reason for this diversity in firehouse(s) cultures is largely attributed to the bespoke styles and preferences that the leadership of these firehouses have put in place for their team members.

A primary reason the researcher found these bespoke styles/preferences arise and take root is that the nature of the fire services profession unintentionally allows the creation of *ego* among the organizational members. Where on one hand the drive to be the best—that is, to be best in the firehouse, the best on the training ground, the best in the department, and

best in the region—positively influences performance, on the other hand, such achievements can lead people towards egotism. Driven by their unchecked egos, these high-performing individuals, when given leadership positions, impose their styles and preferences on others in order to maintain consistency in excellence.

This finding does not imply that firehouses or their leadership have disassociated themselves from the overarching philosophy of fire services and operate independently from the other units. Rather, it signifies that firehouse sometimes uniquely adopt heterogenous styles and preferences—based on those of their leadership preferences—that direct how certain tasks should be performed, and certain terms are defined. Differences among these styles and preferences can thereby cause confusion among members who are not familiar with such approaches.

The inclination of certain firehouses to perform or define tasks differently from others was seen as problematic in the fireground communication. Observed at IFSI, for instance, terms that were used in a particular firehouse(s) caused misunderstandings among the fireground teams during live-fire training evolutions. Albeit, in most cases, the receiver of the information was able to decipher the meaning of the term without considerable effort or delay, there were some cases where the confusion caused by an unknown term disrupted the communication flow and prolonged operation. Evidence of firehouse specific language and definitions of certain term was also noticed during classroom training and discussions where further clarification was required to comprehend the complete meaning of the information.

This research deems the presence of subcultures as provoking in the use of inconsistent terminology. When firehouses adopt protocols and label terms uniquely from others, communication issues follow as witnessed during training at IFSI. The point worth noting here is that if such fundamental discrepancies in language and semantics can upset the response efforts within teams of the same organization, one can only estimate the degree to which they can influence multi-agency response attempts to emergencies.

5.2.1.6 Training Disparities and Inadequacies

Found in the data is evidence of disparities and inadequacies at intra-organization level training within the USFA. Based on the empirical data, the

researcher proposes that both the diversity in training practices as well as insufficient training could lead to information-sharing issues on the fireground. More specifically, the researcher observed that when individuals are trained using disparate methods or are not sufficiently trained, the use of inconsistent terminology becomes more frequent.

During the data collection at IFSI, the researcher acquired information on the widely spread network of fire training institutes throughout the country. While, on one hand, this network shows the great deal of emphasis and commitment the USFA places on training its workforce, on the other hand, it poses certain serious challenges. One such predicament, caused by having multiple training centres within the same state and the same jurisdiction, is the struggle to develop a standardized system of training practices.

To grasp better understanding on how the firefighters training system is designed and operates in the United States, the role of National Fire Protection Association (NFPA) was examined. This step allowed the researcher to interpret the findings of training disparities and inadequacies more deeply as he had no prior relationship, knowledge, and experience in the field of fire services. Thus, by summarizing some of the background information, the following section provides useful insights on the impact of training disparities and inadequacies on the routine functioning of fireground officers.

Founded nearly 120 years ago, the NFPA aims to deliver information and knowledge to fire trainees through research, training, education, outreach, and advocacy. NFPA has produced three documents that are particularly relevant to this section exploring the training methods employed with the USFA.

NFPA 1000: *Standard for Fire Service Professional Qualifications Accreditation and Certification Systems* sets a framework for which a national accreditation and certification system could be developed. It sets out the accreditation system for the firefighter training and for the assessment and validation of the process used by a training entity to certify fire and related emergency response personnel to professional qualifications standards (NFPA 1000, 2017)

NFPA 1041: *Standard for Fire and Emergency Services Instructor Professional Qualifications* identifies the minimum job performance requirements (JPRs) for fire service instructors (NFPA 1041, 2019)

NFPA 1500: *Standard on Fire Department Occupational Safety, Health and Wellness Program* specifies the minimum requirements for an occupational safety and health program for fire departments or organizations that provide rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, and other emergency services. Chapter 5 of the NFPA 1500 requires fire departments to “establish and maintain a training, education, and professional development program with a goal of preventing occupational deaths, injuries, and illnesses” and “provide training, education, and professional development for all department members commensurate with the duties and functions that they are expected to perform.” (NFPA 1500, 2018)

Using the guidelines set forth by the NFPA in these documents, each state establishes its own set of standards and requirements for career and volunteer firefighters initial training. For example, firefighter training course in California is spread over 256 hours whereas a similar course in Alabama takes 360 hours. In other states such as Missouri and Kansas, there are no set training requirement for the firefighters. Adding further to the training discrepancies is the research’s finding that each department within the 50 states controls its training topics and decides what is necessary for personnel to be ready to respond. Despite the several NFPA guidelines (such as those covered above) are available, no recommendations specify what knowledge, skills, and abilities should be covered during training (O’Neal, 2019).

Moreover, the researcher learnt that while NFPA 1041 suggest all training be conducted by an instructor meeting specific requirements, how that training should be delivered remains in the discretion of the authority having jurisdiction. For example, the program instructors at IFSI deems hands-on practice as critical in nearly all their courses. The instructors include components of mindfulness training (cf. Fraher et al., 2017; Sutcliffe et al., 2016) in their methods of teaching to help their students learn the value of awareness at all times. A similar course in California-based South Bay Regional Fire Academy (SBRFA) is conducted solely in classroom setting and sometimes, even delivered online. Thus, any combination of these issues can create a lack of consistency and standards and lead to failures when firefighters are faced with dynamic situations.

The lack of standardization in training are found as contributing to the use of inconsistent terminology on the fire ground. As evident from the main phase data, fire officers who received their initial or continued training in different states or training facilities tend to define or interpret fireground terminologies differently from others. Especially during the live-fire evolutions, the fire officers from the neighbouring state jurisdictions shared vital event information using certain words that were misinterpreted by their counterparts.

Like the issue of disparate training methods, is the finding of a dearth of intra-agency training efforts within the USFA. This finding is primarily based on the anecdotal accounts of several participants from various fire departments. These participants acknowledged that through training, fire departments produce a well-prepared force that can provide safe, efficient, and effective service to their communities. While fire departments are constantly and consistently encouraged to undergo training of its members, many fire departments hardly train together. Although lack of intra-agency training is a macro-level issue within the USFA, the research deems this issue as contributing to information-sharing issues among the members of the fire services.

The above discussion on inconsistent terminologies, its causes, and its impact is important in places where the aim is to develop common understanding of the situation through shared interpretations (e.g., during crisis). It is an act of explaining, reframing, or otherwise showing one's own understanding of something (Brown et al., 2015). In organizational settings, members usually share their interpretations to engage in creative activities such as decision-making, strategy formulation, learning, goal setting or innovation, and change by giving idiosyncratic meanings to their own actions or those of others (Gary et al., 1985).

Based on the empirical data, the researcher suggests that the presence of inconsistent terminologies tend to complicate the development of common understandings. As people interpret the situation, they rely on words, phrases, or idioms to explain their interpretations to others. To ensure that their interpretations are acknowledged, the words or phrases chosen to carry those interpretations must be clearly understood. However, when unfamiliar words or phrases are used, interpretations are either neglected or lead the recipient

towards confusion. This claim is supported by several instances in which group members struggled to cope with the meaning of the unfamiliar terminologies used during the training evolutions at IFSI consequently leaving them confused and, at times, in a state of complete breakdown in understandings.

The empirical findings suggesting the impact of inconsistent terminology on the development of common understandings provides useful insights into existing sensemaking discussions. As discussed in Chapter 2, central to the sensemaking process is interpretation. According to Daft and Weick (1984), interpretation is the process through which information is given meaning and actions are chosen by engaging the human mind. Although previous studies have emphasized the importance of discourse more generally in acts of interpretation and meaning production (Cornelissen et al., 2008; Fenton and Langley, 2011), there is a paucity of discussion on the factors that can make the interpretation process a lot more intricate, for example, when unfamiliar and confusing terminologies are used in conversations. Thus, by mitigating the effects of unfamiliar terminologies during crisis communication, the development of common interpretations and shared understandings can be made possible which, in turn, can lead to enhanced sensemaking at group levels.

5.2.2 Trust and Technology: Factors Contributing to Communication Problems

While the researcher found inconsistent terminology to be the primary factor causing information-sharing problems at IFSI, there were other factors that contributed, as well. The following section begins by first emphasizing the role of interpersonal communication in the emergency services followed by a discussion of cross-training relationships and trust.

Interpersonal communication is crucial in the emergency services. Through interpersonal communication, people create an environment that encourages open dialogue and flow of information. In dynamic and time-pressing situations where one's decision can make the difference between life and death for those involved, open communication can benefit decision-making processes by using reliable information that has been freely exchanged, questioned, and filtered. Open communication also encourages the growth of

strong working relationships as people exhibit increased response and sensitivity towards the viewpoints of others.

5.2.1.1 Cross-Training Relationships and Trust

A general perception in emergency services is that cross-training provides the means of building strong working relationships. The empirical data confirms this view. For example, during evolution debriefs at IFSI, several fireground officers would share their personal feelings of being 'unnoticed', 'left alone to deal with the situation', or 'given a lot to handle'. The researcher interpreted these feelings as an outcome of weak prior working relationships. This interpretation is based on the observation that as these fireground officers spent more time in training together, they started to build stronger working relationships which helped them to identify each other's personal and professional characteristics.

Recognizing these personal and professional traits helped the team members in compressing some of the concerns that were formerly shown in the early days of the training. As the fireground officers trained together, they essentially built high levels of trust with one another which paid dividends as they progressed. Getting to know each other's strengths and weaknesses also enabled the officers to reach common understanding, coordinate planning, and enact strategic and tactical decisions jointly with more readiness. This notion that trust facilitates understanding, planning, and enactment represents the core principles of the sensemaking process.

Previous discussions on sensemaking insinuates it as the process by which individuals and groups evolve shared understandings of their setting (Boje, 1991). According to Louis et al. (2010), 'individuals pay attention when something in their surroundings does not fit with their usual routines, and use their experience to find patterns that help to explain new situations. Similarly, collective sensemaking occasionally occurs as part of a deliberate activity (like strategic planning), but more often emerges from informal communication that leads to common actions or agreed upon activities' (p. 161).

Drawing from the literature and empirical findings of the main phase data, the researcher claims that although communication is useful in leading to common actions in episodes of collective sensemaking, however, to develop strong communicative links in which open exchange of information takes place,

trust among group members is critical. As posited by Tschannen-Moran and Hoy (2000), people in high trust situations are more likely to disclose 'accurate, relevant, and complete data about problems. They will also be more willing to share their thoughts, feelings, and ideas' (p. 581). To develop trust, cross-training initiatives are helpful (Meyerson et al., 1996; Mills and Weatherbee, 2006). As people train together, the growing familiarity allows them to increase their work efficiencies by understanding each other's motives, plans, and actions more quickly than otherwise.

Similarly, trust has an influence on sensegiving activities. Sensegiving, which 'attempts to influence the meaning construction of others towards a preferred redefinition of reality' (Humphrey et al., 2012, p. 42) involves statements or activities that provide plausible descriptions and explanations of events for others (Weick, 1995) or that shape others' attitudes towards certain social or political issues (Brown, 2004). When people trust each other, the efforts required to 'influence' or 'persuade' one another are lessened. In other words, trusting relationships provide a sense of 'safety' that, in turns, should lead people to stable, internal attributions regarding the person's benevolence, integrity and competence, or in the case of impending harm – external, unstable, uncontrollable attributions or justifiable reasons for the impending harm (Williams and Belkin, 2016).

5.2.2.2 Technology Reliance and Firefighting Communication

The role of technology in facilitating interpersonal communication on the fireground is crucial. From the fire dispatcher operating at the radio console position to the fireground units battling at the fire site, everyone along the communication chain is connected with one another through some form of technology. During interviews with members of several fire departments, almost all participants emphasized the importance of technology in their routine work. Some, for example, called the digital radios the 'lifeline' of their work while others deemed it as the 'only tool they need'. Similarly, the introduction of wireless communication technology was seen as exponentially improving fireground communication by providing superior audio quality and hands-free operation with abilities to exchange voice-to-text and text-to-voice seamlessly. While everyone in the fire services recognized the importance and value of

technology, there is also a growing concern that technology is making the agency's workforce complacent.

A view mostly expressed by the senior level fire officers is that although technology has its obvious benefits on the fireground communication, the heavy reliance on technology is making the newer generation of fireground officers struggle to develop and maintain competency at work. Firefighters have reported to become less interested in training, practicing, and communicating openly. The main phase data offered several examples of the underscored complacency that the senior officers reported. For example, during some live-fire training evolutions, the researcher observed the frequent practice of talking on the radio even when face-to-face communication was an available option.

Although the finding of overreliance on technology and the complacent behaviours associated with it are beyond the interest of this research, there is some connection on how this dependency can cause information-sharing issues on the fireground. Circling back to the discussion of radio versus face-to-face communication, the researcher discovered that most incident commanders prefer using the latter medium for communication as it greatly reduces the chances of misinterpreting information. Several participants affirmed that a prime advantage of face-to-face communication is that it helps in mitigating the unnecessary radio traffic. When radio traffic is not disciplined, it can cause distraction raising dangers of missing important cues or listening to critical messages.

The added benefit of using nonverbal cues (e.g., eye contact, physical contact, body language) during face-to-face communications helps convey ideas and facilitates understanding more effectively than over the radio. During the data collection at IFSI, the researcher observed that using nonverbal cues positively influences the fireground communication. From his personal experience during a fire evolution (*IFSI-EVOL-08*), the positive body language of the fireground officers helped the researcher in estimating the confidence and control the officers had over the situation. This, in turn, helped the researcher to cope with difficulties and dangers of the fierce conditions that he was under.

Moreover, face-to-face interactions can reduce situation uncertainties as people can ask questions or identify problems more readily and clearly during

one-on-one dialogue. This feature of face-to-face communication is particularly relevant for this research as relates to improving information sharing. The concept that face-to-face communication allows the instant or at least speedy clarification of information is crucial in emergencies where room for misunderstandings or confusions caused by heavy or noisy radio traffic is limited.

Now that the factors inferred as contributing to the information-sharing problems among the IFSI participants have been discussed, the following section now explicates the highly consequential role these factors can play on the operational efficacies of these crisis responders in real-life emergencies.

5.2.2.3 The Goal of Interoperability

Drawing on the main phase data, this research posits that interoperability is crucial in crisis response settings where inter- and intra-organizational teams are involved. According to the Standard Computer Dictionary published by the Institute of Electrical and Electronics Engineers (IEEE), interoperability is the ability for two (or more) systems or components to exchange information and to use the information that has been exchanged [IEEE, 1990]. Ide and Pustejovsky (2010) provide a scholarly definition of interoperability as a ‘measure of the degree to which diverse systems, organizations, and/or individuals are able to work together to achieve a common goal’ (p. 2). According to the United States Department of Homeland Security (DHS), interoperability is the ability of emergency response agencies to talk to one another via communication systems—to exchange voice and/or data on demand, in real time, when needed, and as authorized. Interoperability, thus, is essentially based on agreements between information requesters and providers on message passing protocols and describes how communication should operate between and among agencies and jurisdictions in day-to-day and mutual-aid responses.

5.2.2.4 Technical and Syntactic Interoperability

Rezaei et al. (2014) posits that attaining interoperability requires resolution at several distinct levels. These include: technical, syntactic, and semantic interoperability. Technical and syntactic interoperability are usually associated with hardware/software components and their ability to exchange

data (Van der Veer and Wiles, 2006). Where the former covers the technical issues of linking computer systems and services and ensures the correct transmission of data, the latter defines the meanings of the transmitted data by allowing multiple software components to cooperate even though their implementation languages, interfaces, and execution platforms are different.

As far as the U.S. fire services is concerned, there seems to be adequate measures in place to facilitate technical and syntactic interoperability with other emergency relief organizations. This inference is made based on many in-class discussions that took place between the instructors and the fireground officers attending IFSI. In nearly every session where the topic of joint planning and action with the police or the emergency medical teams would appear, a list of technical advancements and capabilities of the fire services available to interact and exchange information with other agencies followed. The *Base Camp Connect* (BCC), used to obtain a voice and data communication between agencies within minutes, the *Beartooth*, peer-to-peer communication platform that operates even without cellular or Wi-Fi service, and *Spartan's gateway* used by the technicians to diagnose and fix technical communication issues remotely are some examples of technical and syntactic interoperability available across emergency services.

5.2.2.5 Semantic Interoperability

Semantic interoperability is the knowledge-level interoperability that provides cooperating businesses with the ability to bridge semantic conflicts arising from differences in implicit meanings, perspectives, and assumptions by creating a semantically compatible information environment based on the agreed concepts between different business entities (Park and Ram, 2004). Semantic interoperability, thus, ensures that the requester and provider have a common understanding of the 'meanings of the requested services and data' (Heiler, 1995, p. 271). Related directly to findings of the main phase data is the semantic interoperability and hence will be focus of discussion in the forthcoming section.

Semantic is defined as the study of meanings (Lyons, 1995). According to Löbner (2013), 'we apply the notion of meaning to all sorts of phenomena that we try to make sense of' (p. 1). Thus, words, phrases, sentences, and actions all have meanings. However, people have the tendency to interpret the

same information differently from others which leads to the situation of semantic heterogeneity. According to Hammer and McLeod (1993), semantic heterogeneity refers to differences in the meaning and use of data which make it difficult to identify the various relationships that exist between similar or related objects. The researcher contends that semantic heterogeneity and information equivocality fundamentally represents the same dilemma.

Here, once again, the issue of equivocality has reappeared, albeit in a slightly different form. Previously, while discussing exploratory phase findings, the issue of equivocality was identified because of lack of communication or interaction among the emergency response teams. Thus, the empirical findings from the exploratory phase confirmed Weick's (1979) equivocality reduction model in which the application of multiple cycles of interaction and information sharing were recommended as effective means of managing high equivocality and creating shared meanings

Even though Weick (1979) offers a sound advice to engage in cycles of communication in order to manage equivocality, there is scarcity in discussions on how to address typical challenges that are embedded in communication. With main phase data, the issue of equivocality goes deeper than merely applying multiple cycles of communication. What is essentially in question here is how those cycles of communication take place. That is, if the communication process is not properly managed or enhanced to deal with challenges such as inconsistent terminologies, resistance to openly share thoughts, or weak interpersonal relationships, there is a high possibility that attempts to manage equivocality through communication will itself provoke equivocality.

Thus, to improve sharing of information so common understandings can develop, the multiple interpretations that people give to the same data must be managed. While increasing communication and interaction among people are considered as useful methods in reducing confusions and misunderstandings caused by these multiple interpretations, equally, if not more, important is to keep in account the challenges that are typical of communication and have the tendency to further complicate the sharing of information by increasing the levels of equivocality. Aiming to improve sharing of information, the next chapter attempts to introduce a solution concept that focuses on enhancing the

communication skills of team members so they can effectively address equivocal inputs as they appear.

CHAPTER 6

SOLUTION ARTEFACT

6.1 Towards Artefact

Crises represent dynamically complex situations that are generally perceived as strong sensemaking triggers (Sandberg and Tsoukas, 2015). Sensemaking allows people to deal with the various pragmatic challenges embedded in crises so they can move towards 'a workable level of certainty' (Weick 1979, p. 3). By using their internal framework of meaning (Gioia and Chittipeddi 1991), actors in crises can socially construct and deconstruct the circumstances to draw a plausible understanding that works in the situation. However, the understandings that actors give to the situation based on their internal meaning framework may differ from others leading to different interpretations, thus, giving rise to information-sharing issues among them.

Theoretically, information that lends itself to multiple and perhaps conflicting meanings represents equivocality (Weick, 1979; Daft and Macintosh, 1981). The meaning given to a situation through interpretations are shaped by members' ideologies and beliefs (Starbuck and Milliken, 1988), changing nature of the context (Dutton, 1993) and patterns of informational interaction among team members (Gioia and Thomas, 1996). Zack (1998) contended that where information sources are unreliable or conflicting, roles and responsibilities are vague, or differing or ambiguous goals and preferences exist, interpretations can be impacted. Furthering such discussions, Sutcliffe (2000) and Cornelissen et al. (2014) highlighted the psychological and social-psychological characteristics of members as salient interpretative tools.

As it is natural to experience equivocality in the presence of multiple actors, the meanings given because of these interpretations need to be coordinated at some point. When interpretations align with others, consensual meanings and mutual understandings emerges which leads into coordinated action (Wolbers and Boersma, 2013). However, when interpretations do not converge, confusion and misunderstandings prevail. This argument does not imply that equivocality is always bad or that managing equivocality will always lead to explicit consensus.

For instance, the presence of multiple interpretations has been seen as an opportunity to 'creatively combine all opposing perspectives on what the problems are and how they should be resolved' (Verweij et al., 2006, p. 817). That is, having multiple viewpoints can lead to raising voice(s) against the blind spots and look at things from different perspectives that can be helpful. They are also deemed as facilitating coordination within and between multidisciplinary communities (Furnari, 2014) by promoting the 'enrollment of others into the game and invite new moves to be made' (Ferraro et al., 2015, p. 376).

While such discussions have merit, the empirical findings in the current research add a nuance to these theoretical explications as they are applied in the context under study. By examining two logically related crisis settings (i.e., Ali enterprises fire incident and fireground officer training at IFSI), it is inferred that when actors face uncertain, complex, and emotional moments that are common crisis characteristics, their cognitive abilities are pushed to the limits. Being in this condition consequently make crisis actors flexible to deal with interpretations which are not in alignment with the ongoing larger narrative and often leads to the dilemma of which of the many interpretations should be considered for ongoing sensemaking and which ones to discard. Thus, the presence of multiple interpretations intrinsically increases confusion and tension among the crisis actors when instead of teasing out unconsidered possibilities, the multiplicity of viewpoints leads to divergence in the actors' sensemaking.

The two phases in which the empirical data was collected for this research validated, as well as extended, the existing discussions on the multiple interpretations that commonly exist in the presence of others. The exploratory phase data on the factory fire incident, for instance, affirmed that the initial misdiagnosis of the environment by the emergency response teams (ERTs) was not because of a lack of information about the situation, but due to the multiplicity of meanings that were ascribed to the same situation. The data also revealed that lack of interaction among the ERTs hindered their abilities to extensively discuss ambiguous information cues to arrive at a common interpretation of their environment which subsequently resulted in a disjointed response operation to the factory fire. The exploratory phase also identified how

stressful conditions, lack of adequate resources, and cross-training deficiencies added to their information-sharing problems by provoking equivocality within and among teams.

The main phase data was mostly collected at a fire academy where fireground officers received operational training and participated in several live-fire training evolutions designed to represent real-life emergencies. Throughout the weeks of training, communication (i.e., information sharing) was greatly emphasized as a useful way of reducing any confusion or misunderstandings that may exist among groups. However, the researcher found compelling evidence that the communication process itself triggered confusion and misunderstandings in these groups. For instance, the use of inconsistent terminologies, training and sub-culture disparities, low levels of trust, and lack of social communication skills of the fireground officers led homogenous team members to interpret the communicated information in multiple conflicting ways. That is, instead of working out meaning differences to make collective sense of the situation through communication, team members experienced higher levels of equivocality because of weak communication processes.

Thus, whether it is present because people tend to ascribe meanings to the same information differently from others, or because of the way communication takes place among group members, equivocality can be impactful and needs to be managed. Recognizing that multiple interpretations could emerge from many uncontrollable sources (some of which are identified in this research) and is highly consequential for information-sharing efforts in crises, the key is in determining *what happens next?* That is, what can be done in the field of practice to mitigate the challenges multiple interpretations can pose on the meaning-making and information-sharing attempts of the crisis handlers.

Weick (1979) suggested how people reduce equivocality. To recap his suggested model, high equivocality demands the application of multiple cycles of interaction and information sharing among those involved in order to create a shared meaning (Putnam and Sorenson, 1982). However, the empirical data – particularly, the main phase data where the researcher closely examined real-time interactions among the fireground officers – makes the case of focusing on the descriptive skills of those involved in the cycles of communication to

mitigate equivocality. That is to say that in the presence of multiple different groups of people, expected elements such as inconsistent terminologies, disparate training, and weak trusting relationships could further provoke equivocality of information in poorly articulated episodes (cycles of communication) intensifying confusion and misunderstandings. Thus, the researcher postulates that to reduce equivocality, it is critical to focus on the communication process rather than simply deploying additional communication cycles.

Communication is often regarded as two-way process and has been described using the conduit model. An alternative is the toolmaker paradigm which acknowledges that in talking to each other, people are more likely isolated in slightly different environments having their own subjective realities – an expression Reddy (1979) called ‘radical subjectivity’. Confined in their own environments, people come to know of one another’s existence indirectly by a cumulative series of inferences’ (Wilcox and Shaffer, 2005). These inferences are mostly based on several iterations of exchanging and executing various sets of instructions which helps the participants (communicators) to learn about each other, each other’s environment, and each other’s past sets of instructions. Thus, in Reddy’s ‘toolmaker’s paradigm’, listeners must expend some energy to make sense of the signals using the communication tools available in their local context. Besides the many critical communication tools already available to the sense makers, the current research, by synthesizing the theoretical and empirical insights, proposes the tool of *Together Telling* which, in the context of crisis, aims to refine the descriptive and listening skills of the crisis responders in describing and communicating event information.

6.1.1 What is Together Telling?

A general assumption is that when responding to a crisis, complex and fast changing information can surface from a range of sources. Experiencing the live-fire training evolutions at the IFSI gave the researcher a sense of how information is usually shared among the crisis handlers. For example, in the initial stages of a response operation, the Incident Commander (IC) only holds limited information about what is taking place. Based on the many stories (comprised of the bits of information about what others are seeing and hearing), the IC makes sense of the ongoing situation. As this process continues, a larger

narrative on the situation starts to build up. In the presence of the larger narrative, the IC then utilizes his knowledge and expertise and dictates the crew of what needs to be done and how. However, developing such an integrated system of communication and action where mutual understandings are facilitated, relies heavily on the communication skills of those involved.

Thus, Together Telling (TT) is a process for *creating and sustaining shared understandings by enhancing the dialogic competencies of the actors involved to facilitate information-sharing among them*. The primary function of the TT artefact is the development of enriched communication and listening skills of the group members to assist them in mitigating the effects of multiple interpretations. Through this skill development, the group's ability to maintain a common understanding of what is emerging and what needs to be done is reinforced. Particularly, in the context of crisis, TT can be deployed as an intervention that will involve the training and development of new skills in the use of descriptive language and techniques for co-creating and communicating a shared narrative that allows crisis responders to openly share intentions, ideas, and actions to the other team members.

6.1.2 How is Together Telling Different?

Central to the idea of TT is the influence of hierarchy on sensemaking and communication which separates it from existing communication frameworks. As commonly known, emergency services adopt a centralized command and control structure where standard set of rules and procedures are applied and where although information exchange is a normal practice, communication on what actions to take typically flows vertically from top to bottom. In the fire services, for example, the Incident Command System (ICS) provides a command structure for coordination, information flow, analysis, decision-making, and implementation in authoritative and standardized manner (Burgiel, 2020).

Whether a centralized command and control system is an effective organizational structure or not is outside the scope of this research and will not be discussed further. However, important to recognize is that rigid centralized structures, at sometimes, do tend to hinder open communication as those in the lower ranks hold back what they know simply because either they are not included in the ongoing dialogue or because their interpretation seems to

conflict with the larger narrative that is developing. Facing the fear of being wrong, incompetent, or rude, the different understandings that these relatively low-position holders give to the emerging situation may remain untold. Similarly, status in the ranks or authority may knowingly or unknowingly lead to the creation of dominant voices where certain weak, yet important interpretations are silenced. Either held back or silenced, the unaccounted and unmanaged interpretations may lead to immature conclusions without knowing the complete story from the vantage point of the individual sensemakers.

With the understandings drawn from the literature and empirical data, TT takes an important step towards improving information sharing among team members by softening the way hierarchies are embodied in highly centralized environments, such as the emergencies services. It is worth mentioning that while designing the TT solution concept, contemporary discussions favouring some form of centralization for effective response (e.g., Moynihan, 2008; Waugh and Streib, 2006) and those that argued otherwise (e.g., Comfort, 2007; Gardner, 2013) were equally considered. While these discussions have merit, TT favours neither of the two extremes. Instead, TT is fundamentally based on the idea of deferring status and control so open and all-inclusive communication can be made possible.

6.2 Role of Ensemble Theatre in TT Incubation

To operationalize these primary tenets, information-sharing techniques used in theatre ensemble were considered. According to Bonczek and Storck (2013), an ensemble may be a cast, a class, members of a program, students, amateurs, or professionals gathered with a sense of deep connection to work towards a common goal. In an ensemble, the emphasis is in developing a group synergy through collaboration which creates work results stronger than those of each member working at her or his best (Svab and Miltenberger, 1995). Zich (1986) summarized the key characteristics of a strong ensemble as:

A strong Ensemble is created by establishing an atmosphere in which each individual is appreciated for her own merits. She is encouraged to share creatively with others. She is both supported by, and supports, others...[she] is an essential part of the production...there is commitment on the part of all performers...the teacher role becomes that of a collaborator, not superior. (p. 2)

The core tenets of TT, when compared with the characteristics of an ensemble posited by Zich (1986), shows great similarities. For instance, in crisis response settings, TT aims to enhance the descriptive and listening skills of the first responders. The ability to describe one's own and listen to someone else's story facilitates the dialogic process which helps in exploring the meaning of the information. Furthermore, TT promotes the inclusion of all the actors of the crisis who are part of the evolving situation. This activity of enabling others to join the ongoing conversations is made possible by creating an environment where people are encouraged to join without feeling the consequences of being wrong or considered unimportant. Thus, TT places great responsibility on the leaders to collaborate with the actors without suppressing their understandings.

In an ensemble, participants are encouraged to work on their descriptive skills since the information that they transfer is highly consequential for the receiver. Ensemble participants are therefore urged to focus on defining the meaning of the information that they hold rather than simply disseminating a piece of data that could be given different meanings at the receiving end. Similarly, ensembles are primarily based on the idea that 'acting is reacting' and, therefore, it is all about listening. Good listening skills allows ensemble members to be aware of any changes that could occur within the role of an actor or in the situation. By developing strong listening skills, ensemble members can tie their responses to their partners in the moment. Moreover, ensemble members are inspired to simultaneously transmit and receive information and listening coordination is one of the primary skill sets required to master this process.

Based on the exploratory and main phase data, TT recognizes that usually in fast-evolving and complex situations, such as crises, no one person has the complete picture of what is happening. Individuals may interpret the developing picture differently from others and cannot claim that their interpretation is the most reliable or complete. Therefore, they must obtain and share additional information by interacting with others so a true sense of the situation can emerge. This means that everyone who is part of the emerging situation must be actively involved in sharing his or her own story to co-create a larger narrative. However, co-creation is not always easy when the consequences of being mistaken or inaccurate is deemed much greater than

the need to say something or where there are dominant voices that result in silencing others.

Ensembles are usually referred to as settings in which people are gathered, observing consciously or unconsciously, communicating information, understanding each other, encouraging each other, and experiencing the same things (Sato and Kuniyoshi, 2011). Thus, ensembles are marked by a sustained commitment to inclusivity and collaboration that fosters an environment of collective ownership of the art by valuing the contributions of every member of the cast and crew. This practice develops a sense of support, trust, and belonging to the group.

The recognition of security from their group encourages artists to take greater risks and achieve higher growth. According to Bonczek and Storck (2013), a good ensemble performance is predicated on the commitment, sacrifice, and support behaviours of the participants towards each other, whereas, individuals with egos, agendas, preferences, and competitive urges often fail to build strong bonds with others and tend to work against a healthy ensemble.

Nurturing a successful ensemble where creative collaboration among actors is enabled, requires a deft form of leadership. The basic premise of an ensemble is that although each member is sure to have individual goals, the group's primary goal is paramount. In a theatre ensemble, therefore, hierarchy and relative status are suspended for the purpose of getting things done. Normal rules of rank that influence who is heard and who can speak, are suspended, and a condition of 'equality before the task' is established. That is, there is agreement and acceptance that the quality and precision of the group's collective performance is more important than the rank or status of the individual actors.

Neelands (2009) claimed that 'the principles of the ensemble, in both the educational and professional spheres require the uncrowning and distribution of the power of the director/teacher' (p. 1813). Leadership in an ensemble is about balancing authority with sharing - 'not necessarily balancing them in equal measure, but in proportions that suit the moment' (Bonczek and Storck, 2013, p. 18). In a theatre ensemble, actors are tasked to provide the director with all the relevant details and insights as performance progresses. The

director's responsibility, on the other hand, is to create an atmosphere of mutual trust and acceptance where performance actors feel encouraged to participate. Thus, a good director accepts and builds on the insights and 'holds the narrative' for the group until he can direct the actions of the ensemble by sharing that picture and describing the actions and intentions that the members of the ensemble are to pursue.

The idea that leadership in theatre ensemble requires 'power distribution' in 'proportions that suit the moment' aligns with the TT principle of hierarchy and status suspension for an all-inclusive development of common understanding. As mentioned earlier, TT encourages this suspension to give others the confidence of participating in the story-building and to take the 'stage'. Furthermore, the role of an Incident Commander (IC) during a crisis response is perceived by TT as akin to that of the director in a theatre ensemble. As a good director accept and builds on the insights of other actors and then uses his knowledge and expertise to direct the ensemble accordingly, the IC, while following the principles of TT, is assumed to direct the production of a cohesive story. As his own story is enriched by the stories (sensemaking accounts) of the other actors of the crisis, the IC can then enact jointly with others. Now that the core idea of TT has been explicated in detail, the following section is spent outlining the practical steps (exercises) that can help the first responders to improve their information-sharing experiences during crisis response operations.

6.3 Practical Steps Toward Together Telling

The proposed TT exercises are inspired by theatre ensemble where the simple idea is 'togetherness'. Working together as an ensemble allows for better understanding of each other and the situation Bonczek and Storck (2013). Given the information-sharing challenges created by multiple interpretations, the forthcoming exercises are put together to facilitate the way in which a dynamic situation can be understood better using the idea of Together Telling. Some of these activities – specifically, exercises 1 and 2 – are widely used in the public domain in various forms and settings. While gaining access to such activities was straightforward, identifying the original source and how these exercises are ought to be carried out was rather intricate.

To help with this difficulty, Piers Ibbotson, Associate Professor of Entrepreneurship and Innovation in the University of Warwick was approached.

For over 40 years, Professor Ibbotson have been linked to theatre; both as a performer and as a director. In the late 1990s, Professor Ibbotson started applying his theatre skills in the business domain and became a regular contributor to senior management programs in the United Kingdom and beyond. When introduced to this study, Professor Ibbotson showed his keen interest in its aims and with the core tenets of the TT artefact.

In a series of discussions with the researcher, Professor Ibbotson provided valuable insights into fundamental techniques used in theatre ensemble by both the actors and the directors where the former develops effective information-sharing (communication) skills through which they are able to describe and express what they see and understand in the ongoing situation and the latter learns to incorporate this critical information into developing an overall narrative of the play that everyone can subscribe to. Thus, the main purpose of such techniques is to reduce possible misunderstandings or confusions among the involved parties and to establish a common understanding of the situation.

Based on Professor Ibbotsons' guidance, as well as the theoretical and practical knowledge, this study transformed following exercises to fit in the multi-agency crisis response settings, and particularly within the fire service teams where one could regard the fireground officers as the actors, the Incident Commander as the director, and the incident scope as the script that the parties are working on together.

6.3.1 Exercise 1: Good Listener – Good Speaker

Aim:

This exercise is based on the *Drawing Twins* activity (P. Ibbotson, personal communication, June 1, 2020). The exercise allows groups to talking and thinking together about how they communicate. This exercise illustrates the difficulty of giving clear instructions as well as to listen attentively and make meaning from those instructions. Thus, the goal of this activity is to help recognize how easily one person's understanding can be misunderstood and/or misinterpreted.

Group Size:

This exercise requires a group size of minimum 7 and maximum 25 participants.

Time Allowed:

Total time: ~ 35-40 minutes

- ~ 5 mins set up and brief the group
- ~ 20 mins activity
- ~ 15 minutes debrief

Equipment Needed:

Drawing pen, blank paper, simple line-drawn pictures e.g., kite, house, tree, tent, etc.

Method:

The Good Listener – Good Speaker activity should be conducted in two rounds. In the first round, the participants are divided in pairs. The first member of the pair is given a picture (image) which must not be shown to their partner. The person with the picture must give instructions to their partner so that they can draw the image. However, the person holding the image must not say what the picture is or about, e.g., 'draw a triangle, draw two more circles at the base of the triangle'. Finally, the person with the picture must not watch the person draw it. Compare the drawing with the original. In the second round, the roles are swapped, and the same activity is repeated. However, in this round, the person with the picture can give instructions in a similar manner as in round one with the exception that the person drawing can ask yes-no questions and the person with the picture can watch as they draw.

Discussion:

Group discussion is encouraged at the end of the activity to compare the drawings from the two rounds. The basic idea is to highlight the effect of clear or unclear instructions on interpretations or understandings. With that purpose in mind, the following are some suggested questions that should be asked during these reflection sections.

- Is the message always clear?
- What happens when a speaker is not clear? How might they be misunderstood?

- What is the role of a listener in strong or poor communication episodes?
- How frustrating it was not to be able to give or receive feedback?
- Did it help to be able to watch the person drawing?
- Did it help to be able to ask questions?

6.3.2 Exercise 2: Spontaneous Narration

Aim:

This exercise is based on the *Colour-Advance* activity (Koppett, 2002). The exercise is designed to help enrich the storytelling skills by fleshing out the details of a story and balancing description with action.

Group Size:

A group between 7 (minimum) to 25 (maximum) is ideal for this activity.

Time Allowed:

Total time: ~ 25-30 minutes

- ~ 5 mins set up and brief the group
- ~ 10 mins activity
- ~ 10 minutes debrief

Equipment Needed:

Pen and blank paper for notetaking.

Method:

The Spontaneous Narration activity should be conducted in a group setting in two rounds. In the first round, a volunteer from the group tells a story of an event without any interruption from the audience. In the second round, the same volunteer repeats the story, and the director or other members of the group can interrupt at any point and say: 'Colour!' or 'Emotion!' or 'Action!'. When the narrator is stopped and asked for Colour, they must then add details of the physical scene without moving the action on. For example, the narrator says: 'I had my breakfast and left the house and got into the car...' If someone tells that narrator to: 'Colour the house!', then the narrator must provide a detailed description of the house and what it looked like before they can

proceed. Similarly, if they are asked for 'Emotion!', the narrator must describe what they were feeling at that point in the story or what they thought others were feeling. If asked for 'Action!', the narrator must move the story on to the next event. The audience can intervene whenever they like to help the narrator create a good story. Repeat activity with other members of the group.

Discussion:

Group discussion is encouraged at the end of this activity to provide feedback to the narrator of their descriptive skills. As the director or the audience calls out Colour, Emotion, or Action, the narrator must provide additional details of the story before moving on. Reflecting on this key activity should help both the narrator and the director to determine how the understanding of the original story is amended by describing the new details. In other words, did the details helped or confused the listeners? Are there other words the narrator might have used to enrich storytelling?

6.3.3 Exercise 3: Zoom Activity

Aim:

This game is based on the wordless picture books *Zoom* and *Re-Zoom* by Istvan Banyai which consist of 30 sequential 'pictures within pictures'. This team-building activity requires participants to create a unified story from a set of sequential pictures they each hold by using their descriptive, perspective talking, and problem-solving skills. The activity becomes more complex with many participants as there are more pieces of the story-puzzle that they must put into sequence.

Group Size:

A group between 7 (minimum) to 25 (maximum) is ideal for this activity.

Time Allowed:

Total time: ~ 35-40 minutes

- ~ 5 mins set up and brief the group
- ~ 20 mins activity
- ~ 15 minutes debrief

Equipment Needed:

A set of sequential images that tells a story. Each image should be on one sheet of paper. The number of images should match the number of participants.

Method:

Start by handing out one image per person (make sure a continuous sequence is used). Participants may only look at their own images and must keep them hidden from others. Participants should be encouraged to study their image in detail, since it contains important information to help solve the puzzle. The challenge is for the group to sequence the images in the correct order without looking at one another's pictures. When the group believes they have all the images in order, they can be turned over for everyone to see how well their sequence aligns with the actual story.

Discussion:

Group discussion is encouraged at the end of this activity to provide feedback to each other. The following can be useful topics to discuss:

- Why was it hard to get the story together? (everyone had a piece, but no one had the big picture)
- What type of communication was used to try to solve the problem?
- What communication methods might have worked better? e.g., Imagine if, at the outset, the group had taken the time to let each person describe his/her picture to the rest of the group. What would have happened then? Would the solution have been found faster? What prevented such strategies from being considered?
- Did you try to 'second position' (i.e., see one's communications from the perspective of others)?
- What kind of leadership was used to tackle the problem?
- Who were the leaders? Why?
- What style of leadership might have worked best?
- If you were to tackle a similar activity again, what do you think this group could do differently?
- What real-life activities are like this activity?

6.3.4 Exercise 4: Together Telling

Aim:

The following two activities are designed based on several discussions taking place between the researcher and Piers Ibbotson (P. Ibbotson, personal communication, July 15; August 8; August 28, 2020). Although these activities are commonly utilized in the theatres, they do not have any source and, therefore, often modified as per the demands of the situation. Nevertheless, these activities aim to make the actors aware of the difficulty of allowing sense to emerge from a group of individuals – all with their own subjective experience and perspective – while collaborating to create a common understanding.

Group Size:

A group between 7 (minimum) to 25 (maximum) is ideal for this activity.

Time Allowed:

Total time: ~ 40-60 minutes

- ~ 10 mins set up and brief the group
- ~ 30 mins activity
- ~ 15 minutes debrief

Activity 1: Counting with eyes closed

The group sits in a circle with eyes closed and is invited to count from 1 to 50, one person at a time. It needs to be stressed that this is not time constrained task. The group must keep their eyes always closed. Only one voice must be heard at a time. If two people speak at the same time all the group must start again from the beginning. The group may tacitly agree to count in order round the circle, if they do this, they must then be encouraged to try the task again speaking at random. The objective is to get to 50 without interrupting each other and ensuring that every voice is heard at some point.

The task requires intense listening and needs side coaching to encourage individuals to share the experience of the task, what is frustrating them, how they are feeling. The task is only possible when individuals let go of their own status about achieving the task and focus on listening intently to what is emerging in the group.

Activity 2: One-word story

The group sits in circle and must tell a coherent story one word at a time going around the circle. This exercise requires side coaching. The group needs to appreciate that 'Full stops' are an essential contribution to the structure of the narrative. (No contribution or a negative contribution is as important as any other.)

A coherent story can only emerge if each player accepts the contributions so far and adds to the sense that is emerging. (There is a logic and grammar that is necessary to make sense of any story, but the individual contributions may generate an unexpected whole. A story works by building on what has been said so far, not what would be 'better' or 'makes more sense'). It is difficult not to imagine your own story, the one you would like to tell, and then try and push the narrative in that direction with your contribution.

6.4 Outcomes and Conditions of TT

TT is expected to improve information-sharing among multiple actors by:

1. Developing and refining descriptive and listening skills of the actors so they can concisely and clearly communicate what they see, hear, and feel;
2. Developing an environment where all actors who are part of the emerging story to be given the opportunity to co-create the larger narrative, and;
3. Developing leadership skills to incorporate the multiple, and often, conflicting voices for the truth or the best idea to crystalize to make the most plausible sense of what is happening.

Table 6.1 summarizes the intervention, mechanisms, and outcomes of this design science research study.

Table 6.1: Summary of Intervention, Mechanisms, and Outcomes

Context	Intervention	Mechanism	Outcome
Information-sharing issues in multi-aid crisis response settings.	Together Telling: a mix of storytelling exercises adopted from theatre ensemble that aims to enhance the dialogic competencies of the crisis handlers so they can collectively understand the situation and move towards action by reducing information-sharing issues within and among groups.	<p>Sensemaking: a process of seeking, gathering, and interpreting information to grasp better understanding of what is going on in the environment.</p> <p>Sensegiving: an interpretative in which actors influence each other through persuasive and evocative language.</p> <p>Storytelling: is an inherently social communication tool by which people ascribe meanings to their individual and collective experiences and life events. The art of storytelling is also useful for purposes of interpreting, influencing and persuading others of the sense that has been made.</p>	<p>Improved information-sharing within and among groups during crisis response.</p> <p>Enhancing the descriptive and listening skills of the actors of crisis.</p> <p>Encouraging all actors to co-create the emerging narrative of the evolving situation.</p> <p>Softens hierarchy and brings agreement and acceptance that the quality and precision of the group's collective performance is more important than the rank or status of the individual actors.</p>

Given the explanation, TT should be considered as a creative process of generating open communication spaces where participants not only learn to accept each other's positions, but also become the co-creators of the emerging narrative of the situation. Thus, this study proposes TT as an artful skill that aims to improve interpersonal communication and ability to address information-sharing issues (e.g., equivocality). However, during crisis response – where the situational complexities and time pressures makes it increasingly challenging for actors to learn or develop new skills – TT may not be successful without prior skill training and practice in stable and favourable conditions such as the pre-crisis phase.

The pre-crisis phase typically includes strategic, tactical, and operational planning and training which allows crisis handlers to better estimate the potentially dynamic and unstable conditions of a crisis and helps to identify ways through which vulnerabilities associated with it can be minimized (Fischer

et al., 2016). Given the understanding, this study seeks to include the proposed TT exercises as part of the pre-crisis skills training of the emergency responders. With consistent training and ongoing practice before the onset of a crisis, the TT process can help develop and refine the communication skills of the emergency response team members that can be useful in overcoming the common information-sharing issues during and between crises. Thus, for TT to be impactful, prior skills training and practice prior to an occurrence of a crisis is critical.

6.5 Validation Phase

Attempts to devise artefacts to solve practical problems essentially represents a Design Science Research (DSR) approach that this research embraced (see Chapter 3). To recap, DSR is a 'research activity that invents or builds new, innovative artefacts for solving problems or achieving improvements, i.e., DSR creates new means for achieving some general (unsituated) goal, as its major research contributions. Such new and innovative artefacts create new reality, rather than explaining existing reality or helping to make sense of it' (Iivari and Venable, 2009, p. 4). In accordance with Iivari and Venable (2009), the artefact of TT is as such a new and innovative way to enhance the communication skills of the emergency response team members so they can collectively make sense of the situation through effective information-sharing. The preceding sections explicated the primary tenets of TT and ways in which it can be operationalized. However, such discussions are not complete until the novelty and efficacy of the new artefact is validated in the field it was intended for. The following section, therefore, outlines the steps the researcher took to validate and communicate the TT artefact.

When it comes to validating the design of the artefact, van Aken and Romme (2012) assert that the 'most powerful design proposition is the field-tested and grounded one: the intervention is tested in its intended field of application and is grounded in an understanding of the generic mechanism – that is the cause-effect relations – that produce the outcome' (p. 4). Heeding van Aken and Romme (2012), the TT artefact was planned for testing in at least two different institutions in the year 2020. The first site selected by the researcher was National Institute of Fire Technology (NIFT) in Pakistan.

Established by the Government of Pakistan in 1980, NIFT offers fire prevention and firefighting courses for fire officers across the country. The reason for this selection was to introduce the concept and practical steps of TT at a sound training academy where fireground officers and other members of the Pakistan emergency services can learn novel ways of establishing strong communication bonds and to avoid disjointed response operations as witnessed in the fire incident case at Ali Enterprises.

The second site considered most suitable for validating the TT artefact was Illinois Fire Service Institute (IFSI). The reasons for considering IFSI were several, however, the most intriguing of them was to witness the direct implementation and impact of TT in the information-sharing experiences of the fireground officers as they conduct the live-fire training evolutions. The researcher's proposal, which was approved by the Program Directors at IFSI in July of 2019, was to allow the researcher to host classroom session(s) where the participants will be initially introduced to TT by providing the background knowledge, potential areas where the artefact can be useful, and its intended purpose. The researcher was then given the permission to conduct a series of exercises (detailed earlier in this chapter) to familiarize the participants with the operational procedures of the artefact. At that point, the participants will have the option to practically test the artefact both inside (through role-playing) and outside classroom (during live-fire training evolutions) settings to report the efficacy of the artefact and to suggest design improvement, if any.

By the end of January 2020, the researcher's visit to NIFT (scheduled for March 18, 2020) and IFSI (scheduled for April 24, 2020) were approved. However, the validation plans were annihilated by the unprecedented COVID-19 pandemic. When the pandemic reached its peak in March of 2020, all national and international travelling halted. At the same time, the scheduled visits were postponed by the NIFT and IFSI authorities until August 2020. However, to ensure continued safety of the event coordinators, participants, and the researcher, both the institutes later decided to cancel all their training activities (in class and outdoors) for an indefinite time. Albeit the major setback, the researcher continued to find some means of sharing his project with the members of the two institutes. After months of struggle, an important breakthrough allowed the researcher to discuss and validate TT with the key

leadership at IFSI including, the Director of Research and Programs Associate Director.

The researcher's meeting with the Director of Research at IFSI, Dr. Farzaneh Masoud, included an hour presentation on the aims and objectives of the study followed by the introduction of the TT artefact (proposed exercises). During the meeting, the researcher was given the opportunity to conduct the exercises as they were originally planned for a classroom session. At the end of the presentation, Dr. Masoud not only confirmed the importance and relevance of a study like this, but also welcomed the idea of theatre ensemble and the role of actors and director in the fireground communication and response settings. Furthermore, Dr. Masoud offered her desire to incorporate the TT exercises in the forthcoming communication improvement programs at IFSI expected to be held in Fall of 2021. In a follow-up conversation, Dr. Masoud indicated her approval and support for the research as she agreed to initiate steps towards funding and scheduling the TT workshop at IFSI.

6.6 Communication Phase

The final step in performing DSR is communicating the results to the intended audience. Albeit the primary aim of designing a workable solution for the world of practice, the researcher also intended to inform the research community on the applicability and benefits of TT. Therefore, the communication phase involved both the practical world as well as scholarly. As far as the scholarly connection is concerned, the TT artefact was first presented at the 78th Annual Meeting of the Academy of Management (AOM) in Chicago, USA where the researcher was invited to take part in several Professional Development Workshops (PDWs). Present at these PDWs were several esteemed scholars and researchers who provided valuable insights into the design planning and delivery of the artefact.

A more detailed introduction of the TT artefact was made at the 2019 and 2020 International Crisis and Risk Communication (ICRC) conferences hosted by the University of Central Florida. The researcher had the unique opportunity to discuss the proposed artefact with several crisis management scholars and researchers from all over the world and received constructive feedback which was then incorporated in the refinement of the artefact.

The current work was also presented at the 36th European Group for Organizational Studies (EGOS) colloquium held in Germany in 2020 where the TT artefact and its usefulness in the crisis response settings was shared with scholars and researchers who are actively involved in shaping crisis management strategies. Here again the researcher received encouraging response from the participants and provided additional feedback which was included in the final artefact design.

As far as the field of practice is concerned, the research, after satisfactorily clearing the validation process at IFSI and NITF, is intended to be shared with additional emergency response agencies across geographical boundaries. One agency approached during the research journey is the Staffordshire Fire and Rescue Service (SFRS) based in the United Kingdom.

The SFRS manages close to 33 fire stations and 600 firefighters in the major towns of Stafford, Burton upon Trent, Cannock, Newcastle-under-Lyme, Tamworth, and Leek. With the end goal in mind of designing a practical solution that can enhance the information-sharing capabilities of the emergency services teams, the researcher was invited by the Fire Chief of SFRS for a formal presentation once the artefact is fully designed and operationalized. In addition to the SFRS, contacts were made with the Los Angeles Police Department (LAPD) where the Assistant Police Commissioner of the City of Los Angeles was introduced to the research and its aims. Like the SFRS, the LAPD also showed great interest in the designed artefact and allowed the opportunity to present the results of this research at its completion. Recently, contacts were again made with the SFRS and LAPD and both institutes granted access to conduct TT workshop as soon as they return to routine operations after the threat of COVID-19 virus spread is reduced.

CHAPTER 7

CONCLUSION

In the introduction chapter, the factory fire incident at Ali Enterprises was depicted as a major event in the life of the researcher and the main motivation for this study. Among the 289 factory workers who perished in this incident, the researcher lost four close professional associates that he had trained and previously worked with. For several months after the incident, the researcher continued his interest in understanding the reasons why a normal building fire swiftly turned into Pakistan's deadliest industrial fire ever. While federal and private investigation reports blamed poor safety protocols and blocked exit doors as contributing factors to this massive loss of valuable human lives and resources, the researcher was interested in examining the efficacy of the emergency services (e.g., fire rescue, police, and emergency medical teams) in handling this crisis.

Based on the preliminary data, the researcher learnt about serious communication breakdowns and coordination failures among the emergency response teams present at the fire site. This led to the development of the main research question that guided this study: What information-sharing challenges do emergency response teams face, and how can these be overcome to facilitate collective sensemaking in times of crisis?

7.1 Research Summary

People, individually and in groups, seek and process information to pursue their sensemaking activities (Choo, 1996) in order to structure the unknown (Waterman, 1990). Given this understanding, the practical aim of this research was to address the information-sharing problems that could emerge as response teams come together to make collective sense of the unexpected and unstable events such as a crisis. To address the pragmatic interest of this research, the Design Science Research (DSR) approach was adopted (see Chapter 3).

In accordance with Hevner et al. (2004), the research followed the DSR roadmap by first outlining the problem definition and research objectives to specify the purpose and scope of the artefact to be developed. The next step

involved prior work that is relevant to the study, including theories, empirical research studies, and findings from practice. Hence, sensemaking, sensegiving, and storytelling constructs were identified as most pertinent to the discussions of collectives in the context of crisis. These streams of literature provided useful insights into how people have the tendency to interpret and make sense of same events differently and how they persuade others their sensemaking by using their narrative skills (see Chapter 2).

Since DSR approach uses both theory and data for designing the solution artefact, empirical evidence for this study was acquired in two distinct, yet logically related phases (see Chapters 3 and 4). First the exploratory phase data were collected in Pakistan that pertained to the factory fire incident at Ali Enterprises. Found in the exploratory phase data was evidence of the failure of the emergency response teams to develop a proper assessment of the situation. Furthermore, cross-training deficiencies, lack of resources, and high levels of stress in individuals and among groups were found in the exploratory phase data. These elements were seen as evoking information-sharing problems among the emergency response team members as they developed different, at times, conflicting interpretations of the situation. The different interpretations consequently caused confusion and misunderstandings among the groups resulting in a disjointed response operation.

The main phase data was collected at Illinois Fire Service Institute (IFSI) – a fire academy located in Illinois, USA. At IFSI, the researcher gained field experience by participating in live-fire training evolutions alongside several dozen fireground officers, fire chiefs, battalion chiefs, and program instructors. Additional data came from interviews, informal conversations, classroom discussions, and archival records. The main phase data revealed the use of inconsistent terminologies – triggered by regional jargons, firehouse subcultures, and training disparities among the firehouses – as a root cause for confusion and misunderstandings among groups. Apart from the use of inconsistent terminology, other factors such as trust issues and overreliance on technology also emerged as contributing to such issues. Hence, the main phase findings also suggested the presence of misinterpretations, confusion, and misunderstandings as evoking information-sharing and subsequent coordination issues within and among groups.

7.2 Managing Equivocality with 'Together Telling'

The existence of confusion, disagreement, and lack of understanding is usually referred to as *equivocality*. (Daft et al., 1987; Weick, 1979). In the context of crisis, equivocality is perceived as crucial for sensemaking activities which aims to achieve certain levels of shared interpretations in order to understand what is happening. However, since equivocality stresses the ambiguity in the interpretation of a message or situation (Daft and Macintosh, 1981), its existence makes it difficult for people to share and converge interpretations attempting to collectively understand what is going on (e.g., Banyongen, 2020; Maltis and Sonenshein, 2010; Weick 1990; 1993).

Given its influence in the sensemaking processes, scholars have posited that by deploying multiple cycles of communication – that is, by increasing interaction among people – the effects of equivocality can be mitigated (Putnam and Sorenson, 1982; Weick, 1979; 1995). However, such discussions fall short in considering the multitude of communication barriers driven by factors such as cross-training deficiencies, high stress levels, inconsistent terminologies, training disparities that this study identified as common in group settings. Thus, this study considered the claims of reducing equivocality by increasing communication among actors as simply inadequate that required further work.

By recognizing that efficient mutual-aid crisis response requires no misinterpretations, confusion or misunderstandings, the practical challenge of managing equivocality was undertaken by the researcher. Presumably, managing equivocality can offer incremental improvement in information-sharing among crisis handlers which, in turn, can lead them to understand collectively and effectively plan and act during emergencies. Thus, the current study attempted to improve mutual-aid crisis response operations and a step forward in this practical endeavour is the proposed artefact of Together Telling (TT).

TT design is fundamentally based on the idea that information equivocality is bound to occur in the presence of groups and has the potential to complicate the ways information is shared and collective understood (see Chapter 6). The artefact design also acknowledged that factors revealed in this study as contributing to equivocality of information (e.g., cross-training deficiencies, inconsistent terminologies, training disparities etc.) are long-

standing, and regardless of numerous attempts, remain irrepressible. Given this information, the core idea behind the development of TT was not to spend further resources on controlling the uncontrollable, rather shifting the focus on enhancing those human skills that can play a part in compressing, or at least, managing the presence of equivocality. Therefore, the general template used in the creation of the proposed artefact was built on the logic that given the information-sharing challenges, such as the existence of equivocality within and among groups in crisis context I, the intervention (I) of Together Telling, by using generative mechanisms (M) of sensemaking, sensegiving, and storytelling, is expected to deliver improved crisis response at inter- and intra-organization levels (O).

Using storytelling exercises adopted from theatre ensemble, TT addresses the information-sharing issue of equivocality by enhancing the dialogic competencies of the crisis handlers so they can collectively understand the situation and move towards action. TT aims to enhance the descriptive and listening skills of the actors so they can concisely and clearly communicate what they see, hear, and feel. TT facilitates the co-creation of the larger narrative by encouraging everyone to share their understandings (i.e., individual sensemaking accounts) of the emerging situation. By assigning a different set of responsibilities to those in the leadership roles, TT allows leaders to create an atmosphere of mutual trust and acceptance to value each contribution by accepting individual interpretations towards the building of the larger narrative (collective sensemaking) until the 'true story' has appeared. The leaders can then put their knowledge and expertise into work and lead the groups into action.

7.3 Relevance to Literature

This study has important theoretical implications. First, it facilitates episodes of collective sensemaking by improving sharing of information among team members. Although sensemaking is considered a social activity through which actors rationalize an ambiguous world into an orderly, comprehensible place, it has been most discussed on the level of individuals. In context understudy where multiple actors are involved, individual accounts of sensemaking are not sufficient. To make joint decisions and take actions, a common ground understanding must be achieved by negotiating the individual

sensemaking accounts into a more collective form. Thus, by offering practical ways of reducing misinterpretations and confusions that can impede effective sharing of information, TT advances sensemaking discussions on the level of groups.

Another theoretical implication of this research is the application of the storytelling techniques in the context of crisis response. In most traditional and contemporary discussions, storytelling, as an effective communication tool has been largely used in pre-crisis and post-crisis settings. In the pre-crisis phase, storytelling techniques have been utilized to stage previous successes and to motivate team members. In post-crisis, stories have been used to communicate event-related information as well as a face-saving strategy by organizational managers whose personal or professional reputation might be at stake. However, there is a dearth in research to embrace the power of storytelling or to improve the storytelling skills of the crisis handlers during crisis response settings. This research, using storytelling exercises as the developmental basis of the TT artefact, underscored the suitability and usefulness of storytelling techniques during crisis.

7.4 Relevance to Practice

Empirically, this research has useful implications in the world of emergency services. TT, for instance, is an artefact that enhances the dialogic competencies of the crisis handlers. Dialogic competencies place the focus on understanding each other's knowledge and perspectives by a way of reasoning which, in turn, not only creates shared understandings, but also allows other ideas and opinions to adapt or integrate into the ongoing thinking. Thus, TT provides practical incremental steps towards achieving common understandings while managing misunderstandings and confusions among the crisis response teams which is crucial in moving forward jointly.

Another practical implication of TT is that it softens the way hierarchy and status is handled and perceived in centralized environments. TT achieves this by viewing leadership not as static and reified, but rather sees it as fluid and flexible, while yet retaining the basic elements of hierarchical centre (Rosile et al., 2018). That is, TT helps in establishing agreement and acceptance that the quality and precision of the group's collective performance is more important than the rank or status of the individual actors. Thus, no one person

is a star rather everyone is allowed to take part in developing the emerging story. TT also assigns more practical and effective responsibilities to the leaders. It enables leaders to acknowledge the value of each contribution in collectively understanding what the challenges are in order engage in actions.

7.5 Limitations and Future Research

While this research has both practical and theoretical implications, it is primarily located in the context of crisis and, therefore, limited in its scope. The researcher acknowledges this limitation, however there is potential generalizability of this work across other contexts. The sharing of relevant, reliable, and clear information is not only limited to crisis handlers but has become a necessity for all functioning groups in every discipline and domain. While information sharing has clear benefits, it poses risks that must be mitigated. Since TT is primarily designed to improve sharing within and among group members, it can be greatly applied across different domains to manage the dangers of multiple interpretations that are ought to emerge in group settings.

Moreover, in designing the TT artefact, only a handful of storytelling techniques were embraced from countless other exercises that are frequently used in theatre ensembles in improving the descriptive and listening skills of the involved actors. These unexplored techniques may offer additional resources that not only help in resolving equivocality, but also other information-sharing issues that were not considered in this study. Therefore, further work in exploring other ensemble activities to reduce information-sharing issues within and between groups is suggested.

Another limitation of this study is the emphasis placed in exploring the characteristics and models of individual sensemaking as opposed to collective sensemaking which, in essence, is the focus of this study. While this is an important limitation to address, this step was intentionally taken to guide those readers (e.g., practitioners) who lack fundamental understanding of the sensemaking phenomenon, and to show how, despite its social nature, sensemaking usually originates in isolation within an individual. Therefore, a detailed account of individual sensemaking was provided to gain deeper understanding of what triggers and enables sensemaking, how it is primarily viewed as a cognitive activity (Dervin 2003; Weick, 1979), and how the

sensemaking process involves iteratively finding information based on initial representations (Russell et al., 1993) or frameworks (Klein et al., 2006b) to build an understanding of the situation on hand. By showing how people individually make sense of a novel situation, and how at times their sensemaking attempts are often incomplete without the help of others, allowed logical and coherent explication of collective sensemaking.

Additionally, this study embraces the idea that actors make sense of interrupted events based on the identities that they have developed (Weick, 1995) and that sensemaking and identity can influence the processes and outcomes of one another. For instance, when responding to a crisis, the identities of emergency response individuals or groups may lead them to perceive or interpret the same situation differently from others resulting in varying sensemaking accounts. This diversity in sensemaking may cause delays or even collapse in collectively understanding and pursuing action.

Conversely, as emergency response individuals or groups make sense of a situation, their identities go through the process of reconsideration, reassessment, or confirmation resulting in their past or existing identities getting altered based on the new understandings of the situation (Vough et al., 2020). As a result, the identity work of individuals or groups could change compelling actors to perform tasks that may or may not align with their typical routine work, thereby, impacting the crisis response effectiveness. In sum, both sensemaking and identity are intimately interwoven processes that have a recursive effect on one another.

While discussing the salient relationship between sensemaking and identity in crisis response studies such as this one is crucial, the topic received less attention than it deserved. This limitation, however, surfaced as the practical aims of this study favoured considering the implications of actions rather than the identities of the emergency response individuals and groups. Therefore, the action orientation of sensemaking was kept central in this study. The study postulates that action-oriented sensemaking – concerned with the question of ‘How does it matter what I(we) do?’ – allow determination of the consequences of one’s sensemaking on others and on the overall situation leading to a more informed crisis trajectory. For example, in action-based sensemaking, actors not only determine what existing routines, plans, and

procedures fit best in the context, but also make sense of how they should be applied to maximize their effectiveness. Similarly, actions are subject to additional cycles of sensemaking to determine their implications as well as to assess what follow-up actions would trigger because of those actions.

The tenets of action-oriented sensemaking are reflected in the proposed intervention of TT. The TT design incorporates delivery of the implication(s) of information and action on others by detailing what a piece of information means and why a proposed action is taken so the consequences of both can become apparent to other stakeholders. Thus, by refining the descriptive skills of the emergency response team members through TT exercises, a practical approach to sensemaking is ensued where emergency response teams need to ultimately build an understanding of the implications of the information they share and the actions they take.

In sum, whether TT is employed in its original form or critiqued for further improvement, the aim of this artefact is to manage the presence of multiple interpretations that can commonly occur in group settings. Managing interpretations could mean curtailing confusion and misunderstandings that often become the source of breakdowns in teams as witnessed in the case of factory fire incident at Ali Enterprises. If TT is adopted as a skill training intervention, communication within and among groups will improve which can then positively impact the way multi-agency response to a crisis is handled. With this incremental change in place, one can hope that in any of the future incidents, co-workers and friends like Saleem, Ayan, Hussnain, and Ahmed do not die needlessly.

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APPENDICES

Appendix A: Pre-Interview Description

Researcher: Fahd Jamil | [REDACTED]
Supervisor: Dr. Mark Johnson | [REDACTED]
Proposed Project: *What information-sharing challenges do emergency response teams face, and how can these be overcome in order to facilitate collective sensemaking in times of crisis?*

Date: 19/02/2019

Greetings Officer Iqbal:

You are invited to act as research participant for the above project. Your participation in this project is entirely voluntary. You may withdraw from participating in this project at any time, with no negative consequence to yourself or the organization for which you work. This project involves collecting data in form of participants' observations, stories, and narratives to study and understand how information was managed within and across organizational boundaries during a crisis situation.

Your involvement in this project will help examine a real-life emergency and the behaviors of all the involved actors of a crisis. Participation in this project will involve being interviewed by the above-named researcher and audio/video recorded unless you choose not to.

It is not expected that you will experience any risks through participating in this project. Data will be anonymized from the start, with no names or specific positions recorded as part of the interview material. Your consent form will be stored in a locked office and transcripts of interview data will be anonymized before being printed and stored in the same place. The transcripts will also be stored electronically on the lead researcher's password-locked laptop. All material may be destroyed after 10 years from the completion of the research. The material from this research may be published. You can request a copy of the publication from the researcher named above.

Should you have any further questions about this research, please contact Fahd Jamil or Dr. Mark Johnson.

You may also contact the University of Warwick Research and Impact Services, University House, University of Warwick, Coventry, CV4 8UW, UK (phone: 02476575732) should you have wish to make a complain about the conduct of the research.

Many thanks in anticipation.

Fahd Jamil.

Appendix B: Interview Consent Form

Interview Consent Form

Title of Project: Together Telling: Reconciling information equivocality in crisis response

Name of Researcher: Fahd Jamil | [REDACTED]

Name of Lead Supervisor: Dr. Mark Johnson | [REDACTED]

Please initial box

1. I confirm I have read and understand the **pre-interview** information sheet dated 02/19/2019 for the above study. I have had the opportunity to consider the information, ask questions from a member of the research team and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
3. I understand that my information will be held and processed for the following purposes: To be analyzed by the researcher for the purposes of completing their DBA research and, where relevant for the writing of associated academic journal articles or monographs.
4. I agree to take part in the above-named study and I am willing to be interviewed and have my interview audio/video recorded.

QAMAR IQBAL

Participant Name

21-02-2019

Date:

[REDACTED]

Signature

FAHD JAMIL

Researcher Name

21/02/2019

Date:

[REDACTED]

Signature

None

Interpreter Name

Date:

Signature

Appendix C: Interview Protocol Sample

Participant: Officer Qamar Iqbal

Date: 21/02/2019

Time: 9:45 a.m.

Location: Marriott Hotel, Karachi, Pakistan.

Working research question:

What information-sharing challenges do emergency response teams face, and how can these be overcome in order to facilitate collective sensemaking in times of crisis?

Research environment:

Note to the Researcher: Start with a personal or professional story that introduces crisis as:

An event that is highly unusual and surprising and which leads to an unstable and dangerous situation affecting an individual, group, community, or whole society.

Note to the Participant: If you have experienced more than one event that can be deemed as crisis, take a moment to recall the most elaborative event that in your opinion surprised you the most or had the most impact in your life.

Conversational Interviewing:

1. Please share with me a story of an event(s) where you or someone else was in an unstable and dangerous situation?

Note to the Researcher: Ask questions 2-4 if not mentioned in the participant's story but do not interrupt.

2. Were you on the giving or receiving end of the assistance or did you act as an observer?
 - a. If on the giving end, do you consider yourself as an experienced (professionally trained) crisis handler?
 - b. If on the receiving end, please explain your situation.
3. Were you the only person in that crisis or were other people or groups of people involved?
4. How did you see this crisis through your eyes?

Note to the Researcher: Given the information provided so far by the participant, share the setting of your own story (counter-story) to make deeper connections with the participant. Proceed with questions 5-7 and allow them to go in detail without any interruption.

5. Were the difficulty and dangers offered by the situation equally identified by all the involved people?
6. What encouraged others to exchange their ideas and information?
7. How well did people exchange their ideas and information?

Note to the Researcher: Add to your story so the participant feels encouraged to share their experiences related to questions 8-11.

8. Give example(s) of how these understandings converge or diverge?
Why did the understandings differ?
9. As the events changed, did the understanding of the people updated at the same time?
10. Why do you think the reactions differed?
11. What kind of efforts were involved in changing perspectives?

Note to the Researcher: Ask questions 12-16 if not already shared by the participant.

12. Describe how your emotions changed towards what was happening?
13. Describe how did you either change the situation to fit your emotions or changed your emotions to fit the situation?
14. How did the other actors react to your behavior, language, and position?
15. How did you react to someone else's behavior, language, and position?
16. At any stage, did you feel that something better could have been done?

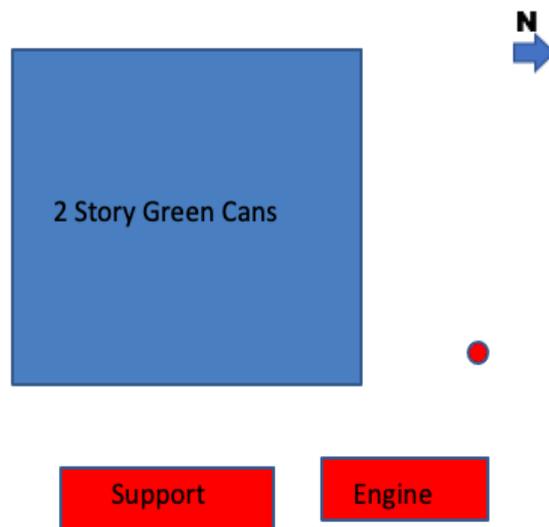
Note to the Researcher: The following questions should be asked during conversation with the participant.

1. Was there a resolution of the issue?
2. What decisions were taken to resolve the issue?
3. Was the situation jointly managed?
4. How did you feel about the outcome?
5. Did you accept the outcome unreservedly?
6. Did the outcome affect other actors?
7. What else do you consider relevant from the outcome decision or non-decision?

Appendix D: IFSI-EVOL-01

Tuesday, May 7, 2019

Evolution Name	2 Story Green Cans
Actual Time	9.30 a.m. to 10.45 a.m.
Elapsed Time	1 hour 15 minutes
Scenario	Instructor shall follow crews; Ensure primary attack line in place; Ensure search companies are protected; Ensure primary, secondary, and final searches are completed; Students shall be in full PPE including SCBA while inside burn building.
Fire Sets	Fires in each burner. Smoke on both floors.
Victim	Two victims; one on first floor, one on second floor.

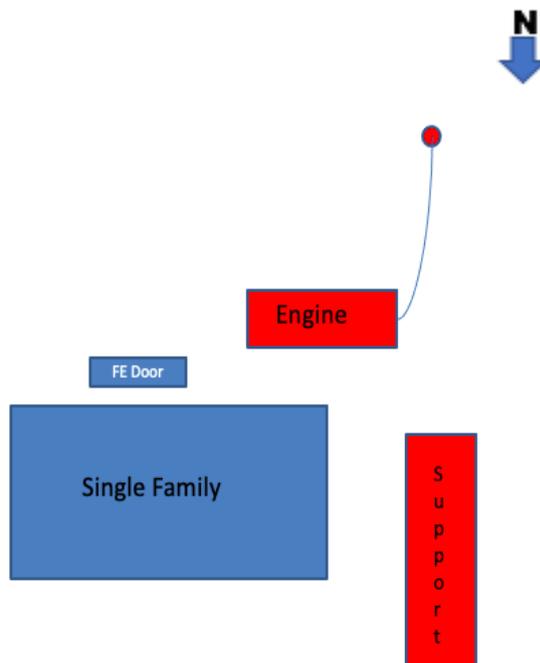


Schematics of IFSI-EVOL-01

Appendix E: IFSI-EVOL-02

Tuesday, May 7, 2019

Evolution Name	Single Family
Actual Time	2:30 p.m. to 3:56 p.m.
Elapsed Time	1 hour 26 minutes
Scenario	All entry and exit will be through the fire exit (FE) door on south side of the Single Family. The scenario will be complete when all fires have been knocked, a primary, secondary, and final searches are completed.
Fire Sets	Fire set in living room area and bookcases. Fire set in bedroom.
Victim	2 victims spread out

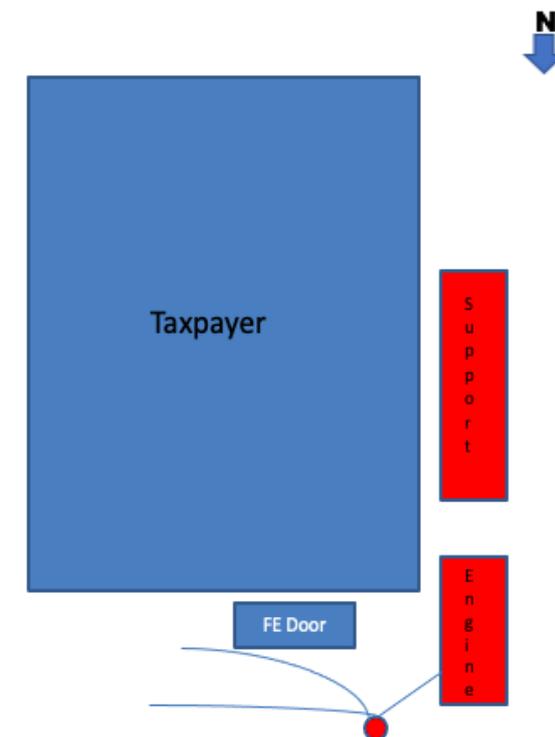


Schematics of IFSI-EVOL-02

Appendix F: IFSI-EVOL-03

Tuesday, May 7, 2019

Evolution Name	Tax Payer
Actual Time	4:45 p.m. to 6:02 p.m.
Elapsed Time	1 hour 17 minutes
Scenario	All entry and exit will be through the door on the north side of the Taxpayer. The scenario will be complete when all fires have been knocked, a primary, secondary, and final searches are completed.
Fire Sets	Fire sets in all burners on first floor. Smoke on 2.
Victim	Two victims spread out on first floor.

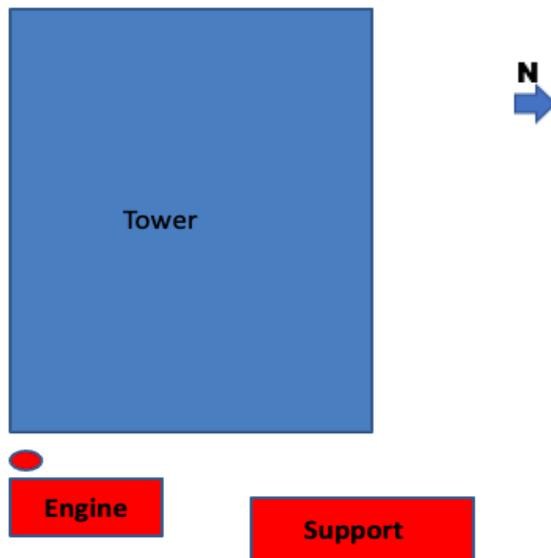


Schematics of IFSI-EVOL-03

Appendix G: IFSI-EVOL-04

Wednesday, May 8, 2019

Evolution Name	Tower 3 Flat
Actual Time	9.25 a.m. to 10.36 a.m.
Elapsed Time	1 hour 11 minutes
Scenario	Tower 3 forcible entry using all 4x4 props. The scenario will be complete when all fires have been knocked, a primary, secondary, and final searches are completed.
Fire Sets	Fire on 2 and 3. Smoke on all floors.
Victim	4 victims spread across 3 floors.

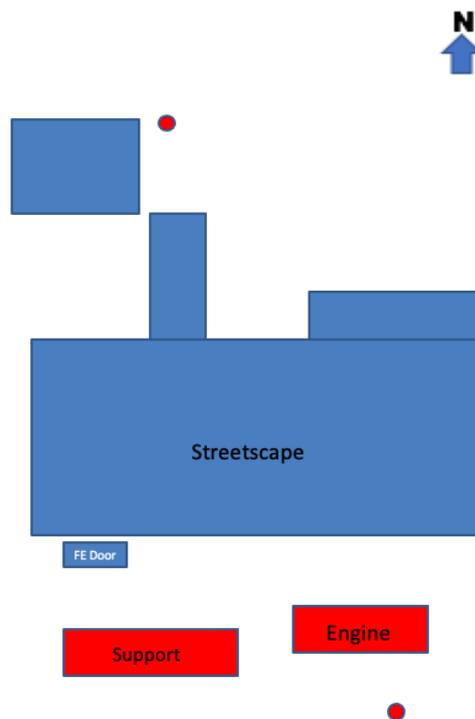


Schematics of IFSI-EVOL-04

Appendix H: IFSI-EVOL-05

Wednesday, May 8, 2019

Evolution Name	2 Streetscape Floor 1 and 2
Actual Time	11.50 a.m. to 1.35 p.m.
Elapsed Time	1 hour 45 minutes
Scenario	Streetscape forcible entry on floor 1 and 2. FE door in front of the diner. The scenario will be complete when all fires have been knocked, a primary, secondary, and final searches are completed.
Fire Sets	Fire sets off kitchen and hardware store.
Victim	2 on first floor, 2 on second floor.

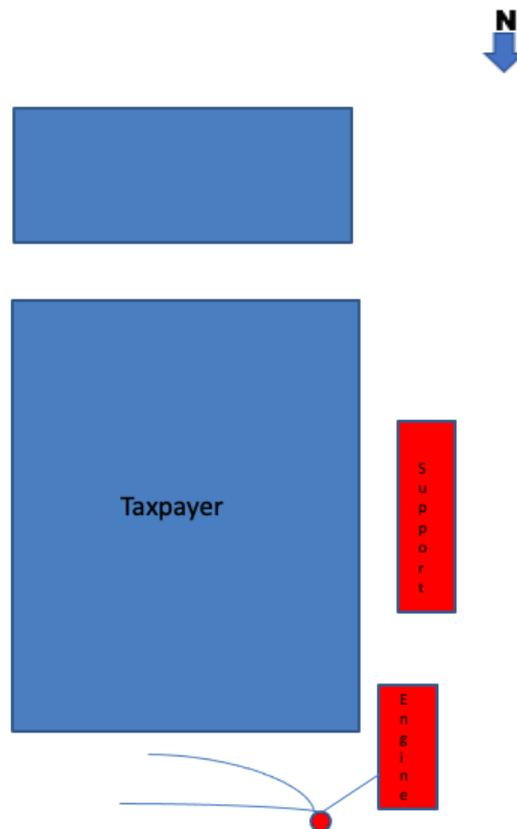


Schematics of IFSI-EVOL-05

Appendix I: IFSI-EVOL-06

Thursday, May 9, 2019

Evolution Name	Taxpayer Basement
Actual Time	04:15 p.m. – 06:10 p.m.
Elapsed Time	1 hour 55 minutes
Scenario	The only entry/exit will be the stairs and second floor door on the southside of the building. The south door on ground level may be used to simulate attacking a fire through a basement window. The scenario will be complete when all fires have been knocked, a primary, secondary, and final searches are completed.
Fire Sets	All burners and bookcases on 1. Smoke on 1 and 2. Southeast room on two: Not to be lit until hose line advances into the basement
Victim	Two victims spread out on first floor.

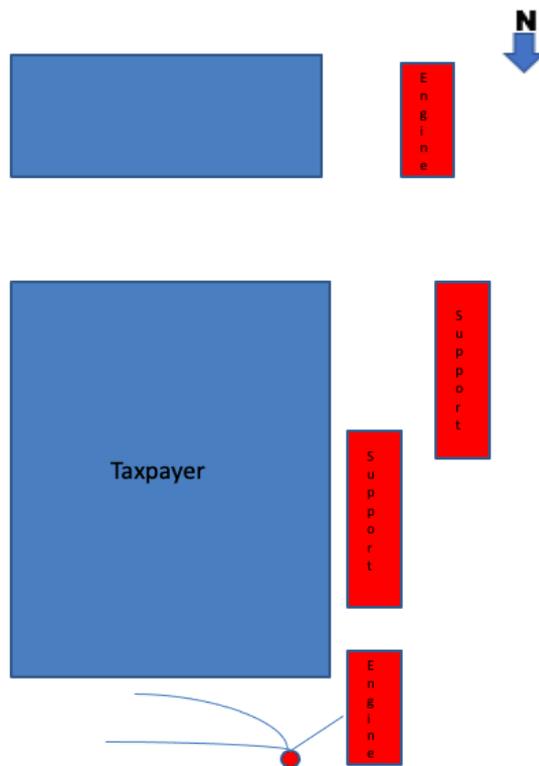


Schematics of IFSI-EVOL-06

Appendix J: IFSI-EVOL-07

Thursday, May 9, 2019

Evolution Name	Taxpayer All Hands
Actual Time	10:00 a.m. to 11:45 a.m.
Elapsed Time	1 hour 45 minutes
Scenario	The only entry/exit will be the door on the north side of the building. The scenario will be complete when all fires have been knocked, a primary, secondary, and final searches are completed.
Fire Sets	All burners and bookcases on 1 and 2. Smoke on 1 and 2.
Victim	5 victims on Floor 1, 5 victims on 2.

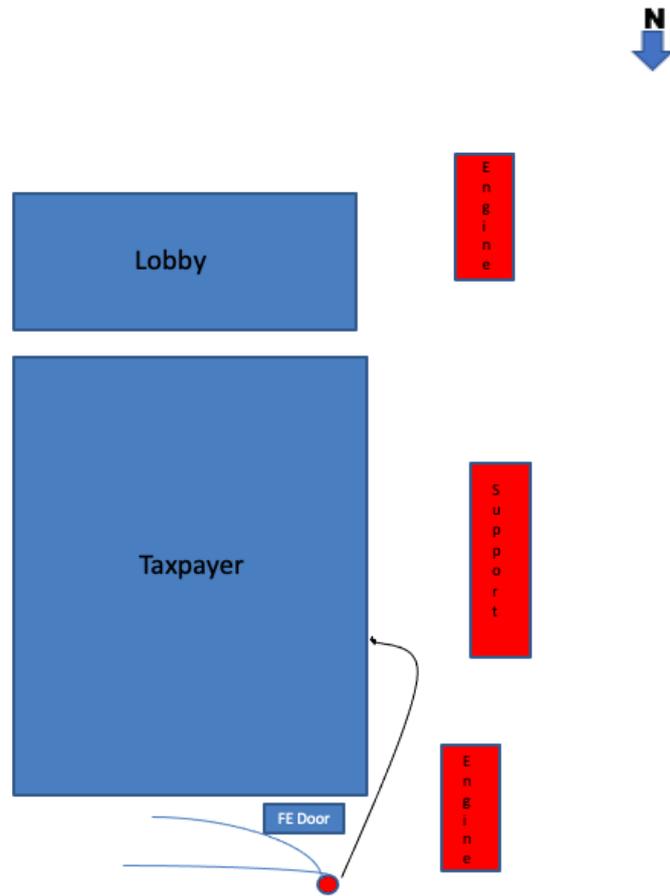


Schematics of IFSI-EVOL-07

Appendix K: IFSI-EVOL-08

Friday, May 10, 2019

Evolution Name	Tower Standpipe
Actual Time	03:20 p.m. to 05:40 p.m.
Elapsed Time	2 hours 20 minutes
Scenario	The Single Family will be used as the lobby. Ventilation will go through Chiefs. All entry/exit of the tower will go through first floor door on North side of building. The scenario will be complete when all fires have been knocked, a primary, secondary, and final searches are completed.
Fire Sets	Smoke on 1 and 2. All burners upstairs.
Victim	Three victims on 2.



Schematics of IFSI-EVOL-08

Appendix L: Photos from Exploratory Phase



Appendix M: Photos from Main Phase



