Beyond ‘Command & Control’: 
Developing a New Paradigm for 
Incident Command Systems, Critical Decision-Making 
and 21st Century Crisis Response

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This thesis is submitted in partial fulfilment of the requirements for the award of the 
degree of Professional Doctorate in Security and Risk Management (D.SyRM) at the 
University of Portsmouth

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Dedication

To Yvonne, Arik, Ami, Ilan and Zanita, who have been constant companions on this journey and have offered unending support and encouragement that has been central to the production of this thesis.

To the staff and faculty at University of Portsmouth, and particularly Professor Francis Pakes, who was an inspiration, and to Dr Alison Wakefield, my supervisor, who has been a constant source of advice and guidance.

To my fellow students on the 2011 cohort – I think it may prove to be a fine vintage.

And finally, to all of the people who over the years and across the world have accepted the responsibility of working tirelessly to protect the communities around them.

Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award
Abstract

The nature of crises has changed radically in recent years, so that rather than being merely ‘major incidents’ or ‘routine emergencies’, they are now characterised by their hypercomplexity and the catastrophic impact of their cascading consequences. The centralised command systems that have traditionally been considered the bedrock of crisis response programmes are repeatedly failing to stand up to the challenges posed by this new class of crisis, and it has become clear, following incidents such as 9/11 and Hurricane Katrina, that new forms of non-hierarchical, decentralised decision-making and strategy-setting frameworks need to be developed.

This thesis makes the case that the organisational vulnerabilities that led to many of the high-profile crisis management failures that have become the major case studies for such incidents are both well known and highly predictable. It examines the nature of current hierarchical command-centered crisis management systems, and questions as to why these are still accepted as the default framework for such programmes. It then looks at some of the critical capabilities that are necessary for multi-agency operations operating in high-pressure crisis environments, and how they can be incorporated into current crisis management practices.

It then goes on to offer two alternative paradigms to the traditional understanding of ‘efficient’ crisis management, based on the concepts associated with organizational resilience, that would allow multi-agency operations to maintain their functionality in high-volatile crisis environments, and the lessons that can be learned from high reliability organisations in terms of recognising the importance of reliability over efficiency.

It concludes by demonstrating that the fundamental weaknesses that are the root causes of repeated failures are not so much technical or operational, but rather are reflective of the culture of crisis management organizations themselves, and makes the point that the acceptance by all levels of the crisis management community of their responsibility to create and maintain ‘organizations that work’ could lead to a rapid improvement in the rates of success.
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<td>BP</td>
<td>British Petroleum</td>
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<tr>
<td>C2</td>
<td>Command &amp; Control</td>
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<tr>
<td>CBRN</td>
<td>Chemical, Biological, Radiological, Nuclear</td>
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<tr>
<td>CECA</td>
<td>Critique, Explore, Compare, Adapt</td>
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<td>CM</td>
<td>Crisis Management</td>
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<td>COP</td>
<td>Common Operating Picture</td>
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<tr>
<td>DHS</td>
<td>Department of Homeland Security</td>
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<td>DoD</td>
<td>Department of Defence (US)</td>
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<td>EM</td>
<td>Emergency Management</td>
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<tr>
<td>EMON</td>
<td>Emergent Multi-Organizational Network</td>
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<td>ENCOMPASS</td>
<td>Enhanced Consequence Management, Planning and Support System</td>
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<td>END</td>
<td>Exotic Newcastle Disease</td>
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<tr>
<td>EOC</td>
<td>Emergency Operation Centre</td>
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<td>EPC</td>
<td>Emergency Planning College (UK)</td>
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<td>ERT</td>
<td>Emergency Response Team</td>
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<td>ERT-A</td>
<td>Emergency Response Team – Advanced</td>
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<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
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<td>FIRESCOPE</td>
<td>Firefighting Resources of California Organized for Potential Emergencies</td>
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<td>GAO</td>
<td>Government Accountability Office</td>
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<td>GT</td>
<td>Grounded Theory</td>
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<tr>
<td>HAZUS</td>
<td>(FEMA Disaster Loss Estimation Programme)</td>
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<td>HSIN</td>
<td>Homeland Security Information Network</td>
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<td>HEAT</td>
<td>Headquarters Effectiveness Assessment Tool</td>
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<td>HRO</td>
<td>High Reliability Organisation</td>
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<td>HRT</td>
<td>High Reliability Theory</td>
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<tr>
<td>HURREVAC</td>
<td>Hurricane Evacuation</td>
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<tr>
<td>ICS</td>
<td>Incident Command System</td>
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<tr>
<td>IISIS</td>
<td>Interactive, Intelligent Spatial Information System</td>
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<td>JCDSTDP</td>
<td>Joint Command Decision Support Technology Demonstration Project</td>
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<td>JESIP</td>
<td>Joint Emergency Services Interoperability Principles</td>
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<tr>
<td>KSA</td>
<td>Knowledge, Skills and Attitude</td>
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<td>LNO</td>
<td>Liaison Officer</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<td>MAGIC</td>
<td>Multi-Agency Gold Incident Command</td>
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<td>MCEER</td>
<td>Multidisciplinary Centre for Earthquake Engineering Research</td>
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<tr>
<td>METI</td>
<td>Ministry of Economy, Trade and Industry (Japan)</td>
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<td>MMON</td>
<td>Mixed Multi-Organizational Network</td>
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<td>MRE</td>
<td>Meals Ready to Eat</td>
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<td>NARAC</td>
<td>National Atmospheric Release Advisory Centre</td>
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<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
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<td>NATO</td>
<td>North Atlantic Treaty Organization</td>
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<tr>
<td>NDM</td>
<td>Naturalistic Decision Making</td>
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<td>NEC</td>
<td>Network Enabled Capability</td>
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<td>NIMS</td>
<td>National Incident Management System</td>
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<td>OODA</td>
<td>Observe, Orient, Decide, Act</td>
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<td>PMON</td>
<td>Planned Multi-Organizational Network</td>
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<td>RPDM</td>
<td>Recognition Primed Decision Making</td>
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<td>RMA</td>
<td>Revolution in Military Affairs</td>
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<td>RRCC</td>
<td>Regional Response Coordination Centre</td>
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<td>RST</td>
<td>Regional Support Team</td>
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<td>SA</td>
<td>Situational Awareness</td>
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<td>SCT</td>
<td>Structural Contingency Theory</td>
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<td>SEOC</td>
<td>State Emergency Operation Centre</td>
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<td>SHAKE</td>
<td>(Earthquake Simulation Tool)</td>
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<td>SLOSH</td>
<td>Sea, Lake and Overland Surges for Hurricanes</td>
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<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
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<tr>
<td>STOD</td>
<td>Socio-Technical Organizational Design</td>
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<tr>
<td>TADMUS</td>
<td>Tactical Decision Making Under Stress</td>
</tr>
<tr>
<td>TEPCO</td>
<td>Tokyo Electric Power Company</td>
</tr>
<tr>
<td>USCNS</td>
<td>United States Commission on National Security</td>
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<tr>
<td>WMD</td>
<td>Weapons of Mass Destruction</td>
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Chapter 1: Introduction

‘The obvious collapse of the intergovernmental system in emergency management under the strains of the catastrophic events initiated by Hurricane Katrina provides an unquestioned demonstration of the failure of hierarchical control in the dynamic context of an actual disaster...This task requires rethinking the terms of communication and coordination to dispel the myth of hierarchical control....It means redefining the terms of cognition, communication, coordination and control in ways that fit the reality of practice in extreme events...The record of operations from Hurricane Katrina compels a redefinition of organizational frameworks and standard terms of emergency management....’ (Comfort, 2007:62).

1.1 Background

It is paradoxical that in an age when technology has given us the ability to manage our environment to an extent that would have been unimaginable in previous generations, and when human ingenuity has provided us tools to measure and monitor threats and develop highly sophisticated crisis and disaster management frameworks, the world has never seemed a more dangerous place. Whether because of the changing nature of terrorism, the range, scale and impact of natural disasters, or the impact of the breakdown in the highly complex technological systems that underpin every aspect of our daily lives, we seem to be increasingly vulnerable to increasingly catastrophic incidents. The power blackouts that affected 600 million people across northern India (2012); the consequences of the Fukushima tsunami/earthquake (2011) that left Tokyo on the edge of being a city without food, and as a secondary effect disrupted supply chains across the world; volcanic activity in Iceland that disrupted international travel across Europe (2010); and the repeated bank IT failures that have left hundreds of thousands of people to survive purely on the money that they happened to be carrying at the time are examples of a new class of risk and threat. In the scale of their impact and complexity, these situations transcend any traditional concept of crisis management frameworks or organisational jurisdictions. The failure to deal with these primary events and their secondary consequences effectively and in a timely manner can no longer be seen as simple management failures. With their potential implications for the social, political and economic continuity of a country (Boin et al., 2003; Guhar- Sapiro, 2011) they are a challenge to the legitimacy of governments tasked with ensuring public safety (Boin & ‘t Hart, 2003; Boin, 2009:367; Stark, 2010).

The fact is that it is extremely rare that a crisis occurs that is completely unexpected. It is equally rare for crisis response operations to fail for reasons that are unique or unexplainable. The reality is that it is not the initial triggering event that causes the tragedies that dominate so much of our media, but rather ‘the inevitable set of human errors that lead to a catastrophic disaster’ (Comfort, 2007:61). The reasons for
those failures are not unknown. In fact, they are so well understood that it is possible to predict exactly how and why the response to the next emergency you see on your television or smart phone will fail. The more one understands the issues and challenges facing current crisis management practices, the more one understands that many of the failures associated with major disasters can be said to be man-made, in that the planning and preparation that were meant to mitigate or manage those disasters were patently built on false premises (Turner, 1994; Turner & Pidgeon, 1997). And yet, despite these repeated high-profile, high-impact failures, lessons are not learned.

The effectiveness of crisis and emergency management is not something that can be measured in terms of key performance indicators, organograms, seminars, workshops or simulated exercises. In fact, ‘no truly objective measure is possible’ (Rochlin, 1993:17). The simple truth is, they do their job when they work – and in many cases, it is the failure of strategic planners and operational managers to realise basic management functions that leads to, or at least contributes to, catastrophic impacts. If emergency management operations were judged in the same way as any other high reliability operation, it is clear that the failure to achieve their objectives would be deemed unacceptable. Yet there is nothing intrinsic to crisis management or emergency response operations that should cause them to fail. In almost all cases, there are specific organisational weaknesses that have either contributed to or directly caused those failures. Rather than seeing failure as being the consequence of some catastrophic outside event, crisis management can learn lessons concerning responsible service delivery from high reliability organisations (HROs) where ‘What distinguishes reliability enhancing organisations is not their absolute error or accident rate, but their effective management of innately risky technologies’ (Rochlin, 1993:17).

In researching crisis management, the outstanding feature that emerges from the dust and smoke of yet another disaster scene is how often the post-event cry is ‘We just weren’t ready’ (Wise, 2006). Whether it is Hurricane Katrina, the Nepal earthquake, corporate risk managers or global financial institutions, the fact is that despite the huge amount of time, effort and resources that are put into crisis planning, crisis management programmes are simply not robust enough to deal with the reality of crisis events (Donahue & Tuohy, 2006). As Comfort (2007) refers to in her quote cited at the start of this chapter, these are not merely technical failings but a reflection of a fundamental failure to understand the nature of the challenges of crisis events and the demands that they make on response management frameworks. Highly disruptive infrastructural breakdowns that are often blamed for the failure of emergency response operations are not an unexpected consequence of crisis events, but a fundamental characteristic of them (Corbacioglu & Kapucu, 2006). Part of crisis management is to ‘plan for not having a plan’ (Norris et al., 2008:143), yet the inability to model that into the response planning led to a situation where Michael D. Brown, Director of the Federal Emergency Management Agency (FEMA), offered an emphatic defence of
the federal response to Hurricane Katrina by saying that his agency ‘prepared for the storm but that the widespread, unexpected flooding kept rescuers out of the city’ (White & Whoriskey, 2005).

Despite the traditional understanding of crises as existing in the ‘high impact, low likelihood’ corner of the risk matrix, situations such as those already mentioned can no longer be seen as improbable and rare events (Lalonde, 2007:507). The number, magnitude and impact of natural disasters are all showing an upward trend (Scheuren et al., 2008), and the scale and complexity of their consequences on state and regional stability have all increased beyond the original scope of managed crisis response (Tatham & Houghton, 2011). The increasing interconnectedness and interdependency of the global community, which has led to a growing inability to control, or even understand, the governing mechanisms by which our basic social networks are managed (Boin et al., 2010; Perrow, 2011), means that crises are becoming more than ever ‘unknown unknowns’, to use Donald Rumsfeld’s memorable phrase. To put it even more starkly, rather than approaching these problems from a position of _tabla rasa_, confronting them may be considered as entering a complete _Terrae Incognitae_ (Lagadec, 2009). With a triggering and escalation period of seconds rather than hours, days or weeks as was the case in the past, the world is now permanently on the edge of a potentially total systems breakdown, and there is an apparent taboo on politicians and academics admitting that things may well be beyond our control (Schein, 1993). The emergence of ‘unthinkable’ and ‘inconceivable’ crises characterized by catastrophic impacts and hypercomplex consequences (Lagadec, 2007), has meant that modern crisis management (CM) has become less concerned with the prevention of catastrophe as management of its aftermaths.

Given the evolution in the fundamental conception of what is considered as a crisis/disaster in the 21st century, it is not unnatural to expect that there would be the need for a radical rethinking of the nature of disaster management, rather than just the mechanics of its delivery. Whilst the nature of crisis has changed, it is questionable as to whether our understanding of the requirements of effective crisis management models and methodologies has evolved to the same degree. Although such issues may be recognised and acknowledged on a theoretical level, the reality of continued failures demonstrates the fact that lessons have not been transferred to the strategic commanders and policy makers who are responsible for designing and managing the coordinated crisis responses. The fact that the debate on crisis management still ranges around fundamental issues such as incident command systems and multi-agency interoperability (Coles et al., 2012), communication and coordination (Comfort, 2007) or sense-making and decision-making (Alison, 2015) suggests that modern crisis managers are spending a huge amount of time and effort (re-)learning the lessons of the 1980s rather than preparing to deal with the crises of the 2020s.

The 9/11 attack on the World Trade Centre (2001) was a ‘major focusing event’ (Moynihan, 2005:177; Birkand, 2009) that highlighted the need for a capability to respond to ‘unthinkable’ crisis scenario (Kapucu, 2007; Comfort, 2007), but it was the widespread failure to respond effectively to Hurricane
Katrina and the subsequent damage, destruction and suffering in New Orleans that called into question the fundamental viability of extant crisis management methodologies and capabilities (Corbacioglu & Kapucu, 2006; Waugh & Streib, 2006; Comfort, 2007; Moynihan, 2009). The failure of the traditional highly-centralised, hierarchically-based command and control crisis management system, which was a ‘cornerstone’ for both theoretical and administrative approaches to crisis management (Hart et al., 1993:12; Boin et al., 2003), led to a call for a ‘redefinition of organizational framework and standard terms of emergency management....that fit the reality of practice in extreme events’ (Comfort, 2007:193). Rather than simply adapting existing methodologies, this process of ‘double loop learning’ would call for a concerted attempt to change the paradigm within which crisis management is conceptualised, based on a fundamental questioning of underlying policies and basic practices (Argyris, 1977; Richardson, 1994).

1.2 Research Objectives

The central premise of this thesis, reflecting the language in the US Congressional reports into 9/11 (9/11 Commission, 2004) and Hurricane Katrina (US Congress, 2006), is that the fundamental conceptualisation of centrally-managed crisis management as it has been accepted until now is no longer appropriate to the challenges of the modern era.

The focus of the research is to provide an examination of the systemic weaknesses and vulnerabilities of current crisis management methodologies, and the development of an alternative model of command and control based on localised decision-making and decentralised command systems involving a free-form interaction between a community of ‘knowledge holders’ responding to the dynamic and ever-changing situation which they are facing. These models call upon lessons learned from research into ecological resilience and high reliability organisations to suggest an alternative language of ‘effectiveness’ beyond the limited scope of current hierarchical systems-based management structures. The defining objective is the desire to build on existing critically recognised work to develop a cohesive model of decision-making within crisis management environments that will ‘create practical understanding that will lead to enhanced policy making, and the ability of policy makers to make correct decisions’ (Rist 1994). In so doing it is intended to contribute to the search for ‘a more sophisticated, contingent and empirically grounded theory of crisis management’ (‘t Hart et al., 1993:12), as well as acting as a catalyst for further investigation into this area of crisis management, which will be crucial in developing a crisis and disaster response capability appropriate to 21st century challenges.

One outstanding feature that has emerged from the research process, and which has been reinforced on a daily basis, is the parallels between decision-making crisis management and theory development in academic research. The language and concepts used are often identical, and if they were to be reduced to
a Venn diagram, would have a significant intersection. Barnett (2000:415) placed the academic institutions in ‘a world of supercomplexity ... characterized by certain features which are captured especially in four concepts, namely contestability, challengeability, uncertainty and unpredictability. These four concepts are surrounded by others such as change, turmoil, turbulence, risk and even chaos’. This could describe, word for word, the environment that emergency managers are responding to. I believe that there are some significant lessons to be learned on both sides from this parallel existence, and that is perhaps a study that could be taken further at some stage.

1.3 Outline of Chapters

The thesis is structured as follows. Chapter 2 provides an outline of the thesis methodology. It gives an overview of the positioning of the thesis within the professional doctorate tradition; the chosen paradigm (constructivist); the research methodology (Grounded Theory), and major influences (qualitative metasynthetic approaches). It then describes the research process itself. It finishes with review of some of the limitations of the paper from a methodological perspective, together with an explanation of the decisions made.

The main body of the work starts at Chapter 3, with an overview of the challenges facing current crisis management frameworks, a taxonomy of crises that lays out the various ranges and degrees of crises events, and a literature review that sets the thesis within the established canon of academic crisis management research. It also identifies the major causes of failures within crisis management operations, which can be used as a touchstone against which the rest of the thesis can be referred.

Chapter 4 introduces the various management structures associated with traditional incident command systems, and examines the political and cultural assumptions that have influenced those developments. It goes on to discuss some of the debates concerning the viability of current incident command systems that have emerged within the crisis management community itself.

Chapter 5 is concerned with the issues associated with interoperability and the need to create a multi-agency approach to crisis management. It examines why there is a failure to develop effective working practices despite the fact that multi-agency interaction is recognised as being a critical component of any major incident response, and highlights many of the significant failure points that are repeatedly identified as being the root causes of major emergency management failures.

Based on the current failings highlighted so far in the thesis, Chapter 6 introduces some of the functionalities that will need to be incorporated into multi-agency management programmes if a genuine
21st century capability is to be created. These concepts include common operating pictures, communication and decision making, and the ability to work together in non-hierarchical, open-framed operational networks.

Chapter 7 introduces the concept of resilience as a critical issue that needs to be considered at every level of a crisis response operation, in order to ensure that whatever solutions are offered are able to operate in the widest range of possible situations, including those which fall well below what would be considered to be optimal conditions.

Chapter 8 examines the research around high reliability organisations, many of which offer lessons in high-reliability management that would be applicable to the operational contexts of crisis management, and uses that model to suggest a new framework within which crisis management capabilities can be both developed and managed.

The thesis concludes with a final Conclusions Chapter (Chapter 9), which sums up the paper and makes recommendations for future issues in crisis and emergency management research.
Chapter 2: Methodology

2.1 Introduction

This chapter gives an overview of the methodological structure of the thesis, together with an explanation of the various choices made in deciding the most appropriate research approach. It starts off by placing the thesis in a professional doctorate (rather than PhD) context, and goes on to set the framework for the general approach, which is that of constructivist practitioner-based research that allows the development of insightful revelations from working with a wide range of sources. It continues with a discussion about the challenges that the study of complex situations creates, followed by a detailed description of the research framework based on the iterative dialogue between data and theory-development associated with Grounded Theory. It references the integrative approaches emerging from qualitative metasynthetic research methodologies, whilst also acknowledging the methodological limitations in applying the theoretical frameworks developed in the more disciplined medical research arena associated with metasynthetic research to the more chaotic world of crisis management. The chapter then describes the research process itself, before concluding with an outline of some of the limitations of the research project that had an influence on the final thesis.

2.2 The Thesis in a Professional Doctorate Context

The remit of the Professional Doctorate student, as opposed to the more academic PhD student, is to bridge the gap between the theoretical model-building of the academic and the practical challenges of the practitioner – and to do so in such a way as to have relevance and validity in both worlds. It is to take information, and to move beyond the constraints of research methodology and advanced discipline-based knowledge, and towards supporting high-level thinking and action appropriate to the exercise of mature capability (Lester & Chapman 2002) and practical wisdom (Sternberg, 1998).

As a doctoral level award, the professional doctorate implies advanced scholarship and extending the boundaries of knowledge (Lester, 2004) but in a way that relates to an action-orientated environment rather than purely academic halls of learning (Maxwell & Kupczyk-Romanczuk, 2009). The nature of ‘prof docs’ can be gauged by alternative names for them; ‘professional doctorates’, ‘applied doctorates’, ‘practitioner doctorates’ or ‘clinical doctorates’ (Kot & Hendel, 2012:346). Whatever it may be called, the objective remains the same, namely to create authoritative experts - ‘pracademics’ (Nalbandian, 1994; Posner, 2009) or ‘scholar executives’ (Maxwell, 2003:282) - who can straddle both the academic and practitioner worlds, bringing insights from each to add value to the other.
In seeking an alternative paradigm to the traditional academic methods of classifying and evaluating high-level research, professional doctorates do not deny the validity or value of academic rigour, but rather seek to develop an identity that goes beyond ‘Ph.D + course work’ (Maxwell, 2003:289). For over four hundred years, since the beginning of the Age of Enlightenment, academic validity has been based on cultural assumptions whereby ‘Scientific maturity is commonly believed to emerge as the degree of quantification found within a given field increases’ (Guba and Lincoln, 1994: 106). The desire to be accepted by the old order can be found in the first generation professional doctorates, which ‘still privileged academic over professional knowledge and outputs’ (Maxwell, 2003:289). Even in specific practice-associated prof docs, such as the Ed.D (Doctor of Education), there is the expectation that the candidate will produce an academic work based on independent research judged on much the same basis as a Ph.D (Lunt, 2002). Under such systems the underlying justification for methodological rigour continued to be based in the rational, scientific world ruled by ‘theoretical capitalists’ (Searle 1999:466), and it was assumed that qualitative research must base itself on those concepts in order to justify wider validity (Guba & Lincoln, 1994; King et al., 1996; Searle, 1999).

In contrast to such formally structured process-driven research, the postmodern orientation associated with practitioner contextualized research and theory development is about deconstruction, reintegration and the development of new perspectives and interpretations (Morley & Priest, 1998), in which it is understood that the focus on tightly defined questions can act as a barrier to the discovery of more intuitively-based insights that emerge from data analysis (Bryman, 2007; Trnka & Jenvald, 2006). The growing awareness that there are other methods of research and enquiry that do not conform to classic ‘scientific enquiry’ methodologies allows for an experimental perspective judged on the ‘credibility, relevance and transferability’ that emerges from working in a ‘context-rich environment’ (Alison, 2015: 315), based on learning frameworks such as ‘interaction, experience, common sense and other forms of tacit knowledge’ (Maxwell, 2003:283).

The professional doctorate process is by its nature inclusive, multi-disciplinary and integrationist (Morley & Priest, 1998; Maxwell, 2003). One differentiator between the professional doctorate candidate and the Ph.D candidate is that the former is likely to be a senior practitioner or consultant, for whom the award can be seen as the summation of a lifetime’s experience and insight (in-service), whereas the latter will in all likelihood be used to establish the foundation for the beginning of an academic’s career (pre-service) (Westcott, 2001). However, the purpose of the professional doctorate is not merely to work within a knowledge-set environment, but extends to ‘applying that knowledge in political, economic, social and cultural contexts’ (Maxwell, 2003:179), contributing to ‘next stage thinking’ and thought leadership within their area of practice (Lester, 2004).
A central theme throughout this thesis is that the concepts and language used to describe the process of ‘sense-making’ in the research process has reflected the realities of crisis management itself. The difference between model 1 (traditional) and model 2 (post-modern) doctoral research reflects the tone, language and meaning associated with similar paradigm changes in crisis management frameworks, which have evolved from being highly managed and largely process-driven to being based on an understanding that such processes are much more free-flowing and self-forming, where ad hoc groups of experienced practitioners come together to create innovative solutions to what are largely unknown, unpracticed and situation-specific problems. The following quote (Lee et al., 2004), based on the work of Gibbons et al. (1994) in developing new models of knowledge and research refers to high-level research, but it would be equally applicable to the challenges of decision-making within chaotic crisis environments:

‘[Model 1] problems are set and solved in context governed by academic interests of specific communities characterised as disciplinary; homogeneous; hierarchical and form preserving; accountable to discipline-based notions of methodologically ‘sound’ research practice….. Model 2 Learning, is ‘transdisciplinary; heterogeneous; heterarchical and transient; socially accountable and reflexive, including a wider and more temporary heterogeneous set of practitioners, collaborating on problems defined in specific and localised context’ (Lee et al., 2000:124; Gibbons et al., 1994).

2.3 The Research Approach

A central objective of this thesis, therefore, is that it will be seen as having value to both the academic and the crisis management and emergency response practitioner. As such, the philosophical approach is pragmatic, taking as its underlying ethos the principles set out by Mills as early as 1959, ‘Be a good craftsman. Avoid any rigid set of procedures….Avoid the fetishism of method and technique….let theory and method again become part of the practice of the craft’ (Mills, 1959:24). From this perspective, the validity of research, especially research into areas that affect policy-making, should be judged on their relevance to decision-making, rather than the need to ‘develop a prescriptive set of categories about which methods or modes of analysis are likely to lead to what types of influence’ (Rist, 1994:557). This approach was reiterated forty years later by Seale, who observed: ‘Intense methodological awareness, if engaged in too seriously, can create anxieties that hinder practice, but if taken in small doses can guard against the more obvious errors…..Research practice, in fact, should be conceived as relatively autonomous from such abstract and general considerations’ (1999:475). The significance of context-based research was highlighted by Mischler (1989), who pointed out that expecting someone to carry out valid research based on a set of prescriptive rules was no more effective than expecting someone to play the violin or make a pot because the rules of that craft had been explained to them.
In that sense, whilst never losing its academic rigour, this thesis has deliberately been situated within practitioner contexts. The ability to avoid ‘high fallutin theory’ (Glaser, 2007:100) and to maintain ‘low-inference interpretation’ (Sandelowski, 2000:335) means that there is more likely to be agreement from various practitioners as to the ‘truth’ of the message, and to avoid the mistrust that practitioners have from unreconstructed academics (Ackoff, 1979; Gibson & Dearick, 2010). However, in making the case for more-open minded research possibilities, it is important to ensure that these ‘alternative enquiry paradigms’ (Guba & Lincoln, 1994:108), do not reduce themselves to a ‘whatever works’ perspective (Bryman, 2006:97). Whilst the use of the word ‘soft’ to describe non-traditional research methods is not (necessarily) pejorative, it does imply imprecision and lack of dependability (Guba & Lincoln, 1994). It is important to avoid the academic nihilism that suggests that qualitative analysts proceed ‘as if they had no method – sometimes as if the use of explicit methods would diminish their creativity’ (King et al., 1996:8).

Traditional academic research paradigms such as positivism and postpositivism are characterised through terms and concepts such as explanation, prediction and control and verified hypotheses established as facts or laws, as well as conventional benchmarks of rigour, internal and external validity, reliability and objectivity. In contrast, the terms used to describe constructivism include ‘understanding and construction; individual constructions coalescing around consensus; more informed and sophisticated reconstructions; vicarious experiences; trustworthiness and authenticity; intrinsic ethics, process tilt towards revelations; special problems; “passionate participant” as facilitator of multi-voiced reconstructions’ (Guba & Lincoln, 1994:112). The constructivist approach is more flexible in its attitude to orthodox methodologies, is observational and interpretative rather than experimental, and proceeds more by feel and improvisation than by plan (Schwandt, 1994; Gregor, 2005). The significance of the researcher’s role is emphasised by the nature of the interaction ‘based on observation and verstehen (that is, empathy; understanding the meaning of actions and interactions from the members’ own point of view)’ (Ecksten, 1992:123). The criteria for judging the quality of constructivist research is not so much measurement against a set hypothesis or existing ‘laws’, as is the case in positivism/postpositivism, but rather the trustworthiness and authenticity of the models (corresponding to the ‘fit’ in grounded theory). Trustworthiness includes the criteria of credibility, transferability, dependability, and confirmability (Guba & Lincoln, 1981; Lincoln & Guba, 1985).

As well as being a reflection of my own personal preference, there is a strong parallel between constructivism as a research paradigm and the realities of crisis management. Both constructivism and crisis management are based on a tacit acknowledgement that any ‘model of reality’ is only an interim stage, based on best available information. As far as the nature of ‘truth’ or ‘knowledge’ is concerned, it is open to multiple constructs, all of which are equally possible, valid or reliable until further information emerges which might give one construct precedence over any or all others. This process is virtually
indistinguishable from Weick’s concept of ‘sense making’ (Weick, 1988; Weick et al., 1999) or Klein’s model of Primed Recognition Decision Making in crisis environments (Klein, 1993; Kaempf et al., 1996). The validity of any construct is based on the judgment of competent personnel (Guba & Lincoln 1994:1130) or those holding embodied expertise (Lipshitz et al., 2003). Models of reality are at best ‘best guesses’, subject to continuous revision as they need to adapt and evolve in line with the challenges of the external world. This conceptualisation of the emergent nature of ‘truth’ and ‘knowledge’ is equally applicable to responding to the complexities of fast-escalating and ever-mutating crises as it is to theoretical methodologies of enquiry.

2.4 The Study of Complexity

One of the critical problems in studying crisis management events is the fact that the situations being examined are themselves extremely complex, and that the participants in those events who are held to be the engaged experts often have little understanding of what exactly they have done, especially when considered from an academic or theoretical perspective (Bresnen et al., 2003). The study of complexity is not reducible to a ‘conditional/consequential matrix’ (Strauss & Corbin, 1998:181). It is difficult to isolate meaningful cause-effect linkages, and practical issues of time, access and resources mean that most studies focus on only a few variables, on subsystems of the organisation, over short time duration, collecting limited data using limited techniques, usually informed by only one discipline (Roberts & Rousseau, 1989).

By its nature, analysing decision making in crisis events means looking for ‘patterns’ of meaning and relevance where often there were none at the time of the incident (Hill, 2010). Rather than detailed analysis, such activity is often limited to ‘storytelling’ about what went wrong (Roux-Dufort, 2007). Practical issues concerning the ability to observe crisis management ‘in the wild’ (Gore et al., 2006) means that any attempts to do so will be largely spontaneous and unstructured, and there will be limited access to critical personnel at the heart of the action. The danger associated with emergency situations means that observers will normally be kept at the periphery, both for their own safety and to limit disruption to the emergency response operation. This means that most case studies are carried out post-event, when the recollections and responses of the interviewees are likely to be influenced by the lack of time, desire to be seen to have adhered to protocols or to avoid possible blame, either for themselves or others (Alison et al., 2015), or alternatively will take place in a training environment, where such situations are lacking in the critical failure issues associated with actual crises (Barosa et al., 2010).

Stern (1994) identifies five classes of complexity for which case studies could be a theoretically justifiable approach, all of which are valid within the framework of this research and are covered in detail in the body of the paper. They are:
• **Political complexity** (the various influences that need to be understood in terms of decision-making);

• **Institutional complexity** (organisational hierarchies and interactions that make up the sub-sections of the over-riding organisational framework);

• **Temporal complexity**, which Stern sub-divides into diachronic (developmental over time, i.e. process), and synchronic (simultaneous at a single point, i.e. event);

• **Informational complexity** (how difficult is it to gain a comprehensive and accurate picture of what is happening); and

• **Problem complexity** (how complex is the actual problem that the case study is engaged with).

### 2.5 The Grounded Theory Methodology

Given that the objective of the research is to develop an overarching theoretical framework of a relatively new area of study, my general approach to the thesis has been based on a grounded theory perspective which allows ‘a detailed, rigorous, and systematic method of analysis’, but still allows the researchers the freedom to develop ideas and theories within the research process, rather than being confined by adherence to the original research question (Jones & Alony, 2011:96). The research has used the guidelines developed within the evidence-based practice movement, which has as its objective rigorously-developed evidence-based analysis that can be used to contribute to policy development and decision-making and which can provide reliable answers to particular questions (Thomas & Harden, 2008; Rist, 1994). It has also been encouraged by the work of Greenhalgh et al. (2005), in the use of literature review-based research, to develop a ‘meta-narrative’ out of multiple research areas as a way to relate to policy-developing questions. This approach is of particular value in a field where ‘policy makers are inundated with unmanageable amounts of information; they need systematic reviews to efficiently integrate existing information and provide data for rational decision making’ (Mulrow, 1994:597).

In the general approach to data collection, synthesis and sense-making, this thesis has largely followed the Grounded Theory framework originally described by Strauss and Glaser (Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987; Strauss & Corbin, 1990). Grounded Theory has grown to be associated with the specific, highly technical and prescriptive methods developed by Glaser and Strauss, initially together and latterly individually. However, Grounded Theory also implies a more generalist approach to research and theory development in which the objective is to develop models of reality that have ‘grab’ (i.e. they seem intuitively correct), fit the data and that work in the real world (Walker & Myrick, 2006). SocioTechnical Organizational Design Theory (STOD) is an example of a practice-based theoretical approach that uses grounded theory to develop a transformative view of command and control structures, claims direct
lineage with academic methodologies, and aims for real world relevance (Walker et al., 2008). ‘[STOD’s] development can be regarded as a continuous iteration between theory and practice and has resulted in a coherent set of design principles, design rules and design sequences. As such, STOD can be regarded as a “grounded theory” (Glaser and Strauss 1967), i.e., a theory using abstract concepts to describe and analyze a series of general phenomena, but based on practical experiences’ (de Sitter et al., 2004:01). Such a process allows methodologically sound conclusions to be developed that are arrived at both deductively (proceeding from loosely-specified hypotheses) and inductively (in that new and unexpected insights surface and add to the inquiry) (Donahue & Tuohy, 2006).

Grounded Theory is based on a process of iterative constant comparison in which the emergent theory is being constantly and simultaneously refined and redefined as it is referred back to ‘what is known’ (i.e. the data), a process which is almost identical to that of decision making within crisis environments. In fact, the parallels are so clear that, had this thesis focussed on the research methodology (Grounded Theory) rather than the research objectives (critical decision making in crisis environments), much of the basic theoretical framework would remain the same. The conception of practitioner knowledge as a dynamic interaction where research and practice are engaged in a continuous feedback cycle (Schon, 1987) is directly analogous to the Grounded Theory method whereby constant comparison is used as an iterative process to develop theoretical concepts rather than merely identifying differences or similarities (Glaser, 2007), which in turn mirrors the sense-making process central to recognition primed decision making (Klein, 1997). In all three systems, an initial ‘theory’ based on available information is used as a working hypothesis, with the acknowledgement that it will be continually updated and refined as further information becomes available.

This concept of emergent theory describes the process of collecting data on an inclusive, non-judgemental basis until a critical mass of neural connections is reached that will allow emergent categories and groupings to be formed, which will in turn pull further data into their orbits on an almost gravitational basis, so that from the chaos of data will be formed planets, stars and, if the scope of research is wide enough, whole galaxies of theoretical networks and matrices. In the grounded theory cosmology, this process is natural and emergent, and is not dependent on any form of ‘forcing’ whereby the researcher imposes their pre-conceived ideas onto the data. Within this paper, the individual studies can be considered as the equivalent of interview subjects (primary studies) whilst the iterative interaction with those papers and the synthesis itself, based on emergent concepts, is no different from a classical GT theory development process.

The main objection that classical Grounded Theory would have to the professional doctorate approach, however, is the concept of the ‘neutral observer’. One of the central principles of GT is its belief that it is possible – in fact, desirable - to come at a research question with no previous knowledge or experience of that particular field, within which ‘GT is the method of choice because it enables an understanding of an
area which requires no preformed concepts of knowledge or reality’ (Jones & Alony, 2011:95). This is in
direct contrast to the concept of the professional doctorate as the summation of a lifetime’s experience
and insight (Westcott, 2001), with the purpose of ‘consolidating and giving a structure to the candidate’s
often significant experience and achievements, and assisting the articulation of previously unorganized
theory and ideas’ (Lester, 2004:760). For the experienced practitioner it is precisely this insight which
differentiates them from the professional researcher (Bourner et al., 2001). However, whilst Glaser and
Strauss specifically warned against too great an understanding of the research subject at hand (1967),
other writers accepted the fact that ‘it is possible to access existing knowledge of theory in a particular
subject domain without being trapped in the view that it represents final truth in that area’ (Walsham,
1995:75). In other fields also, the additional value that an experienced practitioner brings is widely
recognised (Eisenhardt & Martin, 2000), and is one of the central issues in discussing decision-making in
crisis environments.

2.6 Metasynthetic Techniques

Given that this thesis is a literature-based research project based on the integration of a wide range of
crisis management and other research fields in order to develop new theory, it has been influenced by the
literature associated with meta-synthetic research. Metasyntheses are ‘integrations that are more than the
sum of parts, in that they offer novel interpretations of findings. These interpretations will not be found in
any one research report but, rather, are inferences derived from taking all of the reports in a sample as a
whole’ (Thorne et al., 2004:1358). This approach is particularly applicable to literature-based research,
when the objective of the research is to summarise the existing evidence concerning a treatment or
technology, as it allows the ‘synthesis of recent advances and ideas into fresh new theory’ (Fitzsimmons et
al., 2011:4). The summation would then be to identify any gaps in current research in order to suggest
areas for further investigation and/or to provide a framework for new research activities (Kitchenham,
2004). It also allows an interpretive approach within a framework of ‘thematic synthesis’ (Thomas &
Harden, 2008) that would not be as valid if based on a single-study research project (Mulrow, 1994). This
approach has the advantage in that it also recognises the significance of critical cases (Flyvbjerg, 2006),
those cases from which conclusions can be drawn which could then be validly applied to all other cases
within that class of cases. Within the crisis management arena, 9/11 and Hurricane Katrina would be two
clear examples of critical cases, based both on the impact that they had on their surrounding environments
and academic theory, and the depth and richness of academic research that they engendered.

The main difference between mainstream metasynthetic methodologies and the reality of research in a
crisis management context is that metasynthetic methodology is largely based in medical and nursing
research, and such has a strong foundation of evidence-based literature to work from, even in its
qualitative manifestations. The weakness of much of crisis management literature, even when it claims to be evidenced based, is that it is working in a research environment characterised by ‘the conditionality and partiality of small-study qualitative findings’ (Thorne et al., 2004:10). However, even if it is as a a general guide rather than a detailed road map, the value of metasynthesis is that it acknowledges the transformative capabilities of such an integrative approach, one in which rather than being limited to a systematic review of the literature or the agglomeration of data findings, its goal is ‘to produce a new and integrative interpretation of findings that is more substantive than those resulting from individual investigations’ (Finfgeld, 2003: 894). The other aspect of metasynthetic research that makes it valuable within a professional doctorate thesis is acceptance of the responsibility to ‘make a difference’. The objective of research is to create ‘useable metafindings’ (Thorne et al, 2004: 18), that have the ability to improve operational outcomes, enhance research and shape policy (Finfgeld, 2003).

In any literature based research, the validity of any findings is dependent on establishing ‘value’, given the plethora of academic journals and articles available. This point was answered by acknowledging the authority of names that were repeatedly cited by other authors and who were considered as thought leaders in particular fields. These researchers often work together in ad hoc groups, with a significant amount of the ‘dominant’ or ‘eminent’ articles featuring at least one, and often two or more of these sector leaders (Greenhalgh et al., 2005). Whilst there are various approaches to the issue of validation, the ultimate objective of such an approach is immediately relevant to this paper, in that rather than being methodologically constrained, The critical issue in any systematic review is to ask the right question. In this context, the right question is usually one that: Is meaningful and important to practitioners as well as researchers; will lead either to changes in current [...] practice or to increased confidence in the value of current practice; identify discrepancies between commonly held beliefs and reality’ (Kitchenham, 2004:5).

2.7 Research Process

The process of adapting the grounded theory approach so as to be applicable to a literature review study followed the three-stage process described by Yang & Maxwell (2011) which would be applicable to any literature review, and which consisted of an initial series of journal reviews, a secondary snow-balling approach based on citations from those articles, and a final process, whereby articles citing the major authorities are identified, and are followed up to see whether they have relevancy and offer new insights or a different approach. The development of the structure of the thesis followed the six-stage process described by Greenhalgh et al. (2005) which is designed to allow the integration of complex information from multiple research areas. This includes the planning phase, search phase, mapping phase, appraisal phase, synthesis phase and final recommendation phase.
The emergent nature of the research question itself was recognised by Mitroff (2004), who stated that the development of the question is not the starting point, but is something that emerges as the research itself creates a working framework that allows such decisions to be made, which in turn will predicate future research paths. The overall process itself, based on a constant iterative dialogue with the extant literature, was designed to lead to a state of ‘thick description (Geetz, 1993) or ‘rich insight’ (Walsham, 2005) in which the emerging narrative had weight and heft, and could be seen as an integrated whole rather than merely the agglomeration of disparate nuggets of fact or conjecture.

The initial planning stage, setting out the research question in broad terms, was followed by the search stage, involving a wide and largely unstructured reading in various aspects of crisis management. An initial search in general databases such as Business Source Complete, Science Direct, Environment Complete, SocIndex and Criminal Justice Abstracts failed to identify many of the main sources, and I subsequently focussed on the archives of specialist journals such as Academy of Management Review; Administrative Science Quarterly; International Journal of Emergency Services; Journal of Contingencies and Crisis Management; Disaster Prevention and Management: An International Journal; Review of Policy Research; Journal of Public Administration Research and Theory, and Public Administration Review. Based on the subjects raised there I followed the trail of citations, as well as using key word searches in Google Scholar and article searches in general management, governance, policy and related academic journals. Initial key words used included ‘crisis management’, ‘emergency management’, ‘multi-agency’, ‘command and control’, ‘interoperability’, ‘critical decision making’ and ‘catastrophic failure’. I researched the official reports that were issued following 9/11 and Hurricane Katrina, as well as the Challenger and Columbia Space Shuttle disasters; the Kobe earthquake (Japan, 1995) and Fukushima earthquake (Japan, 2012), and disasters in the UK including the Kings Cross fire (1987), Clapham Junction railway accident (1989), 9/11 terrorist attacks (2005) and Charles de Menezes shooting (2005). I also accessed papers from specialist organisations such as the UK Emergency Planning College, Berkeley Centre for Catastrophic Risk Management, Harvard Kennedy School Programme on Crisis Leadership and RAND Corporation.

The next step was to use the initial reading to develop a snowball approach based on the repeatedly cited names of those who were considered thought leaders in particular fields (Greenhalgh et al, 2005). Having established some of the main topics that would be included in the thesis, the mapping stage set the basic structure of the thesis, in which the key elements had been identified and the framework of the thesis could begin to take form, which in turn allowed a more detailed investigation of the separate components of the paper through a targeted search for significant papers in each field as well as wider general reading. This was followed by an appraisal stage, in which comparable studies were grouped together, and the synthesis stage in which each section was then subjected to both in-depth and wide-ranging reading, leading to the development of a well-formed narrative, with an appropriate level of historical background,
theoretical overview and investigation and discussion of all of the major issues associated with each study. The final stage was the recommendation stage based on self-reflection and an understanding of where the final thesis fitted in to the existing literature, which allowed the distillation of the lessons emerging from the research process in a form that would behave relevance in terms of recommendations for practice, policy and further research.

Throughout the research process, I was aware of the importance of ensuring that the research methodology was truly metasynthetic, and not merely a supercharged literature review that was overclaiming on its academic relevance (Thorne et al, 2004; Glaser, 2007). The process of theory-development followed a classical grounded theory pattern. Significant passages from the reading were encoded, which allowed a critical mass of associated readings to be grouped together. As that critical mass took on further shape, significant issues would emerge which led to broader enquiry and deeper reading (Charmaz 2006). This could then be used to reinforce, expand or adapt the emerging framework. Constant rereading of each paper was critical to give further significance to emerging information, which allowed the initial stage of the development of substantive theory (Fernandez, 2004) in which ‘first order facts’ evolved into ‘second order concepts’ (Jones & Alony, 2011).

2.8 Limitations of the Research

The decision to use a literature-based approach rather than to develop primary data through interviews was based on the conceptual nature of the thesis. The objective of the thesis, from its inception, was to create a conceptual framework of crisis management that took into account multiple perspectives, including incident command systems, decision making, sense making, political policy and organisational culture, as well as issues such as resilience and lessons learned from the study of high reliability organisations. As such, insights from individual practitioners from separate sectors would have added little to the development of an over-riding integrative model of multiple areas of research. Not only do those considered as embodied experts within a particular scenario often have little understanding of what it is that they have actually done, especially from an academic perspective (Bresnan et al, 2003), their explanations of why they made decisions and on what basis can often turn out to be little more than ‘unrelated war stories’ (Klein et al., 1989:465). As Woods & Cook (2002:139) put it, ‘It is important to distinguish clearly that doing technical work expertly is not the same thing as expert understanding of the basis for technical work’. The high levels of confusion associated with crisis scenarios, combined with highly complex decision-making procedures that consist of an ever-changing agglomeration of serial, parallel and accumulative decision pathways, means that there is a lack of a clear research methodology with which to approach these factors (Alison et al., 2012), and therefore much of the information gathered from such
interviewees, however experienced they may be within their own fields, often fails to go beyond descriptions of their own experiences rather than an insightful analysis of what specifically caused those situations (and, often, failures) to arise (Tranfield et al., 2003). As such, it was felt that the introduction of interviews and the subsequent data analysis associated with such actions would have added significantly to the research process without adding anything of significant impact to the rest of the thesis or to the validity of the final conclusions.

However, there are a number of decisions - and eventual comprises - that were made that have inevitably impacted on the final version of this thesis. The first is the fact that the range of areas covered has meant that individual sections have not received as much detailed engagement as would have been the case if they were the sole focus of the thesis, and I have not been able to give the level of detailed analysis that I would have liked to had the word count allowed. The truth is that any one of the subjects covered could in itself have been the subject of a doctoral thesis (and many of them have been). However, the objective of the thesis was to develop an integrative framework taking into account all of the major aspects of current crisis management practices, and particularly those areas that are associated with operational failure. I do not believe that any of the issues covered could have been omitted without significantly impacting on the validity of the final paper, and I have consciously tried to ensure that each section was given the level of engagement that it merited.

The other issue is that the thesis is almost entirely US-centric. This has been the outcome of my initial reading, which coalesced around the multitude of US-based resources that have emerged from the 9/11 and Hurricane Katrina events in terms of crisis management analysis, as well as the work done around the development, role and capabilities of Federal Emergency Management Agency (FEMA) within the US national security context. Having developed the initial draft based on mainly US academic and FEMA management models, the attempt to integrate UK-based work into the thesis (as suggested by my supervisor) proved overly disruptive and I made the decision to maintain the focus on US literature and operating environments. By maintaining a US-centric approach, this thesis has been able to build on and have both reference and relevance to the wider body of US-associated crisis and emergency management literature that may have been limited if it had a purely UK-centric approach. However, although they did not appear in the thesis, some of the excellent and ground-breaking work done in the UK in areas concerning multi-agency interoperability and integrated emergency and crisis management development had an impact on my final conclusions. The work being developed by the Emergency Planning College (EPC), as well as through initiatives such as JESIP (Joint Emergency Services Interoperability Principles) and Multi-Agency Gold Incident Command Training programme (MAGIC), as well as by UK authorities at the EPC, Liverpool University (under Professor Laurence Alison) and University of Portsmouth itself are
undoubtedly germane to this areas covered in this thesis, but will have to be covered by someone other than myself.

2.9 Conclusion

Given that the underlying concept which this thesis set out to engage with was that of ‘complexity’, it is germane that the process of grappling with complexity and developing an integrated multi-disciplinary model of practice-associated activity is one of the core functions of a professional doctorate. In fact, all four of the leading thinkers concerning complexity who are widely cited in this thesis (Schon, Ackoff and Rittel & Webber) were named as exemplars of the sort of transdisciplinary or post-disciplinary research situations that were accessible to professional doctorate projects, and which related to real practice situations (Lester, 2004).

An early guide to prof docs set out twelve criteria on which the final work would be judged: knowledge, analysis, synthesis, evaluation, self-appraisal and reflection on practice, planning and management of learning, solving problems, communication and presentation, research capability, engagement with context, responsibility and ethical understandings (Lester, 2004: 762-763). The role of the experienced practitioner is not only to have ‘knowledge of’ and ‘understanding about’ (Stallings 1986:236), but at a higher level ‘accepting responsibility for’ their statements. Schon’s ‘reflective practitioner’ had a duty to be aware of how they interacted with those around them (Schon, 1983), but Barnett (1997) took that further, claiming that the ‘critical professional’ had a moral duty to speak out, based on their ‘socially sanctioned authority to pronounce within a particular domain of knowledge and action’ and their duty to move from ‘knowledge in use’ to ‘critical action’ (Barnett, 2000). Under such terms, a professional doctorate thesis must demonstrate not only a level of learning and insight but also a contribution to both the specific field and the wider context, an objective which has been a touchstone for all aspects of the development of this thesis.
Chapter 3: Setting the Scene: An Overview of Current Crisis Management Research

3.1 Introduction

This chapter sets the conceptual framework for the rest of the thesis. It starts off with a Background, introducing the main issues that will be addressed in the thesis, namely the nature of 21st century threats, the dominant role of hierarchical, command-centred crisis management systems, and the inability of crisis management policy makers to learn lessons from repeated failures in order to develop more effective crisis management capabilities. It then sets out a Taxonomy of Crises, differentiating between those incidents that can be considered as part of the ‘normal activity’ continuum and those that fall into genuine crisis categories. The chapter goes on to review some of the main strands in crisis management academic research, identifying the main authorities in each sector, and then looks at the issues surrounding hyper-complexity in crisis events, discussing the dilemmas and challenges that are unique to such events. Finally, the chapter examines some of the causes of repeated crisis management failures, many, if not most, of which are seen to be rooted in basic management failures rather than technological or systems breakdowns, and thus to be due to internal organizational vulnerabilities (many of which are known and acknowledged) rather than the result of the external event itself.

3.2 Background

The crises of the 21st century are undoubtedly growing larger in scale, and more destructive in their impact, and any model of crisis management that claims to offer solutions to 21st century threats will need to demonstrate an ability to react and respond in an environment defined by catastrophic crises and hypercomplexity (Lagadec, 2007). These incidents can no longer be predicted by extrapolating from previous incidents, as is the case in classical risk management. Rather than regular, reproducible and recurring events that can be predicted, modelled and managed on scientific principles, they are singular and unrepeatable (Weinberg, 1985). As well as affecting multiple jurisdictions, undermining various policy sectors and critical infrastructures, escalating rapidly and changing and evolving as they do so (Ansell et al., 2010), they are likely to be volatile with unpredictable outcomes, requiring the integration of large numbers of agencies that may not have faced such a situation before (Turoff et al., 2008).

Crisis management command systems across the world, but most notable in the US, are firmly grounded in a centralised, hierarchical model of command and control. These are often accepted as the de facto default setting for crisis management, especially following the development of the formal Incident Command System (ICS) (Irwin, 1989; Smith & Dowell, 2000; Lutz & Lindell, 2008; Ansell et al., 2010). Dynes (1994) went so far as to label it the dominant planning model, which was specifically modelled on military command and control structures. The US Department of Homeland Security (DHS)-mandated Federal
Emergency Management Agency ICS follows this model, irrespective of the nature or scale of the incident, a requirement that was maintained even after the policy changes following Hurricane Katrina (FEMA, 2007; FEMA, 2011; Moynihan, 2009). Such centralised command systems are based on a military model of command and control, in which a strictly hierarchical command structure has unity of command as the guiding principle (’t Hart et al., 1993). This system may well be the framework that is best suited to support the development of enhanced capabilities able to respond to the ‘ambiguity and turbulence’ (Tierney & Traynor, 2004:164) of what might be called ‘normal crises’ (Bigley & Roberts, 2001). In such circumstances (and under the specific conditions discussed later in the paper), a formalised ICS may be able to adapt to the needs of a coordinated multi-agency network management approach, rather than being stuck in a systems-led hierarchical command system (Moynihan, 2009). However, its fundamentally hierarchical structure is precisely the weakness that makes it incapable of adapting and responding to the rapidly escalating ‘vicious and unmanageable circles’ (Boin et al., 2003:102) associated with disaster response. It is the attempt to extend the domain of rationality and bureaucratic organising to the uncertainty of chaotic environments (Buck et al., 2006) that has been a critical factor in the repeated failures of crisis response programmes at exactly the time that they are most needed.

Although it is the unique nature of each crisis that underpins the failure to respond appropriately or effectively, the operational causes of those failures are often both simple and predictable (Lagadec, 2005; Comfort, 2007). It is notable that once an incident goes beyond normal operational status and escalates into a ‘unique and unfamiliar’ problem (Munns & Bjeirmi, 1996:81), the subsequent breakdown in response capability is almost inevitably identified as being due to a breakdown in fundamental incident management functionality (Dynes, 1970; Quarantelli, 1988). These can take place at the personal (micro), agency (intermediate) or community/multi-organisational (macro) levels (Bharosa et al., 2010). Official reviews into major CM failures (e.g. Hurricane Katrina (2007), Fukushima (2012), the BP Deepwater Horizon oil spill into the Gulf of Mexico (2006) and the Anders Breivik massacre (Norway, 2012)) repeatedly identify the same five fundamental organisational weaknesses: lack of understanding of the nature of the crisis, lack of realistic modelling of required responses, lack of leadership, lack of effective communication, and lack of inter-agency capability (Mintzberg, 1980). These are in line with Quarantelli’s (1988:375) observations in his review of crisis and disaster management research findings that there were likely to be critical problems concerning communication and information flow, authority and decision-making, and failures to manage increased coordination and a loosening of the command structure. As the 9/11 Congressional report (2004:353) unequivocally stated, aside from the specific operational issues, the underlying fault-lines in the government’s failure to develop an effective crisis management capability was founded on its ‘broader inability to adapt how it manages problems to the challenges of the twenty-first century’.
Risk management at the level discussed in this paper can be seen as a sub-branch of futurology. It is not merely a matter of identifying the threats that exist, and will continue to exist, but rather determining what exactly the threats of the future might consist of. The work of leading authorities such as Lagadec and Comfort, amongst others, has been predicated on the fact that the models of risk and crisis management that have stood us in good stead (or at least, have been accepted as the natural form of crisis management, given the lack of a better or more effective model), are no longer fit for purpose in facing up to the challenges of emerging threats. From this perspective, the inability to identify the fundamental requirements of a 21st century crisis management capability, and to learn the lessons of previous failures, is a moral issue as much as a technical or managerial one (Jarman, 1998).

3.3 Taxonomy of Crises

Although there are many definitions of crises, the underlying criteria were set by Hermann (1963), with a three-stage definition taking into account threat, time pressure and uncertainty. Despite the fact that many studies presume that both time pressure (urgency) (Grint, 2008) and uncertainty (surprise) (Veil, 2001) are prerequisites for crisis, Hermann & Dayton (2009) found that in 50% of the cases they investigated there was time for consideration in the run up to the crisis situation, which were themselves anticipated scenarios (what Boin et al. (2010:1) labelled ‘predicted disasters’). Only 40% of the situations were considered as genuine surprises, where the policy makers were caught off-guard and had no plan of action.

The generic use of the phrases ‘crisis’ and ‘crisis management’ in the literature covers a wide range of scenarios, though often with little clear relevance to genuine crisis situations (Gundel, 2005). Lalonde (2007) describes crises including natural disasters, technological catastrophe, terrorist attack or management failure; Quarantelli (2008) analyses ‘consensus-type’ crises – natural and technological disasters, and conflict crises – riots, civil strife; Pearson and Clair (1998:60) list organisational crises that co-mingle potential crisis management problems (natural disasters, terrorist attack) with normal operating management procedures (copyright infringement, bribery); Veil, (2011) analyses corporate and organisational crises; Roe (2009) analysed decision making in financial crises; Van Wart & Kapucu (2011) offer examples of crises developing from human error, and there is also a separate field of study concerning crises and international disputes (’t Hart, Rosenthal & Kouzmin, 1993; Stern, 2000; EPC, 2005). There is also a hierarchy of urgency and potential catastrophic consequences running from incidents, accidents, conflicts, rupture and crises (Pauchant & Mitroff, 1992) which in turn are classified as normal crises (Bigley & Roberts, 2001), routine crises (Moynihan, 2008, 2009b), through creeping crises (Lalonde, 2007; Hermann & Dayton, 2009), to unthinkable and inconceivable hypercomplex catastrophic crises (Dror, 1999; Lagadec, 2007).
A three-level crisis hierarchy was outlined in Rittel and Weber’s seminal paper ‘Dilemma’s in General Theory of Planning’ (1973), which allowed crises to be categorised by their inherent characters rather than specific properties. The three levels were labelled ‘tame problems’ (those that could be solved through well-established response protocols); ‘loosely structured problems’ (which need to be managed by innovative solutions developed through the collaboration between a number of different agencies that shared a common working culture), and ‘wicked problems’: those that, due to their chaotic nature and overwhelming scale, are not approachable from a traditional crisis management perspective of solutions delivery. As well as in crisis management, the theoretical models of wicked problems have been used to explain issues of problem solving in the UK’s National Health Service (Koh, Clegg and Deighan, 2010); military decision making (Kalloniatis, Macleod & La, 2009); disaster relief (Tatham & Houghton, 2011) and public policy (Roberts, 2010; Roe, 2009).

For the purposes of this paper, crises are considered to be those extreme ‘landscape crisis’ situations (Howitt & Leonard, 2006b), which are so impactful that they leave historical marks (Farazmand, 2014), and project a ‘serious threat to the basic structures or the fundamental values and norms of a social system’ (Rosenthal & Kouzmin, 1997:280). Weick (1993:633) described the extreme end of such situations as ‘cosmology episodes’, when the universe is no longer a rational, orderly place. They are likely to be characterised by a total breakdown in normal operating environment, where management and presumed crisis management responses are no longer either applicable or accessible (Roux-Dufort, 2007). As well as facing the normal pressures of urgency and uncertainly, they are also situations with transjurisdictional impacts and potential for catastrophic damage. Situations which can be anticipated, planned and practised for, and approached under the terms of standard operating procedures, should more correctly be considered as ‘routine emergencies’ (Howitt & Leonard, 2009) rather than true crisis situations.

3.4 Main Strands in Academic Crisis Management Research

Literature concerning decision-making within crisis management environments falls broadly into two areas. Firstly there are theoretical studies into specific aspects of decision-making within a wider context of organisational dynamics (leadership, authority, group think, peer pressure, information sharing, networking, etc.) which, although pertinent to crisis management, are not confined to that particular activity. The second aspect involves research into operational failures within crisis and emergency management responses, attempting to identify intrinsic faults, weaknesses or vulnerabilities that have led to those failures. This includes both academic papers and official reviews, which often allow an insight into the activities of a wide range of actors involved in all aspects of those operations, including a forensic analysis of the decision-making processes that would otherwise not be available.
On the response side of the emergency management equation, there is a relatively well developed body of theoretical literature concerning decision-making in high stress environments. Perrow (1984), Toft and Reynolds (1994) and Turner and Pe dez (1997) all identified specific models of critical-pathway decision-making integral to crisis escalation and resolution. These ideas were used to develop a model of systems management and decision-making within what were labelled high reliability organisations (HROs), which combined tightly-bounded and highly inter-dependent organisational frameworks, highly complex operating environments and a high level of criticality of their continued functionality (Weick, 1987; Roberts, 1990; Schulman et al., 2004). Examples of studies into HROs include US air traffic control (La Porte, 1988), naval air operations (Rochlin, La Porte & Roberts, 1987; Rochlin, 1989; La Porte & Consollini, 1991), nuclear power plants (La Porte & Thomas, 1990; Schulman, 1990), and critical national infrastructure in general (de Bruijne & Eeten, 2007; Santella, Steinberg & Parks, 2009). The traditional HRO model was based on the presumption that the key to successful management of highly complex and interconnected systems was increased use of technology and automated systems management, and the removal of the single most likely cause of systems failure – human error (Pauchant & Mitroff, 1992; Flood & Carson 1993; Lagadec, 1997; Dror, 1989; Schulman, Roe, van Eeten & de Bruijne, 2004; de Bruijne and van Eeten, 2007).

The modelling of decision-making within HROs led to a belief that the appropriate management model for highly complex environments was an incident command system (ICS) based on military style centrally-directed hierarchical command systems (‘t Hart et al., 1993). The concept of a multi-agency ICS was originally developed in response to failings to deal with forest fires in California in the 1970s, and ICS literature therefore often focused on those specific issues (Weick, 1993; Irwin, 1989; Smith & Dowell, 2000; Lutz & Lindell, 2008). The theoretical justification for the universal applicability of a single ICS model is based to a large extent on a widely cited paper, Bigley and Roberts (2001), which made the case for the hierarchical ICS framework as a universal template for HROs within complex and volatile environments. Despite criticisms of both the system and its implementation (Wenger, Quarantelli & Dynes, 1990; Buck, Traynor and Aguirre, 2006; Moynihan, 2009) the ICS was nominated by FEMA in 2004 as the mandated crisis management system, as a central component of the post-9/11 National Incident Management System (NIMS) (US Department of Homeland Security, 2004), a move which was confirmed following the failures of the response to Hurricane Katrina in 2005 (US DHS, 2008).

The catastrophic failures of the US emergency and crisis management community to respond to the challenges set by Hurricane Katrina and the destruction of New Orleans (2005) set in chain a radical rethink of the requirements of a crisis management capability appropriate to the challenges of the 21st century. Hurricane Katrina proved beyond doubt that the emergency management frameworks put in place after 9/11 were not only failing, but were not ‘fit-for-purpose’ on any level of conception or delivery (Comfort,
There is an extremely rich source of literature from the post-Katrina period, including both government reports and academic papers. The official government response was that the current system was ineffective (White House, 2006; US House of Representatives, 2006; Ink, 2006). However, the academic community was more condemnatory, with a realisation that the centrally-commanded hierarchically managed system needed revolutionary rather than evolutionary change (Comfort, 2007; Farazmand, 2007).

The nature of the debate concerning future developments in EM methodologies (and one which this thesis will support) can be summed up in the title of a paper by one of the leading conceptualists of the ‘new paradigm’ movement: ‘A New Cosmology of Risks and Crisis: Time for a Radical Shift in Paradigm and Practice’ (Lagadec 2009). A central aspect of the new paradigm of crisis management was a realisation that 21st century emergent crises could no longer be described through the language of ‘routine emergencies’.

The realisation of the need to move from static, centrally-commanded, process-led decision-making to a much more fluid understanding of the realities of crisis response is at the heart of the debate on the future of emergency response frameworks (Rosenthal et al., 1989; Grint, 2008). Current thinking as to the best way to understand the realities of these largely unstructured groups is based around the concept of free-forming and fast-mutating networks of emergent multi-organisational networks (EMONs), consisting of national agencies, local response teams and ad hoc voluntary groups (Marcum, Bevc & Butts, 2012; Butts, Acton & Marcum, 2012; Stallings & Quarantelli, 1985). This was further developed by Lutz & Lindell (2008), into planned multi-organisational networks (PMON) and mixed multi-organisational networks (MMON).

This is paralleled by the growing acceptance that, rather than using a formal analysis of competing response options, decision-making in crisis environments is based more on intuitive responses to unstable situations. The realisation that ‘naturalistic decision making’ (NDM) allows responders to build a picture of the environment that they are operating in (Weick, 1988; Dynes, 1994; Klein, 1997; Klein & Cooper, 1982) led to a ‘recognition-primed decision model’ (RPDM) (Klein, 1997; Ross et al., 2004), and other models of time-stressed, information-poor decision-making (Turoff et al., 2008; Waldenstrom, 2008; Lipshitz, Klein, Orasanu & Salas, 2001; Lipshitz & Strauss, 1997; McAndrew & Gore, 2013).

Burns (1963) had already identified the need to develop a non-hierarchical model of leadership and decision-making, which was supported by Braybrooke & Lindblom (1970), and which Dyne (1970) developed further in his study of crisis management under pressure. Although there had been some studies of organisational failures in crisis environments, notably Three Mile Island (Shills, Wolf & Shelanski, 1982) and a seminal work by Weick (1993) on the Mann Gulch fire disaster, these theories and models were revisited post-9/11 (Kendra & Wachtendorf, 2002; Wachtendorf & Kendra, 2002; Boin, Lagadec, Michel-Kerjan & Overdijk, 2003; Boin & ’t Hart 2003; Kapucu, 2005; Butts et al., 2007; Tierney & Traynor, 2007) and again after Katrina (Comfort & Kapucu, 2006; Howitt & Leonard, 2006; Comfort 2007; Marcum,
The dominant conclusion within all of these works was that, rather than specific failures of skills or technical capabilities, these failures were due to a misunderstanding of the nature of crises and the need for organisations to develop a radically new conceptualisation of decision-making and hierarchical control. Organisations are seen as self-creating entities whose internal workings affected their decision-making, rather than neutral edifices which merely delivered a service (Landau, 1973; La Porte, 1982; Agnew & Brown, 1986; Todd, LaPorte & Consolini, 1991; Powell, 1989; Howitt, 2012). A wide range of authors have examined the specifics of decision-making in crisis environments, including such issues as homogeneity of decision-making groups, peer group pressure, risk aversion, blame shifting and tendency to agree/disagree in crisis environments (Janis, 1972; Jarman & Kouzmin, 1990; Rosenthal & ‘t Hart, 1991; ‘t Hart, Rosenthal & Kouzmin, 1993; Van Beuren et al., 2003; Lagadec, 2005; Comfort, 2007; Garnett & Kouzmin, 2007; Hermann & Dayton, 2009; Lodge, 2009; Stark, 2010 and Boin, Hart, McConnell & Preston, 2010).

There is an understanding in the academic world, even if it has not yet made an impression amongst practitioners, that there is a need to change the basic concept of crisis leadership from one that is predicated on a hierarchically-structured and procedurally-driven management style to one that is inherently free-forming, self-managing and based on ‘embodied knowledge’ of experienced practitioners (Dynes, 1994; Bresnen et al., 2003; JCCI, 2012). One model for such an institutional change is the Revolution in Military Affairs (RMA) framework, introduced by the US military in order to transform itself from an organisation based on highly prescriptive commands transmitted from distanced managers, requiring a high level of administrative support and process-driven bureaucracy, to one based on rapid reaction forces, where small ad hoc teams can be brought together and moved to the hot spot within a matter of hours, or even minutes (Boin, 2009; Lagedec, 2009; Department of Defense, 2003).

Having developed a structured understanding of the limitations of current crisis management models, and what is required to make them more relevant to the modern world, the final aspect of the thesis is an assessment of how the lessons learned from operational experience can be codified, so that they can be absorbed into organisations rather than depending on the embodied knowledge of experienced individuals. A wide range of authors have looked at ways in which organisations involved in crisis and emergency management can learn, and what the barriers are to learning that lead to repeated failures (Burns & Stalker, 1961; Schein, 1993; Daft & Weick, 1984; Seng, 1990; Pauchant & Mitroff, 1992; Smith & Dowell, 2000; Tierney, 2002; Corbacioglu & Kapucu, 2006; Lagadec, 2006; Van Wart & Kapucu, 2011). Much of their work is based on the foundation set by Argyris and others (Argyris, 1976, 1993; Argyris & Schon, 1978; Argyris & Herbane, 2005) involving ‘double loop learning’ that implies revolution in corporate thinking, as characterised by the US military acceptance of RMA, rather than minor and relatively insignificant incremental changes.
3.5 The Nature of Hypercomplex Crises

If traditional crisis management modelling saw crises as little more than large-scale incidents, ‘an event circumscribed to a specific area, within a global system that otherwise remained stable’ (Lagadec, 2007:1), the nature of the threats that we now face are infinitely more complex, with cascading consequences that are literally incalculable. The transformational nature of the threats that we are facing today was described as comprising of ‘un-ness’—‘unexpected, undesirable, unimaginable, unscheduled, unplanned, unprecedented and definitely unpleasant’ (Hewitt, 1983:10), to which Rosenthal et al. (2001:5) added ‘unwanted and almost unmanageable, causing widespread unbelief and uncertainty’. The ‘hypercomplex’ scenarios examined by Lagadec (2007), reflect the concerns first circulated in a seminal paper setting out the parameters for ‘wicked problems’ (Rittel & Webber, 1973). Hurricane Katrina was a classic example of a wicked problem, in that the original triggering event soon became relatively unimportant in describing and prioritising the consequential crises. Secondary, and in themselves catastrophic, crisis dilemmas included the rescue of thousands of stranded citizens, the housing, feeding and caring of tens of thousands of people, the restoration of a city, the preservation of public safety in light of the impact on critical infrastructure, the impact on adjacent jurisdictions and, on another level, the political implications of the perceived failures of the government, the emergency management community, the homeland security agencies and the President himself, who was seen to embody those failures on the public stage (Waugh, 2006). The 2011 Fukushima earthquake/tsunami is another example of a situation where the initial ‘triggering point’, although catastrophic in its own terms, was soon superseded by the impact of a nuclear reactor meltdown, and the subsequent cascading effects on the food supply to Tokyo, the threat of a transnational nuclear cloud, and the impact on global supply chains of the disruption of Japanese component manufacturing (Escaith et al., 2011; Norio et al., 2011).

In describing such fundamentally undefinable scenarios, Rittel & Webber (1973) identified a new crisis that would not only fail to respond to classical RM methodologies, but had mutated into a completely different class of event. Similar to a virus that mutates so much from its original form that it not only refuses to respond to traditional approaches, but redefines the parameters of the threat (as was seen in the BSE ‘mad cow disease’ situation in the UK when the triggering virus jumped the species barrier (Lagadec, 2005)), so the new threat must be seen in terms of a completely new and distinct threat topology, rather than merely being a sub-set of previously modelled problems, or anomalies that fall outside of the parameters of crisis response. Unbounded and hypercomplex events are not merely a higher, more dynamic form of accidents (Lagadec, 2009), they are a central reality of the modern world. If classical risk management was the domain of the statistician, predicting future possibilities based on an analysis of an aggregate of the masses, the threat set by the new paradigm is predicated on the criticality of the singularity, the outlier – the unknowable and inconceivable (Weinberg, 1986; Lagadec, 2005).
The dilemmas that wicked problems pose to crisis managers, strategists and planners are twofold. Firstly, by the nature of their scale, complexity and non-bounded nature, the choice of any particular response option can only be made in a context of ambiguity, information asymmetry and organisational fragmentation (Lodge, 2009). It is this ambiguity created by lack of central locus combined with unbounded limitations (Howitt & Leonard, 2006b) that distinguishes the true wicked problem from, for example, the major fire that Bigley & Roberts (2003) use in their critique of ICS within disaster management scenarios. The second problem that the wicked problem sets is that there are no ‘classes’ of wicked problems that can act as a template for possible responses (Rittel & Weber, 1973; Rittel, 1972). There are no ‘ready-made solutions’ to such crises (Lagadec, 2009: 478). Any response to a wicked problem is, by definition, going to be innovative, self-generating and based on ad hoc meetings of minds between a disparate range of knowledge-holders, who will develop situationally responsive solutions based on their own experience and insight (Weick, 1999; ‘t Hart et al., 1993; Howitt & Leonard, 2006).

The polar opposite of such undefined, unbounded and ultimately unknowable situations are the tightly-coupled, inter-dependent systems described by Perrow (1999), labelled as high reliability organisations (HROs) (Weick et al., 1999). Such systems, often sitting within the national critical infrastructure, are characterised by the potential catastrophic effects of even minor systems failures, involving both fast escalating (developing into fully-blown crisis) and rapidly cascading (affecting multiple levels of society across a wide geographical spread) consequences. The first three situations studied using the HRO model were the US air traffic control system, an electricity company operating both a nuclear power station and an electricity distribution system, and US Navy nuclear aircraft carrier operations (Mannerelli et al., 1996; Hopkins, 2007). High Reliability Theory (HRT), is the theoretical modelling of decision-making which sets as its objective the creation of operation management programmes that are fail-safe (‘systems that are not only foolproof, but damned foolproof’, (Schulman et al., 2004:23)), within the context of such highly complex, interconnected and dependent networks. HRT depends on granular modelling of systems dependencies, identifying potential vulnerabilities and creating safeguards to minimise the likelihood of malfunction, while simultaneously ensuring that any gestating problem will be identified at the earliest possible stage in order to allow early (and low-input) intervention.

Despite the fact that such HRO systems are designed and engineered to the final component, the eight defining characteristics of these organisations that were identified by Roberts & Rousseau (1989) share qualities common to all crises events. They are hypercomplexity; tight coupling in which all sections of the process are highly interdependent, with little if any room for divergence from protocols; extreme hierarchical differentiation, in which roles and responsibilities are both highly detailed and extremely distinct from each other; large numbers of decision-makers in complex communication networks; a uniquely high degree of accountability; high frequency of immediate feedback following decisions;
compressed time factors in which cycles of major decisions and their cascading consequences occur within a few seconds; and finally multiple critical outcomes which must all be handled in parallel, but which have a dependency relationship on the other simultaneous decisions (Roberts & Rousseau, 1989: 133). Although Roberts & Rousseau insisted on a strict interpretation for inclusion in HROs (excluding hospital surgery theatres and petroleum refineries, for example (Roberts & Rousseau, 1989: 133)), and there were questions as to both its accuracy in portraying highly managed technical environments (Perrow, 1994) and its relevance to smaller and less complex organisations (Lalonde, 2007), this suggests that lessons may in fact be drawn from the highly-designed environment of critical infrastructures that could have value and relevance within the unformed chaotic milieu of crisis management.

The limitations on the range and relevance of HROs to other organisations of a greater or lesser complexity as set out by Roberts & Rousseau were considered by a leading researcher of the second generation of HRO development, Weick. He gave an attitudinal perspective to the qualities of HROs that he coined ‘mindfulness’ (Weick and Sutcliffe, 2001:v). Mindful organisations could be identified by their adherence to five practices. They were preoccupied with failures rather than success, that is, determined to become zero-failure organisations; they had an understanding of (and to a certain extent an empathy with) complexity, and therefore did not feel the need to simplify interpretations; they had a sensitivity to operations, and understood their challenges and demands; they had a commitment to resilience, associated with a determination that they would not fail, and they had a deference to expertise, recognising the insight that experts could give which was demonstrated by a fluid decision-making system rather than one that was based on hierarchy and job descriptions (Hopkins, 2007:7).

It has generally been accepted that the highly interdependent and tightly bounded nature of HRS precludes the possibility of innovative solutions to potential or actual problems. However, even within the systems dependency and tight coupling of a major power management system or a nuclear submarine, it is precisely the ability of operators dealing with the immediate realities of emerging problems to create innovative solutions using their experience and improvisational abilities that allows them to deal with surprises and volatile events (Mintzberg & McHugh, 1985; Schulman et al., 2004; de Bruijne & van Eeten, 2007). This critical capability was encapsulated in Ryle’s description of ‘a union of some Ad Hockery with some know-how….the pitting of an acquired competence or skill against unprogrammed opportunity, obstacle or hazard’ (Ryle, 1979:129). In fact, the undirected actions of self-asserting operators responding to the contingencies of a crisis situation are seen as critical in almost every crisis (’t Hart et al., 1993:33). Mannarelli (2006), one of the original researchers into HROs, pointed out that, given the increasing likelihood of critical failures occurring in ever more organisations, and the increased risk this posed to the public both in terms of direct impacts and secondary consequences, the lessons learned from HROs could be usefully transposed into what had been seen as less than critical organisations.
3.6 Causes of Crisis Management Failure

The two central themes that repeatedly emerge from the study of disaster and crisis management failures were encapsulated in two phrases from the Congressional Reports into 9/11 and Hurricane Katrina. The 9/11 Commission (2004:336) reported that ‘the most important failure was one of imagination’, whilst the Congressional Report into Katrina identified it as being primarily ‘a failure of leadership’ (US Congress, 2006). These two leitmotifs of failing to understand what exactly a 21st century crisis would look like as part of the pre-event planning process, and a failure to respond effectively as part of the post-event emergency management operation, are repeatedly highlighted in post-crisis event reviews, whatever the nature of the event. The two extracts below, from official reports into very different events, highlight the organisational shortcomings that led to the failure to either create a safety culture that would have prevented the crisis happening, or to develop organisational capabilities that would have allowed them to respond effectively once the crisis had been triggered.

(From Fukushima Nuclear Accident Independent Investigation Commission (Fukushima, 2012:16)
‘The TEPCO Fukushima Nuclear Power Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties. They effectively betrayed the nation’s right to be safe from nuclear accidents. Therefore, we conclude that the accident was clearly “manmade”. The direct causes of the accident were all foreseeable prior to March 11, 2011. The operator, the regulatory bodies and the government body promoting the nuclear power industry (METI), all failed to correctly develop the most basis security requirements, such as assessing the probability of damage, preparing for containing collateral damage from such a disaster, and developing evacuation plans for the public in case of serious radiation release’.

(From Report of the 22nd July Commission into the Utoya Island Massacre) (Utoya, 2012:10)

- The ability to acknowledge risk and learn from exercises has not been sufficient.
- The ability to implement decisions that have been made, and to use the plans that have been developed, has been ineffectual.
- The ability to coordinate and interact has been deficient.
- The potential inherent in information and communications technology has not been exploited well enough.
- Leadership's willingness and ability to clarify responsibility, set goals and adopt measures to achieve results have been insufficient.
- In the opinion of the Commission, these lessons learned are to a greater extent applicable to leadership, interaction, culture and attitudes, than to a lack of resources, a need for new legislation, organisation or important value choices.
The question that is constantly asked, and which lies at the heart of 21st century crisis management, is whether a disaster is a truly random event, one that is outside the ability of the relevant authorities to influence, mitigate or prevent, or is it in fact a signifier of the failures of community and government agencies to prepare effectively, and to learn lessons from the past (Comfort, 2007). There is a growing awareness that any disaster, however dramatic and catastrophic its consequences, should be seen as part of an extended development process rather than a single event, and that the failure to prepare or to respond is a function of vulnerabilities and failures in the management systems rather than a direct consequence of the external event alone. The truth is that very few of the ‘disasters’ that have become crisis events are completely unexpected, and many of them could be considered to be high likelihood, high impact events that approach Perrow’s concept of inevitable occurrence (Perrow, 1993). Many of the major events that can be considered as catastrophic failures stem from the failure to identify potential issues that were not only known, but should have been central to those organisations’ risk management processes. It is those organisational planning and management failures that is the critical issue, rather than the specific aspects of the external event. Whether it is Hurricane Katrina, air traffic controllers responding to adverse weather conditions or the failures of British Petroleum management in responding to the oil spills in the Gulf of Mexico, whilst those specific events may have been unexpected, that is not to say that they could not have been planned for, or that the relevant management teams (and the organisations as a whole) should not have been prepared to respond to exactly such situations.

A clear example of this phenomenon is the fact that in almost every crisis the failure of communication is an immediate consequence of the initial triggering event. This then becomes a causal influence on many of the subsequent problems that are later identified as having a critical impact on the failure of the crisis response programme to deliver its core functions (Longstaff & Yang, 2008; Drabek, 1985). The reasons for such failures can broadly be defined by three categories: the failure of mechanical communication systems (as when the radio systems of one agency do not interact with the systems of another, or they fail in the challenge of the crisis situation); the inability to transfer critical information across the network of the emergency response framework; or simply when the level of information and communication associated with the emergency response operation overwhelms the management framework and those working within it (Kapucu, 2005; Sagun et al., 2008; Kapucu et al., 2010). The causes of such failures are almost banal in their ordinariness, but their impact is potentially catastrophic. The emergency response to the 7/7 terrorist bombings in London in 2005 were severely hampered by the fact that the emergency services radios didn’t work in the underground tube system (London Assembly, 2006; Allen et al., 2013), even though this had been previously identified as a critical issue in the 1987 Kings Cross Fire which led to 37 deaths (Kings Cross, 2007; Fennel, 1988). In Hurricane Katrina, ‘the lack of survivable, interoperable communications, which Governor Haley Barbour of Mississippi said was the most critical problem in his
state, occurred because of an accumulation of decisions by federal, state, and local officials that left this long-standing problem unsolved’ (US Congress, 2006:5).

3.6 Discussion
The question that lies at the heart of 21st century crisis management thinking is whether a disaster is a truly random event, one that is outside the ability of the relevant authorities to influence, mitigate or prevent, or is it in fact a signifier of the failures of community and government agencies to prepare effectively, and to learn lessons from the past. There is a growing awareness that any disaster, however dramatic and catastrophic its consequences, should be seen as part of an extended development process rather than a single event, and that the failure to prepare or to respond is a function of vulnerabilities and failures in the management systems rather than a direct consequence of the external event alone. The truth is that very few of the ‘disasters’ that have become crisis events are completely unexpected, and many of them could be considered to be high likelihood, high impact events that approach Perrow’s concept of inevitable occurrence (Perrow, 1993). Many of the major events that can be considered as catastrophic failures stem from the failure to identify potential issues that were not only known, but should have been central to those organisations’ risk management processes. It is those organisational planning and management failures that is the critical issue, rather than the specific aspects of the external event. Whether it is Hurricane Katrina, air traffic controllers responding to adverse weather conditions or the failures of British Petroleum management in responding to the oil spills in the Gulf of Mexico, whilst those specific events may have been unexpected, that is not to say that they could not have been planned for, or that the relevant management teams (and the organisations as a whole) should not have been prepared to respond to exactly such situations.

The way in which an emergency event is perceived is not merely of academic interest, but is critical to how those in power implement appropriate changes. If the ‘disaster’ is perceived of as an external event, lessons are unlikely to be learned and systemic errors of management and policy are likely to be repeated. If, however, it is accepted that the root causes of failure were within the system, then lessons can be learned and improvements made. Which path is chosen will decide whether the next crisis will see an improved response, or escalation of the levels of impact and loss (Comfort, 2007). A clear sign that lessons are not learned is the judgement by those in power that the disaster was the result of a ‘one-off event’, or a ‘unique set of circumstances’, and that there is little to fear from the possibility of future similar events. For those with an understanding of systems design and management, it is clear when the systemic faults and vulnerabilities that led to the original disaster are left in place, those conditions not only could cause, but given time, will inevitably cause similar catastrophic failures, what Perrow (1993) called ‘normal
accidents’. The inability to learn from such incidents is not only a sign of the management weaknesses that precede such failures, but is a root cause of them.
Chapter 4: Then and Now: The Evolving Nature of Incident Command Systems

4.1 Introduction
This chapter examines the traditional centralised hierarchical command-and-control systems that have emerged as the default framework for formal Incident Command Systems (ICS). It starts off by examining the relationship between ICS and the environments in which they are operating, and then goes on to delineate the evolutionary link between current ICS frameworks and the highly managed processes associated with industrial production. It then discusses the limitations that causes, particularly in terms of dealing with complexity and multi-organisation responses. The subsequent section introduces some alternative concepts of ‘command and control’ based on an equal exchange of information between a community of embodied experts, rather than the creation of pre-set frameworks which must then be imposed by those lower down the command chain. It discusses the inherent tension between centralisation, where there is a single unified command system and integration, which is built around collaborative efforts of multiple players, within which the value of local participation is recognised. The chapter then goes on to suggest ways in which that transformation can take place, taking into account the cultural restrictions that are inherent to command-based organisations, and finally identifies some of the issues that cause failures within ICS, and which will need to be addressed if a truly effective management structure is to be developed.

4.2 Limitations of Current Incident Command Systems
There is a growing awareness that 21st century crisis management is no longer confined to merely a bureaucratic role delivering pre-formed emergency response programmes. Kendra & Wachtendorf (2003) identified emergency management as a ‘craft skill’, based on the intuitive judgement of an experienced practitioner. Wise (2006:313) recognised the need for ‘managerial craftsmanship’ in the aftermath of Katrina, while Weinberg (1986) went further and called the ability to deal with the ‘singularities’ associated with unique crisis events as ‘art’. The qualities that they were referring to included a high degree of organisational craftsmanship; the ability to respond to the singularities in the interaction of social, technological and natural systems; and a sense for the similarities and differences from previous experiences, so that responses are continuously adjusted, anomalies are sensed, and learnings are then incorporated into the next incremental unit of response (Wise, 2006). Traditional management models, whether associated with crisis management or not, recognise the distinction between relatively stable states which are conducive to ‘routine management’ and more dynamic situations that require responses involving the development of new knowledge and iterative execution to produce adaptive but unpredictable outcomes (Eisenhardt & Martin, 2000). With the growth in the understanding of concepts such as ‘fuzzy thinking’ in the 1970s, it became clear that, whilst the reductionist, mechanistic models
based on the centralised control of increasingly small components of activity may have been appropriate to the problems of the emerging industrial age, they are not applicable to the ‘messy problems’ (Ackoff, 1974, 1979; Flood & Carson, 1993) of the 21st century. Whether they are labelled as wicked problems (Rittel & Webber, 1973), catastrophic events (Rosenthal & Kouzmin, 1997) or hypercomplex (Lagadec, 2005), it is now recognised that responses to complex crisis scenarios are based on emergent ad hoc interactions between differentiated groups, each with their own organisational culture, language and wealth of embodied experience (Waugh & Streib, 2006). The need is not to command or direct them, but rather to create the space wherein these groups, each with its own highly developed but highly focused expertise, can develop collaborative relationships based on trust, communication and recognition of shared values (Bresnen et al., 2003).

The fundamental nature of extreme complex problems is that no ‘answer’ exists, and although there may be ‘experts’ who have specialist insight into specific aspects of the crisis, there are no ‘experts’ who can claim to know how to solve them (Rittel, 1972; Rittel & Webber, 1973). Solutions are not so much managed as brought into existence through an iterative decision making process that is in a constant state of flux (Bresnan et al., 2003:157; Rittel & Webber, 1973; Lagadec, 1997; van Bueren, Klijn & Koppenjan, 2003; Moynihan, 2008). This perspective assumes that solutions to crisis situations must be pragmatic and situationally responsive (‘t Hart et al., 1993), rather than being predicated on pre-planned process-based templates. The people who are interacting with the crisis environment are constantly monitoring and assessing changing situations, and then creating new decision-paths, which in turn are monitored, assessed and adapted (Pich et al., 2002; Weick, 1988). This process is dependent on the interaction of experienced practitioners who are the repositories of specialised knowledge that is in itself tacit, intangible and context-dependent (Bresnan et al., 2003:160). Such knowledge, by its very nature, resists attempts to codify it into universally applicable ‘guides to practice’.

The fact that the external environment is itself unstable and dynamic – and will respond to interventions in ways that cannot be modelled or predicted - changes the whole crisis management process from one of a tightly-managed mechanistic procedure which leads to the finished article (‘the solution’), to one where the project itself is seen as inherently innovative, experimental and ambiguous (Mitzberg, 1994). Within such a working space, project management strategies are more likely to be focused on a ‘probe and learn’ methodology, based on ‘clumsy solutions’ (Grint 2008; Verwiej et al., 2006), or even ‘fuzzy gambling’ (Dror 1989), where the project itself is seen as a learning, reflective process, progressing through a series of failures and improvement (Pich et al., 2003: 1010), and where managers can only ‘grope along’ towards organisational goals (Rist, 1994:554). This ‘science of muddling through’ (Lindblom, 1959) stands in contrast to the classical understanding of strategic decision making, which is focused on developing a ‘deliberate conscious set of guidelines that determines decisions into the future’ (Mintzberg, 1978:935). In wicked problems, there is no one correct answer, because there is no way of testing the outcomes or
consequences of any particular option (Rittel, 1972). The general tone is one of consultancy between peers holding embodied knowledge rather than a predetermined response delivered through a hierarchical command system (Burns & Stalker 1961). In such a situation, the role of the central command team is to coordinate actions and to support them in appropriating resources and resolving conflict, rather than cascading instructions through a hierarchical chain of command (Moynihan, 2009). The challenges of responding to either unthinkable (9/11) or highly-predicted but nevertheless surprising events (Hurricane Katrina) led to the realisation that, whatever the formal emergency response plan might have described, the reality on the ground was that in the early, chaotic stages, spontaneous self-organising teams were created that worked together with other empowered individuals to develop solutions to the most immediate challenges, using resources that were close to hand. Emergent multi-organizational networks (EMONs) came to be seen as a critical stage in creating effective solutions within the context of high-stress, highly unstable and fast mutating threat environments (Comfort & Kapucu, 2006; Comfort, 2007).

Although the criticality of such self-forming and often spontaneous EMONs in creating innovative solutions is offered as an alternative theoretical model to the tightly controlling centralised management system, their fundamental need – and nature – were described over fifty years ago as follows:

Organismic systems are adapted to unstable conditions where new and unfamiliar problems and requirements continually arise which cannot be broken down and distributed amongst specialist roles within a hierarchy..... Responsibilities and functions and even methods and powers have to be constantly redefined through interactions with others participating in common tasks or in the solutions to common problems. (Burns 1963: 17-20)

The organisational frameworks described by Burns, which he considered to be a natural outcome of the nature of the environment they were operating in, is in stark contrast to the hierarchical command system which sees the external environment as something to be controlled, through the imposition of a predetermined and highly-structured management system. However, despite the *ad hoc* nature of such non-hierarchical, decentralised, free-forming emergent groupings, they are neither random nor without foundations. Whether they are purely emergent MONs, more structured planned multi-organisational networks (PMONs) or mixed multi-organisational networks (MMONs) (Lutz & Lindell, 2008:124), the efficiency of both the individual components and the inter-connected whole are still dependent on the amount of training and inter-agency practice undertaken by participating agencies (Lutz & Lindell, 2008; Bigley & Roberts, 2001), as well as the capabilities and motivation of critical individuals (Butts et al., 2007; Schulman et al., 2004; de Bruijne & van Eeten, 2007). The question for such unstructured social groupings is how capabilities can be developed that are both institutionally and organisationally sound, yet flexible enough to adapt to the challenges of chaotic crisis situations.
Even with the acknowledgement of the critical importance of such *ad hoc* collaboration, there is little understanding of how the knowledge and insight that is embodied in experienced practitioners can be encoded and transferred to organisational frameworks (Schein, 1993) and which can then be utilised in a range of contexts. So it is no surprise that those who talk of such issues often sound as though they are searching for the correct terminology to convey exactly what is required. In their study of the role of social interactions in the management of knowledge, Bresnan et al identified the problems associated with articulating what are often highly amorphous concepts.

In case of process innovation...what is learned is often tacit, intangible and context-dependent....Such learning is not only difficult to measure and evaluate, it is also difficult to capture in explicit forms, in ways that can be understood and applied in new contexts.... How is the organisation able to capture learning and deploy it over the long term, when it is so embedded in the individual and manifested in their particular expertise and range of contacts....The individual embodiment of engineering knowledge and expertise militated against the transfer of such knowledge...’ (Bresnen et al., 2003:163, 164)

Given the ‘fuzzy, informal and context-dependent nature of much of organizational knowledge’ (Greenhlagh et al., 2005:426), in which even in a nuclear power station `What we do around here doesn't always make sense' (Carroll et al., 1993), it may seem paradoxical to ask how that which cannot be talked of can be shared, and that which cannot be described can be taught. However, just as with any paradox, the answer lies not in confronting mutually self-negating contradictions, but in rephrasing the question. The issue is not so much concerned with facilitating the transfer of explicit knowledge from one ‘knowledge holder’ to another ‘knowledge receiver’, much less to command and direct, but rather with how we can create a working environment that supports a truly interactive community, one which can collectively develop and explore the innovative solutions that are at the heart of modern crisis response.

4.3 Hierarchical Command Systems: Removing Uncertainty

Bureaucratic management systems are built upon accepted processes, due consideration of received information, a dialogue with various stakeholders and, finally, an agreed decision that is mandated by all parties. They are based on a multi-layered and highly differentiated development process (‘t Hart et al., 1993). The nature of crises, involving severe threat, high uncertainty and time pressure (Rosenthal & ‘t Hart 1989:9) means that the decision-making processes associated with organisational bureaucracy are inherently incapable of responding to the challenges that such situations set (Wise, 2006). As was noted in a study of the emergency response to 9/11, ‘[B]y their very nature, these highly unusual and perhaps unique situations are not amenable to unvarying procedures, checklists or protocols’ (Kendra et al., 2003:44). This is exacerbated by the tendency for government agencies to further centralise control systems
when under pressure. In fact, the expectation that such centralisation will take place has become the cornerstone of both theoretical models of crisis management and the administrative frameworks that are activated once such crisis situations are triggered (t’Hart et al., 1993). Although this model of centralised control has become increasingly challenged from both a theoretical and practical perspective, it is still true that such automatic responses are the norm rather than the exception once a crisis event takes place.

In many cases, rather than failures in crisis management leading to the acceptance of the need for a non-hierarchical management system more appropriate to the demands of the crisis, there is the tendency for the ‘solution’ to such problems to involve yet another level of bureaucratic oversight being put in place (Dynes, 1994; Birkland, 2009). A growth in external complexity is matched by increasing the organisation’s internal complexity, often involving the creation of more staff functions or the enlargement of staff-functions and/or the investment in vertical information systems (Sitter et al., 1997:498). As an example, the review of FEMA’s failings following Katrina led to a recommendation by then Secretary of State Michael Chertoff that FEMA’s preparedness function (as opposed to its response function) should be severed from FEMA and assigned to a newly created Preparedness Directorate (Wise, 2006). This tendency to increase organisational complexity rather than simplify it is in direct contrast to what Sitter et al. (1997) labelled as ‘simple organizations and complex jobs’, which they described as the quality of the organization that gave it its ability to deal with a complex and continuously changing environment. The hierarchical command systems that are currently considered appropriate to manage complex incident responses are directly traceable to a model of ‘instructionist management’ that was developed at the start of the Industrial Revolution to oversee the delivery of a product, whether a mass-produced artefact or one-off bridges or ocean liners (Burns, 1963; Beringer, 1986). It was developed around a process-driven production-line system based on standardisation, compartmentalisation (division of labour) and a separation between the individual and the final product, and its ultimate objective was to remove any uncertainty from the production process (Pich et al., 2002; Walker et al., 2008). The reliability of the operating system was predicated specifically on the validity of the design process that created it (Landau & Chisholm, 1995; Schulman et al., 2004), based on a process embodying efficiency, predictability, quantification and control (Ritzer, 1993). Within such a system, the human operator has no more significance than any other component of the machine, merely required to fulfil their roles as minor cogs within a greater whole, concerning which they neither had nor needed any understanding (Burns & Stalker, 1961). Based on Newtonian mechanistic physics (Rittel and Webber, 1973), such modelling assumes that planners and systems analysts can break down problems into component parts, individual sections can be isolated and treated as self-contained units, and that there is a logical process based on identification of problem, analysis of needs and delivery of a ‘correct’ solution. However, when such industrial management systems are transposed to different operating environments, the determination to impose them on processes that
cannot be reduced to highly differentiated de-skilled tasks can lead to a ‘pathology’ (Ritzer, 1993:22) that creates the exact opposite of the desired effect, where the ‘best services’ of yesterday turn into ‘worst practices’, and ‘core competences turn into core rigidities’ (Malhotra, 2000:7), creating inefficiency, lack of control and an inability to achieve the core objectives.

The following description of a basic structure of an ICS appropriate for large-scale emergencies or disasters is a perfect example of the ‘industrialisation’ of the crisis management arena, and could have been used word-for-word to describe a 19th century cotton mill:

The system is highly formalized, characterized by extensive rules, procedures, policies, and instructions. Jobs within the system are specialized, are based on standardized routines, and require particularized training. Positions are arranged hierarchically and related to one another on the basis of formal authority. (Bigley and Roberts, 2001:1282)

If the first stage of process management emerged from the Industrial Revolution, the second stage came with the development of computers, and systems management was then seen in terms of information processing, complete with information flow diagrams, input, output, processing, and feedback loops (Eysenck & Keane, 2001; Cooke et al., 2004). Although there was a high level of complexity inherent in such systems, they were basically linear in nature, with a clear pattern of information transfer that could be mapped, directed and controlled. The fact that such systems were highly complex was seen as an advantage – allowing a much higher level of data to be managed than was previously possible – rather than a cause of potential catastrophic failures.

However, the attempt to transfer such a mechanistic design to the field of crisis planning and management carries seeds of failure. The ‘paradox of rationality’ (Rittel, 1972:391) is that the validity of such a mechanistic, rationalistic systems management approach is predicated on the ability to use deductive reasoning to anticipate all possible consequences of a potential action, and thereby to eliminate harmful or undesirable causal pathways, leaving a single causal pathway that leads inevitably and unavoidably to the desired optimal outcome. This is impossible outside of a highly-engineered mechanistic system, and even systems science texts make it clear that their models and approaches are not applicable to ‘real world phenomena such as social or organizational groups [which] are typically poorly structured or “messy”’ (Flood & Carson, 1993:11). In fact, not only are such tightly-defined management processes no longer seen to be functional in a loosely structured environment, but the belief that they are – that one can set the parameters for determining how a crisis will develop, and then make assumptions as to how it will respond tamely to your interventions - is regarded as dangerous and crisis-creating in itself (Clarke, 1999), entering into the realm of moral responsibility (Rittel & Webber, 1973; Wexler, 2009).
The need to move away from a mechanistic model led to the third evolutionary stage of systems management, which introduced the concept of ecology to operations planning. Rather than seeing the situation as something that could be isolated and approached as a bounded event, the relationship between the event, the responder and the surrounding environment was recognised as consisting of a dynamic ecosphere, within which any action would produce primary and secondary effects with cascading consequences on every other component of the system (Holling, 1973; Walker et al., 2004). In terms of interaction with its environment and adapting to it, such an organisation could be classed as ‘vitalistic’ (Morgan, 1986; Walker, 2008). Although organisations operating within such a dynamic biosphere were not without structure, that structure could no longer be described in traditional terms of hierarchies and linear relationships, and was more analogous to a living entity than a cold machine.

Given the evolving models of systems management, the issue with centrally-directed hierarchically structured command and control frameworks is not that they are unnecessary or ineffective, but rather than they are used to deliver the wrong task (Dynes, 1994). In multiple reports, it becomes clear that the role of the centralised command system is not to control or direct operations, but rather to coordinate communication, data sharing and sense-making (Trnka & Jenvald, 2006; Waldenstrom, 2008). The ability of the command system to manage the flow of overwhelming amounts of complex information is a critical factor in any crisis situation (Kapucu, 2005; Comfort, 2005). This is a task that, if managed correctly, the centralised command system is uniquely able to manage, but if it fails, can lead to catastrophic consequences (De Dreu, 2007). The effectiveness of a centralised command system, as exemplified in the ICS framework, is predicated on two limiting criteria, both of which have been identified as failing under crisis conditions. The first is that, rather than dealing with genuinely crisis situations (that is, those which significantly exceed an organisation’s capability to adapt and respond), the scenarios that are used as evidence of ICS value are often positioned within the ’normal operating environment’ of the responding agencies, involving ‘preplanned organizational solutions to meet the more predictable aspects of an evolving incident’ (Bigley & Roberts, 2001:1297; Howitt & Leonard, 2009). These are also situations where those utilising it are official responders, part of a professional community developed through years of training and shared experiences, where the demands being responded to are routine to them, and where social and cultural emergence is at a minimum (Buck et al., 2006). This modelling of crisis management conceptualises the crisis as an incident which, despite a potential for destructive consequences, can be approached in isolation and be solved with the application of the correct (and known) solution (Lagadec, 2007).

The second criteria for judging ICS effectiveness involves inter-agency integration. Although the management of inter-agency coordination is often cited as the reason for the need for ICS (Moynihan, 2009), case studies are often limited to operations involving coordination between agencies of a similar
nature, in particular fire departments with other fire departments (Weick, 1993; Klein et al., 1986; Bigley & Roberts, 2001; Moynihan 2009). In fact, the original ICS system was based on the first formal multi-agency coordination programme, FIRESCOPE (Firefighting Resources of California Organized for Potential Emergencies), which was specifically designed for the benefit of fire teams (Moynihan, 2009:190). Bigley and Roberts' widely-cited paper concerning high-reliability organising for complex and volatile task environments, focuses exclusively on fire department responses. Other high-reliability organisations that were said to embody the principles of a centralised hierarchical ICS included naval aircraft carriers, nuclear power generation plants, air traffic control systems, space shuttles and maritime systems (2001:1293). Although these are undoubtedly complex organisations, their complexity is internal, and their complexity is contingent on a shared ‘sense making’ (Weick, 1988) between all actors that allows extremely technical issues to be discussed in a highly-coded and mutually understandable lingua franca. It is questionable as to what extent this situation is analogous to the challenges of creating interoperability with other agencies which may not benefit from a common operational language, basis of crisis cognition, organisational culture or shared embodied knowledge (Boin et al., 2003; Pollock & Coles, 2015).

Studies on the topology of increasingly complex organisational frameworks (Dynes, 1970) or the EMONs that came together in response to 9/11 (Kapucu, 2005) and Katrina (Comfort & Kapucu, 2006; Comfort 2007; Marcum, Bevc & Butts, 2012), demonstrate that from both a theoretical and an empirical perspective, the usefulness of centralised command systems are strongly bounded by issues of size and organisational complexity, and are quickly called into question once the scale and composition of the response operation moves beyond what might be considered ‘enhanced normality’ (Wenger et al., 1990). Dynes (1983) was prepared to categorically state that ‘The fact that emergencies have implications for many different segments of social life, each with their own pre-existing patterns of authority and each with the necessity for simultaneous action and autonomous decision-making, indicates it is impossible to create a centralized authority system and that it is probably not necessary’ (Dynes, 1983:659).

Whilst centralised command systems theoretically offer a framework for managing conglomerations of agencies that share common values, their effectiveness in responding to challenges outside strictly normative conditions can be less than optimal (Howitt & Leonard, 2005). However, it is precisely at the point that crisis response operations move beyond ‘routine emergencies’ (Lutz & Lindell, 2008:122), to a highly volatile crisis situation which requires innovative solutions, that the weaknesses of hierarchically-managed command systems become clear. An instructionist/hierarchical system is predicated on decisions being made and then disseminated through the command chain of a ‘relatively small and homogenous group of actors with similar backgrounds’ (Moynihan 2009:903), within an administrative framework that assumes stable operating conditions (Comfort, 2007). In fact, the traditional division between strategic and operational roles, based on the concept that strategists work out solutions and operational managers
deliver them, tends to imbue the strategic commanders with an omniscience on which all decisions will be based (Burns & Stalker, 1961; Daft & Weick, 1984; Dynes, 1994). However, distance from the crisis location inhibits their decision-making power. The command chain will be operating in a highly complex and unstable environment, dependent on fragile technical systems and being held hostage to the likelihood that detailed information will be misheard, mis-transmitted or misunderstood at some stage in the communications chain (Van Wart & Kapucu, 2011; Butts et al., 2007; Garnett & Kouzmin, 2007). Given the time needed to assimilate information, develop solutions and transmit them back down the communication chain, the reality is that, by the time the latest strategic decisions have reached the ground, the situation will have changed to such a degree that the local teams will have already created their own solutions to the original problem, and are already managing a new set of problems.

4.4 Centralisation vs Integration

The debate concerning the appropriateness or otherwise of ‘centralisation’ and ‘integration’ is not just a matter of semantics, but on a much deeper level reflects the world view of the opinion holder. For the centralist, the role of the ‘command structure’ may be considered to control, direct, impose options and responses onto communities that are not only not involved in the decision-making process, but may well come to be seen as either a nuisance, an obstacle or outrightly hostile both to the policies that are imposed and to the agencies at the ground level that are implementing them (Dynes, 1994). Although centralised command and control systems are often seen as inflexible, that is not necessarily an inherent quality. If centralised command systems are considered as systems architecture, setting a framework within which different sections can work on a commonly shared basis (McNeese et al., 2006), there is no reason why that architecture cannot accommodate new entrants, new working relationships and the ability to adapt and respond to external challenges (Kendra et al. 2003). Rather than being seen as restrictive, from this perspective a crisis management framework can act as the host for a ‘system of systems’ fundamental to the success of the network-based nature of modern crisis management (Jungert et al. 2004; Miller, 2005). This in turn would engender the qualities of robustness, responsiveness, flexibility and adaptation that could contribute to the necessary level of ‘C2 (Command & Control)-agility’ (Kalloniatis et al. 2009:2). However, despite the fact that it is perfectly possible for leadership to be directive, supportive, participative, and achievement-oriented (Moon et al. 2004:682), it is more likely that most people involved in such systems will be more familiar with a management framework that is characterised by its hierarchical pattern of interaction, its grudging and minimalistic delegation of decision rights and its relatively tight control over the distribution of information (Walker, 2008).
Structural contingency theory (SCT) postulates that the structure of an organisation, rather than being set in stone, should be able to adapt according to the demands of specific tasks (Pennings, 1998; Moon et al. 2004; Beersma et al. 2003). As such, the structure of an organisation is a reflection of the values that it sets itself, as well as acting as a framework and boundary within which decisions are made and actions are delivered. The spectrum of such organisations ranges from those which are entirely mechanistic (such as a factory assembly line) through to the organic where decision making can be seen as spontaneous, innovative and unstructured at all levels of operation. However, even within a highly controlled environment such as a nuclear power station, there are a range of management systems that include both highly directive and more open, structured options (Bouliier, 1996). Whatever decision-making model is chosen, it is the ability of the coordinated command structure to set commonly shared superordinate goals (Cannon-Bowers et al. 1995; Alison, 2015;) and an agreed agenda of strategic objectives that sets the framework for all subsequent activity. This effort to create sense-making at the highest level, that will then cascade down and influence all other decisions along the command chain, complements the traditional understanding of sense-making in terms of ‘data – information – knowledge – understanding’ (Waldenstrom, 2008) that starts at the operational level and is then communicated up the command chain to the strategic commanders (McNeese et al. 2006).

In general, centralised command-based systems are better suited to the range of tame problems that are tightly defined, have limited impact and which are conducive to clearly defined solutions, whilst organic systems are more appropriate to those areas that move into the territory of wicked problems. Whilst it is a generalisation, it can be said that centralised organisations are more suited to decision-making environments where accuracy and adherence to a commonly agreed policy is required, whilst decentralised organisations are more effective in environments where the situations they dealing with are more dynamic and unstable, and where time is of the essence in making decisions concerning specific operational requirements (Hollenback et al. 1998; Ellis et al., 2003; Moon et al. 2006). Decentralised systems are also more effective when there is an implied need for dynamic learning associated with unstable and fast developing situations (Mintzberg, 1980; Jundt, 2004; Wise, 2006). When put in such simple terms, it becomes clear why attempts to impose a centralised system onto situations that demand innovative decision-making and fast-learning adaptability are unlikely to produce positive results.

4.5 From Command to Collaboration

The value of collaboration has been well-recognised (Hill, 2010), but despite the many academic works on different aspects of collaboration in crisis management decision-making (Samurcay & Rogalski, 1991; Devitt & Borodzic, 2008; Mishra et al. 2011; Allen et al. 2014), we still have little understanding of what exactly
allows organisations to develop collaborative arrangements in the heat of a crisis situation (Ansell et al. 2010). Whilst there is the acknowledgement that collaborative decision-making organisations are qualitatively different from hierarchical, command-based organisations, and that there may even be a tendency for collaborative structures to replace command structures in many organisations (Powell, 1990; O’Toole, 1997), the present challenge is not necessarily how to create a more democratic form of decision-making within command-based organisations, but how to allow collaboration between organisations from different cultures (Kapucu, 2005). As an example, although there is the expectation that local response teams should interact with police or national guard units for larger events, the American Red Cross and the Salvation Army are the principal sources of assistance to US disaster victims, (Waugh & Streib, 2006), and 72% of all fire fighters in the US are volunteers (Schafer et al. 2008:14). Whilst this does not affect their professional capabilities, it does mean that there may be problems when they come in contact with hierarchically command-orientated police or military units, especially within the pressurised context of a high-level emergency response.

The desire to impose a military style command and control system on emergency management networks indicates a misunderstanding of both the nature of the problems that emergency managers face and the nature of the solutions that they are required to develop and deliver (Drabek, 1986; Ohder & Sticher, 2013). The heterogeneous, locally-based, multiple organisation nature of emergency management (Paton & Johnston, 2001) means that a centrally-managed command style is not only ineffective, but encroaches on the ability of service deliverers to achieve their own aims, which are often clear, local and immediate. Whilst there is no doubt that an information and communication system is critical to the success of any operation, beyond the most simple (Comfort, 1989; Chua et al. 2007; Moynihan, 2009b), the role of that system should be ‘to support creative, adaptive behaviour throughout a distributed decision making network’ (Harrald & Jefferson, 2010:7). As such, is should be supporting decision-making rather than issuing commands, or as Harrald & Jefferson put it ‘to enhance collaboration and coordination, not to support organizational control’ (2007:7). Those valuing integration over hierarchical command systems recognise the inherent value that is brought to the response programme through local knowledge, shared decision making and the belief that the locus of the response lies at the community level. This is not just a matter of ‘political correctness’ or theoretical posturing, but reflects a deeply held belief that what the community needs is the support of those with authority to allocate resources and ‘make things happen’, rather than being seen as an impersonal problem that needs to be solved through centralist intervention. From this perspective, ‘Emergency management agencies thus act as consultants to communities, rather than directing the change process’ (Paton & Johnston, 2001:275). The tendency to centralise limits the access to a wide range of knowledge, experience and insight that could be critical to the development of effective solutions, given that centralisation and integration are in themselves often mutually antagonistic and exclusive in nature (United States Commission on National Security, 2001).
From a hierarchical command perspective the host community of the disaster has often been seen in terms of a nuisance/distraction to the professional responders who are trying to follow the protocols set out in their response manuals (Dynes, 1994), which often do not take account of the realities imposed by the presence of actual people in the disaster zones. Such tensions can cause distrust and even active antagonism on the part of both the responding agency and the local community (Kapucu, 2005; Waugh, 2000). However, there is a growing awareness of the negative impact of the imposition of a centralised command-style system controlled by outside agencies who often have little if any understanding of the local environment, whether physical, geographical or social, and who impose the ‘expertise’ of military or federal managers. Under such a regime, ‘[t]he real experts, the state and local officials who are first to the scene of natural disasters, and from whom we have a great deal to learn, have been subordinated to the “expertise” of federal law enforcement officials, military officers, and, often, civilian contractors, many of which have little to no experience in any sort of disaster or emergency management’ (Birkland 2009, 433). In their desire to impose external solutions onto local communities they will almost certainly either ignore or antagonise those local community-based organisations and networks that are best positioned to deliver first response services, whether in terms of accommodation, local skills, or the ability to quickly reconstruct some sort of social network (McEntire, 2002). This is especially true if the ability to work with (or as it may be seen from the community perspective, submit to) the ICS system is a condition of acceptance into the network (Moynihan, 2009b). In one sense, all emergencies are inherently local (Schaffer et al. 2008), involving a system of disaster response emerging from a ground-level effort of schools, faith groups and voluntary organisations as well as more formal agencies who have shared cultural and community memories and experiences which can be utilised when similar events occur (Stratton, 1989).

4.6 Adaptability within the Command System

Even within the most tightly managed centralised command systems, there is usually the understanding that as a human activity interacting with the external environment it will involve some level of decision-making and creativeness (Pigeau & McCann, 2000). In that sense, just as any organisation lies somewhere on the spectrum of centralised/hierarchical and devolved/networked, so the individual command culture will set a defining boundary within which decisions can be made more-or-less freely, depending on the demands of the particular situation and the defining command culture of the particular organisation. The fact that operations are highly designed and defined in concept does not mean that that micro-management reaches to the molecular level. Within each stage, there is a degree of freedom of decision-making, the ‘outer envelope’ (Kalloniatis, 2009:13) within which acceptably autonomous decision-making can be made.
As an example of the modelling of such transactional complexity, the NATO SAS-050 programme attempts to unify the issues surrounding the nature of the management system, the information-rich or information-poor environment it was operating in, and the nature of the problem itself (NATO, 2006; Walker et al. 2009). The three axes (dimensions) that are used to model such decision-making processes range from centralised to de-centralised, tightly managed to relatively unrestrained, and from information withholding to information distributing. There are also three variables relating to the nature of the problem, namely the familiarity or otherwise of the problem, the stability/instability of the problem and the amount of information available concerning the problem. This was then set against two classes of problems, either decomposable, in that they can be broken down into component parts and formally distributed to different stake-holders, or non-decomposable, in that they must be treated as a single organic event; and those that can be seen as predictable, in that effective planning and preparation will lead to enhanced response capabilities and effectiveness, and those that cannot be predicted, which call for a much higher level of innovative response development (Walker et al. 2009). Each of these axes must also be analysed in light of other aspects of organisational interoperability, such as institutional, functionality and technological (Scholl et al. 2012), or social, technological and temporal (Mishra et al. 2011).

Given that most problems in the real world are ‘neither totally random nor totally predictable’ (Kalloniatis, 2009:10), it is clear that an unthinking adherence to one ‘pure’ system would be neither appropriate nor optimal. Whatever the official doctrine may be, the likelihood is that any organisation is a hybrid of centralised mechanistic command systems and more autonomous, free-moving organic organisations (Jendt, 2004). From a systems management perspective, a crisis management system is an open system, combining a high degree of non-linearity in the environment in which it is operating together with a high level of non-linearity within its own operating framework. This requires a high level of integration and optimisation between the different participating organisations in order to create an ability to cope with high levels of complexity, instability, disruption and dynamism (Walker, 2008). Turner, identified these tensions as existing between competing demands, based on the need to make decisions both quickly and accurately, to have a well-defined hierarchy but also to integrate lower levels of the organization into the decision-making process, and to manage the balance between having masses of information and getting trapped in an ‘information quagmire’ (1994:218). The ability to manage the balancing act between creating a framework that can interact with such unstable complexity, and maintaining the freedom to adapt as the situation changes, was described as operating on ‘the edge of chaos’ (Waldrop, 1992). Mannarelli et al. (1996) identified the ability to move from a highly centralised hierarchical management framework during times of normal activity to a completely decentralised and flat decision-making framework during time of heightened tension as being one of the characteristics of all three of the HROs that they studied.
There is nothing intrinsic to any single management system that precludes it from utilising different management styles, even if only on a case-by-case basis. Although it is clearly in an organisation’s interest to be able to switch smoothly between different systems or styles, there is not an equal balance in the ability to make that switch. Described as ‘asymmetric adaptability’ (Moon et al. 2004; Hollenback et al. 2002), in all cases that they reviewed it was easier for a more controlled system to move to a more relaxed mode than it was the other way around. Thus it was easier for a centralised command-based structure to delegate decision-making responsibilities and give local decision-makers greater autonomy and authority than it was for an organic system to impose centralised command discipline. The reality is that any incident that goes beyond the most basic will require some level of adaptive decision making. The question is not ‘Whether…?’, but rather ‘How much…?’.

4.7 Why Hierarchical Command Systems Fail

For any researcher of emergency management, one of the earliest and perhaps most stark lessons that becomes clear is that the cause of failures in emergency response and management, rather than being genuinely unexpected, are typically not only foreseeable, but actually were predicted, often with remarkable accuracy (Wise, 2006). It is in the nature of emergency response that the characteristics associated with chaos and the breakdown of normative management frameworks within the crisis event are reflected absolutely within the incident command systems themselves. This is why incident command systems are extremely effective at responding limited and tightly-defined incidents, have significant challenges when dealing with situations which require a higher level of innovative response, and fail miserably (and actually are seen to have been completely inappropriate) when there is a collapse of the underpinning operational frameworks (Comfort, 2007). As repeated post-disaster reviews have demonstrated, although the range of crises is perhaps unlimited, the causes of the failure of effective response are remarkably similar (Pollock, 1986).

The trust in the effectiveness of the centralised ICS is so inbuilt to the US system that it seems hard to believe that its efficacy is doubted (Quarantelli & Dyne, 1994; Wenger et al. 1991). And yet when it comes to actual incident management, the ICS itself is often the first point of failure. One of the single most significant issues raised by experienced crisis response commanders in New Orleans following Hurricane Katrina was the lack of unified command. The command structures that were in place were characterised by Donahue & Tuohy (2006:6) as ‘unclear, multiple, conflicting, uncooperative, and isolated’. As one fire commander described it, ‘In New Orleans, you couldn’t go two blocks without running into somebody’s incident command post. But there was no coordination between them. Everyone assumes there’ll be a graduation up to some larger structure, but nobody knows how to get to that’ (Donahue & Tuohy, 2006:6). In many cases, the cause of the failure is simply the inability to manage the level of information that is
created by a disaster event (Kapucu, 2005; Kapucu et al. 2010). The Oklahoma bombing of a single office building in 1995, targeted by an individual US extremist because it housed federal agencies, created a situation that involved response teams from across the nation, fire fighters from more than 75 Oklahoma communities and more than 35 other fire departments from various other states, as well as over 1,000 FEMA agents and hundreds from other federal agencies (Waugh & Streib, 2006). The need to create an overarching ICS that could manage that level of interaction was simply beyond the capabilities of the existing infrastructure to handle.

The idea that a hierarchical command-centred emergency management framework was either necessary or appropriate has been questioned for at least seventy years. The end of the Second World War, with the transition of emergency management from a branch of war-footing civil defence to a more community-based collaborative approach, brought a growing realisation that not only did distance-managed central command response systems not work, but they actually disrupted the much more local and informal response frameworks that developed spontaneously when a crisis event occurred (Waugh & Streib, 2006). This differentiation between ‘organisational’ and ‘collective’ responses has been documented across a wide range of events (Moynihan, 2009). Despite the level of time, funding and resources that have been pumped into the development of effective multi-agency command systems, many of the people who are tasked with managing those systems lack either actual experience or the personal and professional background that would allow them to work effectively under the pressures that a crisis situation brings (US GAO, 2003; Ross et al. 2004). As one interviewee commented in a study by Donahue and Tuohy (2006), their training was too simplistic to allow them to understand the demands of a crisis event, and once the crisis was in full flow, that was not the time to start learning.

The defining demonstration of the failure of the traditional centralised command system was Hurricane Katrina and the aftermaths of its landfall in New Orleans in 2005. This occurred four years after the events of 9/11, following an unprecedented level of political, human, technological and, above all, financial investment to develop an agency that would be fit to respond to the challenges of 21st century emergency management. The US government’s tone in describing the post-Katrina management failures was one of apologetic regret. At the Congressional report put it, ‘There is no question that the Nation’s current incident management plans and procedures fell short of what was needed and that improved operational plans could have better mitigated the Hurricane’s tragic effects’ (US House of Representatives, 2006). To President Bush, speaking from New Orleans in the immediate aftermath of the event and in the midst of the on-going disaster, the solution was clear: ‘a challenge on this scale requires greater federal authority and a broader role for the armed forces – the institution of our government most capable of massive logistical operations on moment’s notice’ (US House of Representatives, 2006:14).
This was in stark contrast to the directness of language used in one of the most influential papers written in the aftermath of the Hurricane Katrina failure, according to which the response to Hurricane Katrina proved beyond doubt that the fundamental organisational issues involving sharing of information, development of a unified ‘task vision’ and the ability of ‘the system’ to deliver emergency response in what was, after all, a relatively benign environment, on United States home territory, in a situation that was both known and expected, were so overwhelming as to call into question every aspect of the fundamental principles and assumptions on which US crisis management and homeland security was based (Comfort, 2007).

The obvious collapse of the intergovernmental system in emergency management under the strains of the catastrophic events initiated by Hurricane Katrina provides an unquestioned demonstration of the failure of hierarchical control in the dynamic context of an actual disaster...This task requires rethinking the terms of communication and coordination to dispel the myth of hierarchical control....It means redefining the terms of cognition, communication, coordination and control in ways that fit the reality of practice in extreme events...The record of operations from Hurricane Katrina compels a redefinition of organizational framework and standard terms of emergency management....' (Comfort, 2007:62)

Given the absolutist nature of Professor Comfort’s assessment, the question needs to be asked – why is there such a continued commitment to centralist command systems, and what impact does this have on possible alternative models of management systems?

4.8 Conclusion

The intrinsically creative nature of crisis management is acknowledged in the recognition of the importance of personal ‘craftsmanship’ in dealing with what are unique situations. The belief that such events can be best managed by pre-planned response programmes, and that it is the role of local commanders to implement those plans, rather than to assess the local situation in order to develop the most appropriate response based on specific local conditions, is both short-sighted and counter-productive.

The nature of crisis response within such an unstable and highly dynamic environment is involves intuitive decision-making and optimal guesswork rather than highly defined and managed responses. Any management framework that would be expected to maintain operational relevance within a crisis management context would need to have these values at its very heart. Hurricane Katrina demonstrated beyond doubt the limitations of traditional militaristic command systems, and yet despite this there is still the ingrained belief that centrally-controlled hierarchical command chains are the best (and even the
natural) form of emergency response management. As this chapter points out, such failures can be seen as the outcome of the inability to use such centrally-managed systems effectively and that, if they are used correctly, such frameworks not only have their place but are invaluable in creating a management structure appropriate for highly complex and geographically defused operations. However, it is the local, collaborative and innovative solution development that is at the heart of crisis management, and it will be the ability of hierarchical command systems to adapt to that reality, and to act as a support system to such local activities, that will determine their relevance in future crisis management situations.
Chapter 5: Designed to Fail: Why Crisis Management Frameworks are not ‘Fit For Purpose’

5.1 Introduction

This chapter looks at the issues surrounding the repeated failure of crisis management frameworks, and asks what goes wrong, and why those problems are not fixed. It starts off by setting the context, in which a multitude of official reports continuously identify the same problems in organisational failures. It discusses the problems that emerged as emergency management (within the US context, at least) moved from being an all-hazard response capability to one focussed purely on terrorism and homeland security, and which by definition (and legal order) was based on a military style hierarchical command system. It then considers the implications for communication and information sharing which are known to be high-impact failure points, and identifies issues of power and the access to power as militating against appropriate information sharing, even at the cost of effective response operations.

Having examined the issues associated with a hierarchical command system, the chapter sets the question as to why, given repeated failures, there is still the adherence to centralised command chains. It suggests that despite the acknowledgement of the need to change, the culture of agency-centric thinking and turf-protection is so ingrained that current integrated management frameworks are not yet strong enough to overcome those cultural imperatives. It then gives a detailed description of some of the command structures that have been built into the Federal Emergency Management Agency (FEMA), and suggests that these are both part of the problem and a symptom of an underlying failure to deal appropriately with the issues of organisational complexity involving multiple agencies, over-lapping jurisdictions and a lack of a unified command structure that would overcome those historical challenges. It then considers the barriers to learning that preclude any meaningful change from taking place at the heart of the us crisis management structure, and finishes off with a an example of a situation where effective intra-event learning did take place, the Exotic Newcastle Disease (END) incident in California in 2002.

5.2 ‘A Dereliction of Duty’

A feature of post-incident reviews is the plethora of official reports and academic analyses that they produce, and consequently there is no lack of literature identifying the shortfalls that lead to operational failures. The outstanding issue is that, despite the fact that such failures are identified, and solutions are offered, there is little work on how such lessons can be implemented and organisations improved. It seems as though the pattern is for lessons to be recognised, acknowledged, reviewed – and then forgotten, so that there is a continuous cycle of the same management failures occurring each time that there is a challenging event (Donahue & Tuohy, 2006; Lalonde, 2007). The truth is that when crisis management operations fail, it is rarely because the scale or nature of the triggering event was so great that there was
simply ‘nothing that could be done’. It is much more likely that the causes of the failures are systematic vulnerabilities that are not only embedded in the organisation, but have been known (and ignored) for an extended period of time, a point explicitly made in Boin & t’Hart’s detailed examination of public leaderships and crisis management. ‘Most man-made disasters and violent conflicts are preceded by incubation periods during which policy makers misinterpret, are ignorant of, or flat-out ignore repeated indications of impending danger’ (Boin & t’Hart, 2003:547). In a more damning indictment, the title of the Senate Committee on Homeland Security and Governmental Affairs Report (US Senate, 2006) into the response to Hurricane Katrina, four years after the attack of 9/11, three years after the subsequent creation of the Department of Homeland Security (DHS), and one year after the DHS had created a National Response Plan was ‘A Nation Still Unprepared’. (Moynihan, 2009b)

In a review for the UK Cabinet Office Civil Contingencies Secretariat, the failure to absorb lessons was identified as taking place at four levels – the personal, the organisational (cultural), the organisational (technical) and the meta-organisational, or political (Cole, 2014). These failures were put down to, amongst others, ‘loss of organisational memory, denial and complacency, loss of opportunity and lack of retention of knowledge and skills, an inability of organisations to develop double-loop or higher level learning and a focus on what to learn rather than how to learn’ (Coles, 2014:2). Although it is true that for any particular agency a crisis event may be a rare occurrence, that is not to say that crises as a class are rare. In fact, they occur on a regular basis, and should be considered as part of the day-to-day activities for crisis responders (Hermann & Drayton, 2009).

The question that needs to be asked is why lessons from crises in general cannot be captured, codified and implemented into organisations, without them having to go through the traumatic experience of crisis survival before they learn (or more often, fail to learn) the lessons (Brattberg, 2012). Although the failures of the response to Hurricane Katrina were considered to be a result of inexperience and organisational incapability, and the crisis itself was treated as though it was a sudden and extreme event, FEMA actually had a long history of responding to major incidents. Under President Clinton’s administration, a Presidential state of emergency was declared in almost every state, some of them two or three times (FEMA 1998). In 2004, the year before Katrina, FEMA responded to a record 68 major disasters, including 27 hurricane-related disasters in 15 states (Chertoff, 2005). It needs to be asked why the lessons from that experience could not be integrated into the management framework of FEMA so that it could, as the lead national disaster agency, develop organisational and leadership skills that would have allowed its senior personnel and operational team leaders to have prepared for and respond to an event such as that more effectively than they did.
5.3 From Disaster Response to Homeland Security

The merging of US disaster response and counter-terrorist activities in the aftermath of the 9/11 attacks created a dilemma in terms of the nature of the response that will be demanded by projected situations. There is a fundamental difference in role conceptualisation between a community-based emergency management network and the deployment, in a military meaning of the world, of highly disciplined, command-led, objective-focused, fast reaction forces who are equipped (and in some cases weaponised, such as the National Guard in post-Katrina New Orleans), before being airlifted in a high impact operation that would be more appropriate to the war zones of Somalia or Iraq rather than the shock and dislocation of a post-disaster response operation. Whilst the immediate issues surrounding a natural disaster or other emergency response scenario may be characterised by confusion, that uncertainty is of a different order of magnitude to the scenarios envisaged in a homeland security incident where the nature of the attack itself may well be unknown - is it a one-off attack, or is it just the first step in a longer, more sustained programme; are there other implications such as the possibility of secondary attacks, or are there other ‘nightmare’ scenarios such as the possibility of radiological or chemical attack components? The nature of the response is also fundamentally different in that the response to an actual or suspected terrorist attack will be coordinated at a higher level of federal decision making, with the commanders neither part of nor particularly interested in the specific characteristics of the community that they are about to respond to.

Such tensions were highlighted in the post-Katrina report ‘A Failure of Initiative’ (US Congress, 2006), where the desire to increase the role (and powers) of the military was seen as the solution to the collective failures of the previous emergency response operation by those in federal government positions. Although the value of the military was not denied by the report, its core function was questioned (US Congress 2006:15), declaring ‘We cannot expect the Marines to swoop in with MREs [Meals Ready-to-Eat] every time a storm hits. We train soldiers to fight wars. You can’t kill a storm’. Given the skills and objectives associated with military units, it is not surprising that the conceptualisation of the role of the military in emergency response has not escaped from a planning culture that sees emergency response as an extension of ‘enemy attack’ scenarios (Dynes, 1994). In fact, if the lessons of the National Guard response to Hurricane Katrina are anything to go by, the nature of the operation will be much more along the lines of an invasion into hostile territory than a support mission to help communities in distress. There was certainly no doubt of this in the mind of the Louisiana National Guard Commander responsible for safeguarding the population of New Orleans who had been left homeless, hungry and desolated in the aftermath of Katrina. Chennelly, 2005) reported, “This place is going to look like Little Somalia”, Brig Gen Gary Jones [.....] said as hundreds of armed troops under his charge prepared to launch a massive city-wide security mission from a staging area outside the Louisiana Superdome. “We’re going to go out and take this city back. This will be a combat mission to get this city under control”.
From an ‘Activity Theory’ basis, which models the interactions between different organisations in complex and dynamic environments (Kaptelinin & Nardy, 1997; Ibrahim & Allen, 2012), such tensions will inevitably lead to disruption, as the shared objectives of responding to a disaster meet the individual objectives and operational methodologies of each responding agency. Unless this can be met, the likelihood is that those tensions will quickly descend into antagonism and deep-rooted cultural positions, significantly impacting the ability of the organisations to work together in a positive and collaborative way. The inability of those with strategic responsibilities to make the cultural change from a military style centralist command system to one which gives much more power to local community responders, ‘a system that generally works from the bottom-up, with help, when needed, from the federal government’ (Birkland, 2009:424), is perhaps so ingrained that it is literally impossible to change it. The tone of this thesis may have given the impression that there is a growing realisation that the nature of modern threats has created the need for a new form of response network and decision-making structure. However, the sad truth is that when it comes down to actually designing the new generation framework, there a return to the hierarchical command system that is so entrenched into the official policy that it denies any other sort of collaborative integrationist framework. This may well be because, rather than designing a management system that would support the needs of the decision-makers, the decision-making process has been forced to accept the organisational structure within which it is embedded (Klein, 1997). Within a military dominated structure, this is likely to prioritise the chain of command over the freedom to make innovative and creative decisions.

The Department of Homeland Security (DHS), which subsumed FEMA as part of its reorganisation in 2003, specifically laid out a detailed hierarchical structure of command and control in its two major policy papers, the National Incident Management System (US DHS, 2004a) and the National Response Plan (US DHS, 2004b). Based on traditional military command systems, they seemingly took no notice of the realities of highly complex, unstable and non-traditional threats. In its new guise, rather than developing an all-hazards capability, it determined that a military-security response would be used whatever the nature of the hazard (Birkland, 2009). The nature of both inter-organisational and intra-organisational working relationships within the Federal system has to a large extent been developed on a ‘division of labour’ basis (Wise & Nader, 2002), and in the case of the military, security and law enforcement agencies, on an even stricter ‘need to know’ basis. This strict differentiation of roles and responsibilities was enshrined in the US Incident Command System as described by Bigley and Roberts (2001). This highly-striated command system, laid out on the basis of highly formalised roles, tasks and authority, where communication between different sections of the organogram would be managed on strictly defined procedural lines, seems to be directly at odds with the understanding of the requirements for a much more fluid organisational framework. It is no exaggeration to state that the structures of the national security and
emergency management agencies of the 21st century are still being operated within a framework that was first formulated during the Cold War (USCNS, 2001:viii).

5.4 Communications and Information Sharing

One of the principal causes of failure cited almost universally in post-incident reports (even those where the response has been judged an overall success) is the matter of information sharing (Comfort, 2005; Kapucu, 2006; Bharosa et al. 2009). The reasons for this could be the general fog of chaos; the sheer amount of information that needs to be addressed, filtered, assessed, and then distributed between numerous other agencies that are themselves likely to be similarly overwhelmed by their own intake of information (Kapucu, 2005); the instinctual response of bureaucracies and government agencies to protect their own sources of information and to see attempts to share that information as dilution of their own power, authority or influence (Quarantelli, 2007; Mishra, et al. 2011); or simply a breakdown in the communication infrastructures that that were supposed to have enabled the sharing of information (Longstaff & Yang, 2008). Whatever the specific cause, information sharing failures are an almost inevitable first casualty of any non-normal incident. Many of the organisations drawn into the response operation simply do not have the technical or management resources to participate in the information sharing process (Bharosa et al. 2010).

Given the transfer of responsibility for emergency response from community organisations to national security agencies, this breakdown in the information process is even more stark when information is replaced by intelligence, and national security agencies are presumed to be dealing with local and regional bodies that do not have the necessary security clearance to be party to the intelligence that they hold (Relyea, 2004; Wise & Nader, 2006). Given that all of the above has serious impacts and implications for emergency response operations and is something that pretty well everyone agrees is critical to sort out, it would be reasonable to presume that the issue of interoperable communications for emergency management would be something that is both high on the agenda for reform, and well down the road to delivery. Unfortunately (and somewhat predictably) this would be a wrong reading of the situation, and rather than being merely a technical issue, cultural and organisational issues are still the main block to the introduction of interoperable communications for emergency responders (GOA, 2004).

Although one might think that the pressures and potentially catastrophic damage inherent in crisis situations would create an environment where all actors cooperate for the best interests of the wider community, that is not the case (Rosenthal & ’t Hart, 1991). Many of the operational failures that are identified as ‘technical issues’ are in fact much more likely to be influenced by political, cultural and
jurisdictional factors than purely by technical capabilities (US Congress, 2006). Information sharing between organisations is never simple, and it is even more complex when it involves multi-agency frameworks. There are various factors involved, one of which is the historical culture that sees information as being valuable and a potential power-lever, and therefore to be protected at all costs (Yang & Maxwell, 2011). The other factor is one of ‘defensive management’, in that the sharing of information could be used against an organisation, especially in any post-event review, and so a culture of blame-avoidance is built into the system from the start (Moynihan, 2009a; Berlin & Cariström, 2011). From this perspective, rather than seeing other agencies and organisations as natural partners in a shared enterprise, they are seen as either competitors or, in the event that something goes wrong, co-defendants or accusers. Whether or not the value of information sharing is accepted on a theoretical basis, the truth is that for the most part agencies are more interested in self-preservation than mutual cooperation, and therefore use obfuscation, avoidance, denial, manipulation and outright deception to preserve their own control (Donahue & Tuohy, 2006).

Although the centralised command system is considered a rationalistic response to the pressures created by a crisis situation, allowing decision-makers to make fast decisions, decide on specific response strategies and bypass normal bureaucratic channels (’t Hart et al. 1993), the concentration of power within a small group of homogeneous senior managers can create an environment where personal power, interests, and influence override the need for immediate and innovative responses (Comfort, 2007; Hermann & Dayton, 2009). Alison et al. (2015) identified three criteria that would work against the proactive acceptance of the need to work collaboratively. These were the lack of time pressure (in that decisions were more likely to be procrastinated over with open-ended, non-time bounded problems rather than when there was a clear sense of urgency, rather); multiple agencies, each of which might have their own agendas, and finally a lack of clear strategic vision to allow the identification of task-orientated problems that could be confronted and ‘solved’. Within such unbounded operational environments, it was more likely that each agency would concentrate on intra-agency communication (even if such action was lacking relevance in terms of developing solutions or delivering responses within the wider crisis management context) rather than communicating with other agencies.

The choice of who is in and who is out is in itself a political decision, and often results in a decision-making cabal comprised of ‘self-selecting experts’ who set up exclusionary barriers based on their own biases (Lodge, 2009) or personal likes and dislikes (Schaffer, 2008), based on a shared mental model of the problem and its possible solutions (Alison et al. 2015). Whilst such small-group thinking creates pressures on its members to compromise on hard decisions in order to maintain group cohesion (’t Hart, Rosenthal & Kouzmin,1993), overly prioritising group cohesion can also lead to faulty decision making (Janis, 1972; Garnett & Kouzmin, 2007), as can cultural issues of command, respect and hierarchy (Weick, 1993). Even in
the heat of crisis management, the overriding law of the organisational jungle may well remain that the fundamental and identity-defining competition for power and influence will often trump the need to support others within that circle (Lagadec, 2005; Jarman & Kouzmin, 1990; Birkland, 2009). It is usually the case in hierarchical systems that planners cannot find ways to develop coordination without either some sort of coercion (Wildawsky & Caiden, 1973; Birkland, 2009) or compromising shared goals (Comfort, 1994). The ability of an organisation to manage the political issues of dealing with the power relationships implicit in such multi-agency environments may in fact be more critical to the success of an operation than the issues of their core skills and capabilities (Mannarelli, 1996).

The main barrier to solving this decades-old problem is the absence of a duly qualified single authority that has the power to impose a solution, however worthwhile it may be (Jenkins, 2006). Within this environment, any solution would need to be introduced on the basis of voluntary cooperation, collaboration and support from all of the disparate organisations that would be affected by the move (Devitt & Borodzicz, 2008). Despite the fact that the failure of inter-organisational communications and decision-making will undoubtedly prove to be a critical factor in the next crisis, we are no nearer to a solution now than when the problem was first identified all those decades ago.

5.5 Why Central Command Systems are Still Seen as the Basic Command Model

An indication of the fundamental inability to grasp the reality of the inherent lack of ‘fit’ for hierarchical command systems within crisis management environments, is the fact that one common response to the repeated failures of a centralised command and control system is to claim that there is a need for an even stronger and more centralised system (Waugh & Streib, 2006; Wise 2006).

Although emergency response programmes had always been based on agency-centric planning, with each agency responsible for ensuring its own response capabilities in situations for which it was deemed to hold appropriate expertise, the desire to create a national unified emergency management system in the immediate aftermath of 9/11 set the framework within which the need for a centralised command system became one of the fundamental tenets and objectives of the entire capability development process. This saw the transition of emergency management from a role associated with community support, response and resilience to one designed to respond to homeland security threats. This was closely linked to the increased participation, influence and cultural hegemony of the law enforcement and national security agencies, in which the ‘threat’ was seen more in terms of terrorist attacks, including the possibility of the use of WMD (Weapons of Mass Destruction) or CBRN (Chemical, Biological, Radiological and Nuclear weapons), rather than floods, hurricanes or other natural disasters (Waugh & Streib, 2006).
There is clearly a distinction to be made between disaster response and emergency management, and the homeland security aspects of responding to terrorist attacks. Although there are certain aspects of consequence management that are common to both (Alexander, 2002), national terrorism preparedness, crisis management and consequence management are bundled together as though the skills and capabilities, whether personal, organisational or inter-organisational, associated with one would automatically be transferable to the others (Wise & Nader, 2002). There is a natural tendency in all organisations, and even more so in government departments, to prepare to respond to the last attack rather than the next one, and there is no question that in the aftermath of the 9/11 terrorist attacks the focus of ‘emergency response’ has been defined in terms of Homeland Security and in particular major terrorist threats (US GAO, 2003; Jenkins, 2006; Comfort, 2007).

One of the major consequences of this change, and one that reflects organisational command cultures as much as a reflection of actual needs, was the subsuming of FEMA, which was formed in 1979 (FEMA, 1979), into the DHS in 2003 (Homeland Security Act, 2002). This was the largest government re-organisation since the creation of the Department of Defence in 1947 (Moynihan, 2005), and effectively demoted FEMA from a Cabinet-level body to being one of twenty-two agencies that reported to the DHS (Chua et al. 2006). It was a reflection of the new security-minded world where professional emergency managers changed from seeing themselves as ‘all hazard responders’ to simply civil defence commanders (Waugh and Streib, 2006). Previously, community-based emergency managers saw their role as managing the response in terms of creating a framework or network that would allow all the disparate organisations, whether government, corporate or NGO, to work together in the face of the immediate challenges posed by the crisis event. Under this model of emergency management, activities were constructed around a framework of collaboration rather than a command structure, and were based on interpersonal skills as much as technical skills (Waugh & Streib, 2006; Drabek, 1987). This reflected a five-stage scale of group integration, based on trust and communication commitment, ranging from competitive, through informative, coordinated, cooperative and finally collaborative (Turoff et al. 2008:468). The highest level, collaboration, implies the fact that the disparate groups are self-managing without any external (or higher) direction required (Lindblom, 1965).

Successive reports reflected a fundamental dichotomy at the heart of government-directed emergency management. That is, the stated desire to create a unified command system that will work effectively when all around it is collapsing is in direct opposition to the way that governments usually deal with such issues, which is to create an ever-expanding number of different agencies that are tasked with specific aspects of the planning, preparation and response management when an actual event arises.

The US Commission on National Security, ‘Road Map for National Security: Imperative for Change’ (USCNS, 2001), laid out the requirements for a future national crisis management capability in a language that was
uncompromising in its simplicity and clarity, and which, by clearly identifying the need for future crisis management requirements, seemingly set the agenda for anyone that has operated in the crisis management field since.

New security challenges will demand a national security strategy, attended by policies, plans, and responses of a more complex nature and a more encompassing character than the past. Taken together, the new challenges will require new levels of interagency cooperation on strategy and policy development, planning and implementation actions, and resource allocation. The introduction of advanced information and communications technologies into our national security processes and organizations is still in the early stages and has been employed on an ad hoc basis. However, it is already clear that ready access to detailed information from a wide range of sources, and the ability to communicate around the globe quickly can produce “information overload,” unbalance old processes, and introduce the temptation to centralize and micromanage operations hierarchically. Finally, the changing nature of the national security environment and the expanded scope of actions necessary to meet the rapidly changing environment suggest that new skill sets will be required. The government will need access to a broad and changing base of expertise to meet the demands of the 21st century security environment. (USCNS, 2001:ix-x)

The stated aim of the DHS and FEMA National Response Plan was to create a single, unified, integrated response management capability ‘that establishes a single, comprehensive framework for management of domestic incidents’ (US DHS, 2004b:1). In reality, the development of the dual emergency management/national defence role has created a seemingly endless plethora of organisations, with different government departments each creating their own alphabet of agencies, offering a mixture of training, response management consultancy and service delivery that means that at every level of the structure there is an inbuilt propensity to overlapping jurisdictions and departmental turf wars (Posener, 2002).

5.6 The FEMA Conundrum: Complexity and More Complexity

Ackoff (1974) describes problems as ‘messes’, to capture the unformed chaos and randomness with which they often develop and escalate. Messes could also be the best word to describe the bureaucratic structure of emergency management in the US. The Federal Response Plan (FEMA, 1998) designated eight federal agencies besides FEMA to take lead responsibility on disaster response, with twenty five federal agencies assigned responsibilities under twelve emergency support functions (Kapucu, 2005). The DHS’s original organisational structure consisted of five major directorates: management, science and technology,
information analysis and infrastructure protection, border and transportation security, and emergency preparedness and response (Jenkins, 2006). It is hard to imagine a mish-mash of agencies, structures, roles and responsibilities, all acted out within an environment of jurisdictional jealousy, turf wars and personal and professional agendas that was less designed to create a unified response capability able to act within the severe time and consequence pressure of an emergency situation. It is perhaps no surprise that the Director of Homeland and Justice Issues for the US Government Accountability Office (GAO), wrote, with typical government understatement, ‘Since the initial formation of the DHS, this has been an area marked with competition and ambiguity in roles and responsibilities’ (Jenkins, 2006:319).

The attempt to build organisational rationality around massive – and massively complex – disaster events often leads to the introduction of additional layers of complexity in order to answer every possible question, as well as from an organisational desire to micro-manage what are often distanced and fast-moving operations. The objective of such a system was clear identified in Wise’s study on ‘Adaptive Management’ in the post-Katrina period. ‘The Incident Command System within the NIMS explicitly specifies that in incidents involving multiple jurisdictions, a single jurisdiction with multiagency involvement, or multiple jurisdictions with multiagency involvement, there must be a unified chain of command with an orderly line of authority, and incident managers at all levels must be able to control the actions of the personnel under their supervision’ (Wise, 2006: 313). An example of this, and a classic of its kind, is the ‘DHS Concept of Operations Plan for the 2006 Hurricane Season’ (FEMA, CONOPS, 2006), which attempted to codify the actions-on plans for response to a range of hurricane-related scenarios. It identified, quite rightly, that one of its critical roles was to establish and maintain a Common Operating Picture (COP), which would allow commanders at any level to know what was required of them, as well as to allow tactical decisions to be made in response to rapidly-changing local conditions (Harrald & Jefferson, 2007). The transition of that vision from policy to practice was, unfortunately, not so clear cut.

The Concept of Operations lists thirty-one separate supporting Federal Departments and Agencies, ranging from the Department of Agriculture, Small Business Administration, US Postal Service and Red Cross, to the FBI, National Voluntary Organizations Active in Disaster, Director of National Intelligence and NASA; fifteen emergency Support Functions; six different decision sciences and modelling and simulation tools and techniques (HURREVAC, SLOSH, SHAKE, NARAC Plume Analysis and the National Weather and Service Forecasts and Analysis); fifteen objectives that need to be implemented in line with NIMS/ICS in accordance with the April 2004 National Incident Management System and December 2004 National Response Plan, and six separate Standard Operating Procedures and Practice Frameworks (FEMA CONOPS, 2006). The document runs to ten thousand words, all divided into military-style bullet points. A typical paragraph reads:
In some selected situations, the FEMA Regional Director is authorized to independently activate the region’s Regional Response Coordination Centre (RRCC), staffed by the interagency Regional Support Team (RST) and deploy, at the request of the State Emergency Manager, a FEMA Liaison Officer (LNO) and/or Emergency Response Team – Advanced (ERT-A) to the State Emergency Operations Center (SEOC) to facilitate an initial Federal coordination of effort. The Regional Director, at his/her own discretion, directs the alert, activation and deployment of the Region’s Regional Support Team (RST) and components of its ERT-A to the Region’s RRCC at any time that available information communicates a credible threat to the Region or one of the State’s supported by the region. (FEMA, 2006).

It was so complicated that, in a pre-planned exercise prior to Katrina, federal officials had no real understanding of how the system worked (US Senate, 2006), and Louisiana officials were so overwhelmed that they actually brought in a consultant, two days after Hurricane Katrina made landfall, to explain exactly how the ICS worked (Moynihan, 2009). It is hardly surprising that post-event analysis of the multi-agency failures in the response to Hurricane Katrina, the first significant test of the emergency response system since its formation following 9/11 in 2001, identified a major issue as being the simple question ‘Who’s in charge?’ (Wise, 2006:306). Despite the core task of the DHS and FEMA being to prepare for a major incident on US soil, Secretary of State Michael Chertoff was forced to admit to the House Committee investigating Katrina, ‘We did not have the kind of integrated planning capability that you need to deal with the kind of catastrophe we faced in Katrina’ (Chertoff, 2005).

The process of creating a multifarious response framework is not merely an issue of creating operating capabilities at the agency level, but is more fundamentally concerned with the conceptualisation of a truly inter-connected network of response capabilities involving intergovernmental, interorganisational and interdisciplinary frameworks. As such, ‘network organizations reflect a qualitatively different form of governance structure than the bureaucratic hierarchies they are beginning to replace’ (Kapucu, 2005:35). However, not only is this capability currently lacking, but the recognition of the required relationships are not in place, and in many cases are not even understood (Wise & Nader, 2002; Hill, 2010; Kapucu, 2005).

5.7 Why Organisations Fail to Learn

The seminal work of Toft & Reynolds (1976) on organisational learning (or lack thereof) identified systemic weaknesses that would lead to operational failure. This included an inability to institutionalise lessons learned, so that mistakes, and their consequences, were repeated on a regular basis (‘Normal Accidents’); an unwillingness to listen to experts who were either giving the ‘wrong’ message or did not have the access to power to make their message heard; organisational stove-piping that meant that a lack of internal
information sharing prevented cohesive information management that would allow a picture of those system weaknesses to emerge; the interpretation of regulations in such a way as to, in effect, allow them to ignore or actively bypass precisely those regulatory and other control mechanisms that were designed to prevent major accidents happening, and the institutionalisation and normalisation of bad practices, so that they were not only not questioned, but came to be seen as critical to the success of the organisation. Whether it is the failure of NASA in the Challenger and Columbia disasters, the failure of a company such as BP to manage an oil spill in the Gulf of Mexico, or the repeated regulatory failings in major financial institutions that have become institutionalised fraud on a global scale, these were not ‘unknown unknowns’, but were systemic weaknesses that were deliberately created, sustained and hidden by those people who stood to gain most from activities. To put it bluntly, crisis such as these do not ‘happen’ – they are caused.

If organisational learning is to take place, then it needs to be at the conceptual and strategic level, rather than purely at the operational level. The implications of what Schon (1987) called ‘reflective practice’, in combination with what Argyris (1976) labelled ‘Double-Loop Learning’, are that this process cannot be left to random post-event changes, but needs to be respected as a critical aspect of organisational development. However, even when such lessons are learned, they are likely to be ‘isolated and perishable, rather than generalized and institutionalized’ (Donahue and Tuohy, 2006:4). Such learning activity is especially difficult when teams are brought together on ad hoc bases to deal with one-off events, what Sandstrom et al. (1990:121) called ‘action teams’. Such teams have relatively brief lives, are disbanded once the problem is solved, and are rapidly replaced by new teams as the response environment changes (Barnett, 2000). This phenomenon is not limited to the unformed chaos of emergency response operations. Exactly the same issues were identified in the more formalised context of emergency surgical teams, another example where such action teams were likely to be ‘team-based work processes that are largely fluid, dynamic and multi-disciplinary... rather than being stable, well defined and uni-disciplinary (like the project teams in high-technology firms)’ (Vashdi et al. 2007:119).

The underlying criteria for emergency response lessons to be implemented, integrated and institutionalised are that the agencies who share the learning also share an operational and command culture, the situations that they are referring to are known to them and part of their core skills, and that they have a chance to practice those protocols on a regular basis so that they become ‘normalised’ (Bigley & Roberts, 2001). The inability to create an effective ‘incident organization’ (Smith & Dowell, 2000:1154), indicates that there is still a lack of a basic common operating doctrine that could unite all responding agencies into a single cohesive group while simultaneously setting the framework for unified multi-agency operations (Donahue & Tuohy, 2006). There is still no model to successfully manage organisational learning, despite the large amount of information available from actual experience which could be operationalised and
made readily available to emergency managers, wherever and in whatever environment they are operating (Roux-Dufort, 2000; Jungert et al. 2004; Lalonde, 2008). However, it is not only from major crises that lessons can be learned. The lack of learning from smaller, more normal events is also a drawback in developing a handbook of best practices, despite the fact that this is often an effective method of identifying and correcting faults (Chua et al. 2006). Post-incident reviews usually concentrate on what went wrong (which is another reason why agencies are fearful of being openly frank and honest with them) rather than identifying what went well. As Donahue and Tuohy (2006) identified, commanders are more interested in knowing what they should do, rather than what they should not.

5.8 END: A Positive Example of Intracrisis Learning

One example of successful intracrisis learning was that given by Moynihan (2009b), when Exotic Newcastle Disease (END), a high contagious avian disease, struck California in 2002 to 2003. However, rather than in learning how to respond to and manage the disease, the lessons learned were in how to manage the ICS itself. One of his respondents reported, ‘It was really the organisational structure, the ICS structure that they were mentoring us on and specific functions because a lot of us were going into positions we had never ever done before’ (p.194). The basis of intracrisis learning is also critical when a new or unknown situation arises. In the END situation, for example, it was the issue of cleaning and disinfecting backyards where chickens had been kept. As one responder noted, they understood what disinfectant was, and how to handle it, but they did not know how to disinfect a backyard, what quantities or procedures should be used, and how to verify whether a backyard was infection-clear (Moynihan, 2009b:195). This led to Standard Operating Procedures (SOPs) being developed that could be disseminated to all other response teams. Given the until then unknown nature of the threat, and the fact that there were no procedures available to deal with a myriad of emerging problems, the new SOPs eventually covered over 400 pages.

Such intracrisis learning is most applicable when the crisis develops over an extended period of time (Moynihan, 2009b), allowing for needs to be identified, lessons to be learned, SOPs to be formalised, information to be disseminated and such lessons to be implemented on the ground level on a team-by-team basis. That is clearly more difficult within a high-stress crisis situation, but nevertheless, the lessons learned and (hopefully) the capabilities developed from such scenarios will still be of value in the most critical crisis management function, information management.

5.9 Conclusion

Given the catastrophic impact of crisis events, it is reasonable to ask why lessons from failures are not learned. A cycle of continuous improvement would be standard in any other industry – it would not be
acceptable to build a bridge, building or plane that collapsed because known engineering principles had been ignored – and yet it is something that has not yet entered into the culture of crisis management. Although individual crises may be rare events, the occurrence of crises as a class is something that happens on a regular, and even frequent, basis, so there is no lack of material for institutional learning.

As this chapter points out, the transition from an all hazards response concept to a military-style homeland security programme has had significant impact on the nature of the crisis management framework, but rather than rationalising the command and management process, it has in many ways increased confusion without bringing additional benefits. As was demonstrated in Hurricane Katrina, which should have been an opportunity for the proving of post-9/11 homeland security crisis management models, it is the complexity of the command structure itself that creates the confusion and communication breakdown that precedes operational failure.

The acknowledgement that something must be done is increasingly being admitted by senior commanders who have a realisation of the scale of the changes that are needed, but nevertheless, there is a cognitive dissonance between that realisation and the willingness to introduce fundamental, paradigm-changing change on an organisational level. Rather than being seen simply in terms of operational capabilities, if multi-agency emergency management frameworks are considered as social constructs, then the tensions associated with power, authority, territory and jurisdiction – all issues which are central to the self-image of most organisations – become apparent. The failure to improve information sharing on both a technical level, allowing for different systems to connect with other, and on a cultural basis, in that different agencies and organisations see each other as natural allies rather than suspicious strangers, if not actual enemies, is an outstanding example of where the lessons from previous failures are clear, and yet changes are not made.

Crises put organisations under a level of pressure that is impossible to recreate in any other context, and it is the ability to learn from previous real-time experience, and to improve organisational frameworks so as to ensure that such failures will not be repeated in the future, that is the prerequisite for the development of organisations that are genuinely fit for purpose within crises scenarios. The next chapter introduces some of the critical issues that must be addressed if such organisations are to become the standard in crisis management.
Chapter 6: New Concepts of Crisis Management

6.1 Introduction

Having used the previous chapters to establish the context within which modern crisis management is operating, as well as to identify what are their characteristics and why they are failing to deliver the service that they are tasked with, this chapter will review some of the basic components that will play a part in any effective crisis management framework, as well as identifying how they can be integrated to create a cohesive management system able to respond and adapt to the widest range of potential crisis situations.

The common feature of the sections covered in this chapter – creating a common operating picture, decision-making and sense-making, trust, and training for high-stakes decision making - is that they are focussed on inter-agency collaboration and task-setting, which are identified as high-risk failure points, rather than the specific agency tasks, which are to a large extent known and understood. The chapter also introduces the concept of emergent multi-organizational networks (EMONs), which describe the ad hoc nature of crisis management more accurately than a highly managed Incident Command System.

6.2 Background

It is the failure of so-called experts to accept the inherently ill-structured nature of crises that leads to the category errors, or paradigm failures, of much of what passes for crisis management studies (Mitroff et al., 2004). Therefore, rather than finding a ‘better mouse-trap’, there is the need to reconsider the underlying foundational beliefs that have led to today’s crisis management frameworks, and to understand why they are no longer fit for purpose for modern challenges (Comfort, 2005; Lagadec; 1997). Ill-structured problems are not only defined by the lack of clarity as to what are the problems that need to be ‘solved’, but there is also significant disagreement about what those solutions may consist of, who would need to be involved in their delivery, and who has the responsibility for those operations. In other words, the problems are not merely technical, but are political in the sense of involving a negotiation of power between organisations and individuals that lack the clear guidelines for such negotiated relationships. The need to create a rational framework through which decision-making can be observed, understood, modelled and then – hopefully – improved, has led to a large number of different models, many of which are seemingly differentiated more by their acronyms than by any inherent differences in their observations. In fact, the problem may be not a lack of cohesive models for the crisis management community, but rather that there are so many. As Guitouni et al. (2006) puts it, the reason for so many models is that decision-making itself is a complex activity, and it is not likely that there will be a single model that fits all situations or needs. In the final analysis, the value in such models of decision making may well lie less in their ability to guide us in
to how to make decisions, but rather in their ability to help us understand how decisions are (or could) be made.

6.3 Common Operating Picture

The inability of agencies to develop collaborative operational protocols is not merely a matter of agencies not being able to communicate with each other. The failure to create a ‘Common Operating Picture’ (COP) concerning the situation, the challenges and the solutions means that, in effect, each operational team is operating on the basis of what is in front of its own eyes. The level of actual engagement is purely at the team and operational level, rather than developing an integrated, cohesive, strategically-focused response. In their study of how teams interact with their external environment whilst conducting on-going, multi-stage and evolving (i.e. complex) tasks, Ancona & Caldwell (1992) found that most organisations fall into one of three sets. They may be isolationist, limiting contact with the outside world to the minimal possible, with most of their communications internal and between various sub-sections of the organisation. Alternatively, they may have task-specific external networks which can be utilised on a case-by-case basis to deliver specific outcomes, often associated with specific benefits. The third option is to have a more open house approach, where communication exchange with other organisations is seen as part of their basic operating procedure, and as such is normalised in every aspect of their operation. If the organisation is culturally pre-disposed to isolationism, the likelihood is that this will be maintained in a crisis situation when the ability (and willingness) to share information and contribute to the development of a COP is critical (Alison et al. 2015). Such cultural behaviours will have immediate and significant negative impacts on the response operation.

A widely cited definition of situational awareness describes it 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 future’ (Endsley, 1988:97). In more colloquial parlance, it is known as ‘having the bubble’ (Roberts & Rousse, 1989; Weick et al. 1999). This recognises situational awareness as being the end product of a three stage process, involving an information component, a perception component and a meaning component (Harrald & Jefferson, 2007). Walker (2009) suggests that these three states can be referred to as ‘data’ in Stage 1 Situational Awareness (SA), ‘information’ in Stage 2 SA, and what called be labelled ‘intelligence’ (actionable information) in Stage 3 SA (Walker, 2009:16). Another model gave the same basic initial three stages plus an additional one related to outcomes, consisting of perception (observation), understanding (awareness), decision and action (Guitouni et al. 2006).

The ultimate objective of any situational awareness programme is, or should be, to enable tactical commanders on the ground to have the information that will enable them to build a mental picture of
what is happening and to develop actionable plans. Unfortunately, the increase in both the amount of available data, as well as the complexity of the management structure that is required to absorb, collate and then disseminate that information, means that such aims are quickly swallowed by the fog of chaos associated with emergency response operations (Wise, 2006). As Kapucu (2005) showed in his analysis of communications between different agencies in the aftermath of the 9/11 attacks, the surge in the level of interagency communication is such that it will almost inevitably overwhelm the capabilities of the information and operational management structures. Whilst this is understandable, it is also a highly critical factor in the failure of different agencies to develop a shared situational awareness that will allow the unified response programme to be put in place.

The conceptualisation of situational awareness has evolved considerably from its original usage, which was specific to Korean war fighter pilots who were able to scan the immediate dog-fight environment and gather the necessary information about where they were, where their team mates were, where the enemy was and what needed to be done to maximise their own performance (Vidulich et al. 1995). It was presumed from the beginning that situational awareness was embedded in a tightly-defined group of people who had an immediate awareness of the battle scene, and who had been through a rigorous shared training and performance development process that allowed them to have almost telepathic powers of predicting how others in the team would react within a particular situation (Weick & Roberts, 1993). The concept of situational awareness was subsequently taken on board across the military, and was used to describe any situation in which a shared understanding was the critical factor in allowing different groups to interact effectively. This led to the adoption of similar Concepts of Operation by Fire Services and Police Departments, using increasingly militarised terminology for what were often quite local events. The final stage was the adoption of the highly centralised and hierarchical military command and control systems by the DHS for all emergency management operations, as set out in their legally mandated ICS (US DHS, 2004a).

The influence of the military style ‘Operation Command’ systems is often reflected in the language used by researchers to describe their work. Whilst the use of such language may simplify the conceptualisation of decision-making processes, there is also a cultural value associated with the use of such language, that can presume that military-style frameworks are both natural and the most appropriate for such environments.

The cornerstone of information superiority, at all tactical levels of an Incident and/or Unified Command, is a robust, continuous, common operating picture of the in-theatre operational environment. The resulting heightened situational awareness vastly improves the effectiveness with which Incident Commanders at all levels can pursue, and accomplish, a mission. The common operating picture can allow tactical decision making at the lowest levels of command consistent
with the higher level commander’s operational objectives and the decentralized tactical execution can enhance the ability of lower level tactical units to react quickly to changing circumstances. (Harrauld & Jefferson, 2007:4)

The importance of situational awareness was repeatedly highlighted in the DHS Concepts of Operation Plan (US DHS, 2004a), which belaboured the point that the strategic objective of the introduction of the ConOps process for the management of hurricanes was to create ‘a single Federal information sharing and management portal to ensure situational awareness of the common domestic operating picture .... emphasizing maintaining situational awareness of the common operating picture and total asset availability .... and maintain comprehensive, near real time situational awareness of the common operating picture’ (Harrauld & Jefferson, 2007:5). The means of realising that vision was the Homeland Security Information Network (HSIN). The HSIN ‘provides a common network platform for gathering, fusing, analyzing and reporting information related to potential terrorist and other threats to the US homeland. It also serves as the DHS network for operational information sharing and collaboration to maintain situational awareness as well as monitoring response and recovery efforts from terrorist, natural and human-caused disasters’ (FEMA, 2013). However, despite its clear objectives, the truth is that once a crisis situation occurs, the very nature of the open-network system precludes it from fulfilling its role, and rather than being a solution, it becomes an obstacle to putting together an effective ad hoc response framework. The overwhelming surge in intra-agency and inter-agency communication as well as the surge in information arriving from multiple external sources means that the resources at HSIN are simply overwhelmed (Drabek, 1985; Kapucu, 2005; Butts et al., 2012). This leads inevitably to a situation where, rather than acting as the central management station for the gathering, collation and dissemination of information, information from HSIN ‘is not quality checked and is inconsistent, inaccurate, and incomplete. The information available is changing rapidly and it is difficult to determine the source or timeliness of the information’ (Harrauld & Jefferson, 2007:5).

Endsley et al. (2003) identified eight factors that led to individuals being overwhelmed in their attempts to create appropriate situational awareness, all of which are immediately applicable to the HSIN model. These included the negative impact on performance and service delivery due to information overload, which meant that any additional information only disrupted rather than enhanced the ability to make effective decisions, and ‘complexity creep’, which described the fact that as systems became more complex, local commanders were less likely to have the time or resources to access them. Out-of-the-Loop Syndrome (Bolstad & Endsley, 2003; Endsley et al, 2008) describes the phenomena whereby, as systems grew complex, local commanders would avoid using them and instead find their own ways of establishing communications with the other teams around them, resulting in partial and patchy shared situational awareness rather than the single, cohesive common operating picture that was the objective of the system.
6.4 Decision-Making and Sense-Making Models

The common ancestor of all decision-making models is the OODA Loop (Observe, Orient, Decide, Act) which was developed in the 1950s for the specific and highly defined situation of air-to-air combat pilots in the Korean War (Grant & Kooter, 2005). Most of the models offered since then have maintained similar ‘progressive stage plus a feedback loop’ styles, usually involving three to five stages. Simon (1960) laid out a basic four-stage decision-making process that involved Intelligence (understanding the nature of the problem); Design (creating various viable options for response); Choice (using various criteria to choose the most appropriate option) which finally led to Action. Klein (1997), in his Recognition Primed Decision Making (RPDM) described a four-stage process that included understanding the situation; gaining benefit from the clues that could be seen; forming expectations to check the accuracy of their own situation assessment, and finally identifying appropriate actions to take. Jensen’s (2007) Functional Sense Making identified four stages: to identify the mission, understand the preconditions, develop methods to accomplish the mission and then to evaluate the situation. Bryant (2003) offered CECA – Critique, Explore, Compare, Adapt. Conklin (2005) came up with gather data, analyse data, formulate solutions, implement solution. Snowden’s Cynefin system (Snowden, 2000) was characterised as Probe, Sense, Respond; Graser et al. (2002) described Sense, Process, Compare, Decide, and Act, whilst De Sitter et al. (2004) had the four-stage decision-making design process as sensing (perception of process states); judging (evaluation per aspect); judging (integrated evaluation of aspects); action selection (choice of control activity). Finally, the Dynamic Decision Making process devised by Turoff et al. (1986) had five stages: problem definition, intelligence gathering, argumentation, idea generation and implementation.

Although all of these models follow much the same pattern (and for much the same reasons, as they are, in essence, all attempting to describe the same activity), there has been particular emphasis on understanding, modelling and improving decision making activity within military contexts, and often with interactions between different military units (va Bezooijen et al. 2007). The Naturalistic Decision Making model (Klein & Cooper, 1982; Klein, 1997, Klein et al. 1989) which has become perhaps the most significant strand of decision-making research (and which claims a methodological rigour that allows it be considered alongside other theoretically-based academic research models), developed out of a conference held in 1989, sponsored by the Army Research Department (Klein et al. 1993). The three themes highlighted at the conference were the importance of understanding decision-making within real life environments for any study to have relevance and validity; the importance of embodied expertise in the decision-maker, and the focus on the process of sense-making rather than the end decision (Lipshitz et al. 2001).

The weakness of the various decision-making research models that had been suggested prior to the development of NDM is that they were highly prescriptive, and developed on a basis of what should happen (as in, a rational person making the benefit-maximising choices without any other consideration
and not deviating from the accepted best practice), rather than reflecting, or even referring to, the reality of the context surrounding operational decision-making, which was likely to involve ‘ill-structured problems, uncertain dynamic environments, shifting, ill-defined or competing goals, multiple event feedback loops, time constraints, high stakes multiple players and organizational settings’ (Orasanu & Connolly, 1993). The awareness that high-stakes decision-making models had to be grounded in the environment and context within which they would be enacted led to a plethora of military-based decision and command development and support programmes. Some typical examples include US Navy Tactical Decision Making Under Stress (TADMUS) (Morrison, 1996); Joint Command Decision Support for the 21st Century Technology Demonstration Project (JCDS 21 TDP) (Hales & Scipione, 2008); Canadian Forces Command Decision Support Capability Document (Funk, 2003; Guitouni et al, 2006); ENCOMPASS (Enhanced Consequence Management, Planning and Support System) (Graser et al. 2002); Network Enabled Capability (NEC) (Walker et al. 2008); Headquarters Effectiveness Assessment Tool (HEAT) (Buettner, 1985) and the Interactive, Intelligent Spatial Information System (IISIS) (Comfort et al. 2001).

As well as being directly associated with decision-making, these are all ‘hybrid’ systems, involving a high level of internal interaction between technology systems and their human handlers. They are also dependent on their interface with the external world, both in terms of people gathering data and attempting to clarify the situation (pre-decision) and then putting plans into action (post-decision). The SocioTechnical Organizational Design (STOD) theory (de Sitter et al. 2004) has been developed specifically to research the impact of the developing interface between mechanistic and organic organisations, and to ‘develop an systematic approach to design which supports improvements in both the quality of work and what is called “the quality of the organization” (i.e. its ability to deal with a complex and continuously changing environment)’ (de Sitter et al. 2004:1; Mc Kearney, 2000). Only by understanding the nature of the complexity of crisis management can we rectify and ameliorate the failure points that seem to be inherent to so many crisis management programmes (Smith & Dowell, 2000; Trnka & Jenvald, 2006).

NDM has moved the focus of decision-making studies from either descriptive analysis or prescriptive theory to one where the expertise of the decision-maker was seen as the critical factor. A general decision-making model such as expected utility theory (Von Neumann & Morgenstern, 1947) pre-supposes that the decision maker has the time to consider various options, to model the expected outcomes of each, and then use that judgement as the basis for any decision that is taken. This is perfectly reasonable, given the correct decision context. Klein (1997) described a situation where a police agency was deciding which bullet to use as one where rational choice theory was both appropriate and effective, as time pressure was low, expertise was low (and therefore there was no premium in allowing an expert to make an intuitive judgement), the problem was stable and there were many stakeholders involved. Whatever its value may be in other, more stable contexts, it is clear that this objective calculation of competing decision options
and the arrival at a numerical value that allows rational comparison between options, a system based on implicitly stated hypothesis generation and hypothesis testing (Brehmer, 2006), is neither transferable to nor relevant to decision making ‘in the wild’ (Gore et al. 2006).

NDM recognises that the decision-making capability (and the value and quality of any decision) is inherently associated with the expertise of the person making that decision, which in turn is based on a wide range of cognitive factors over and above the mere information that is at hand. It also acknowledges as critical the role of intuitive and non-linear decision making in an environment which adheres to the three main criteria of NDM modelling, namely lack of information, time pressure and the applicability of the experienced practitioner’s skills to the task at hand. The nature of the areas that are attractive to NDM researchers can be seen by the papers that have been conducted on naval surface ship commanders (Klein, 1992), tank platoon leaders (Jenkins et al. 2010), urban and forest fire officers, off-shore oil installation managers, infantry officers and commercial aircraft pilots (Orasanu & Fischer, 1997; Schreiver et al. 2008).

The advantage of NDM from this perspective is that it bypasses the problem of how to deal with a unique event, by accepting that although the event itself may be unique, it still falls into a pattern of dynamic developments which can be considered analogous to other events. It is this insight that allows the benefits of individual experience and expertise to be both acknowledged and formalised (Patterson et al. 2010).

The failure of information sharing is not just confined to response management. It is almost a truism of emergency management that the first question that is asked is not ‘What shall we do?’, but rather ‘What has just happened?’. The need to build a ‘common operating picture’ (Comfort, 2007), or ‘sense making’ as Weick (1995) put it in his highly influential series of papers, is the first step in creating order from chaos. The lack of common operating picture is almost the sine qua non of emergency management: if there was a common operating picture, then the likelihood is that there would also be a well-understood framework for delivering appropriate response options. The ability to develop those shared organisational skills in not spontaneous or haphazard, but is the result of years of shared training, experience and the development of a mutually supporting operational culture (Comfort, 2007; Bigley & Roberts, 2001). Even amongst UK emergency services with a long degree of joint response, there is still a tension that means that the initial stages of a major incident consists of the three fundamental failings of poorly shared mental models, a breakdown of communication at the command level between the emergency services and a conflict between organisational and individual decision making (Kings Cross Fire Report: Fennel, 1987; Hidden, 1989). This can be reflected at the operational level where, as an example, the fire service, whose natural response is to throw a cordon around an incident, comes into conflict with the ambulance service, whose natural response is to get its vehicles as close to the incident as possible (Hill, 2009).
Weick (1993), in his study of firefighters and a particular incident where thirteen fire-fighters died, stated it simply: From a distance, problems and solutions seem simple, it is only as you approach that you see the ‘uncertainties, doubts, questions and complexities’ (Weick, 1993: 641; Meacham, 1983). Situational awareness is not just limited to an understanding of ‘What is’, but is the experience to picture ‘What might be’. Endsley (1995) described three levels of situation awareness: perception of the current situation, understanding of the current situation, and anticipation of how the situation will evolve. Just as ‘intelligence’ is ‘information in context’, so ‘situational awareness’ is the ability to maintain a multi-dimensional mental picture of the myriad environmental factors that could affect a situation, and the implications of those impacts if they occurred. The fact that this multi-dimensional picture is constantly mutating in the midst of an unstable and often extremely volatile environment is a testament to the value that experienced practitioners bring to the game. The fact that the practitioner must maintain a self-renewing image of the reality that they are working in has led to the phrase ‘ecological realism’ to describe the scale and complexity, as well as the inter-connectivity with the surrounding environment, that is involved (Flach, 1995; Endsley, 2000).

6.5 Decision-Making

The attempt to transfer some of the models of classical chaos theory to the management of crisis situations is one that has been increasingly explored (Cartwright, 1991; Gregersen & Sailer, 1993; Forgues & Thietart, 1994; Kiel, 1995; Quigley, 2004; Koehler et al. 2014), with the realisation that the study of complex deterministic non-linear dynamic systems (Overman, 1996) requires the development of ‘nonlinear and multicausal or noncausal thinking within organizations and social systems’ (Farazmand, 2014: 7). The inability to model and conceptualise the complexity of crisis management (Chisholm, 1998), has led to the development of a non-linear, and at times even non-rational, language to describe the ‘solutions’ (to use a concept from an older, simpler era) that can be found. Weick (1993: 634) quoted March (1989) that ‘decision making is highly contextual, sacred activity, surrounded by myth and ritual’, whilst another paper described institutional organisations as being based on a structure of ‘Myth and Ceremony’ (Meyer & Rowan, 1977). Vaughan (1996) identified organisational ritual as being at the heart of organisation as supposedly rationalistic as NASA.

The instructionalist frameworks within with traditional hierarchical command systems operate do not take into account the fact that for the people on the ground, interacting with the event on an immediate and personal basis, there may be no clear ‘correct’ solution in any situation. This is due both to the fact that information over the situation is limited, and the consequence of any action that is taken cannot be prejudged. As Brehmer puts it (2006), any option that is proposed for consideration can only be judged on...
its plausibility, and it is only after it has been implemented that one can judge whether that assumption
was true or false. There may be a tendency to believe that there is a clear division between those problems
that are ‘elegant’, that can be neatly defined and for which the pathway to a ‘correct’ solution can be
clearly described, and those problems that are ‘messy’ (Ackoff, 1979), for which the mere act of articulating
the nature of the problem is likely to lead to confusion, internal inconsistency and conflict. The truth of the
matter is that for many, if not most, emergency management situations, the fundamental belief in
rationalistic decision-making that lies at the heart of traditional deterministic centralised command and
control structures does not translate to the realities of an operational environment.

Although expert knowledge may be individualised, it is not random. It is ‘principled and proceduralized’
(Ford & Schmidt, 2000:197). The sense-making model that was identified by Weick (1993) as being the
internalised decision-making system used by fire fighters is part of a wider naturalistic decision making
model. Under such decision-making modelling, decisions are always taken in sub-optimal conditions, and
with an understanding that they are subject to review (often on a moment by moment basis), as more
information becomes available and a greater understanding of the overall situation emerges (Klein, 1997).
Although there is rationality to Recognition Primed Decision Making: it is an inherently intuitive process,
based on the ability to choose the most appropriate choice through a comparison of the current situation
with the memory bank of previous situations that the person has been involved in (Klein et al. 1989). As
such, it is most appropriate in a time-pressured situation involving an area over which they have expertise,
and which is characterised by uncertainty and/or ill-defined goals (Klein, 1993). Following on from Klein's
work, Lipshitz et al. (2001) identified three decision-making processes, each progressively more complex,
depending on the availability of sufficient information to make a sound choice. The first was a simple
recognition of a situation, a decision as to the best option, and then a determination to carry that out
through recognised actions. They found that if such a course of action was taken, it was almost always later
recognised as the correct one, in that it may not have been the ‘best’ option, but it achieved its goals in
ways that adhered to the internalised requirements of the decision-maker – safety of personnel, use of
available resources, speed of response, ease of application, etc. The second method that allowed an
experienced decision-maker to make effective decisions, given the lack of sufficient information to support
the simple choice method above, was to create a story behind the event, so that they could imagine the
build-up to the current situation, which in turn would allow a cohesive story to emerge from the limited
information available. The third method was then to take the range of acceptable decision options, and to
project in the future so as to understand what the possible consequences of any particular intervention
might be.

The usefulness of NDM and RPDM models are not only in their recognition of the value of the expert
participant, but also in the space it provides for a dynamic assessment feedback loop process that will allow
for a constant iterative review of the external situation as well as the relevance of the chosen response. This is because the touchstone against which any option is judged is not whether it is the best option, but whether it will work in this particular situation, which means that each choice is context-specific (Klein, 1997). This can be defined as serial decision making (‘best at that moment’) rather than concurrent (choosing between multiple options on a comparative basis (Klein et al. 1989:463). This also allows for the on-the-ground decision maker to change their mind, and to realise that the option that they have used so far is either not relevant or can be actively dangerous, in that it can add to the severity of the situation being faced. However, the RPDM model will also allow the practitioner to see ways in which the current situation can be diverted so as to bring a new set of response options into play, seeing such a transition as merely another part of the ongoing action-management process, rather than a denial of the validity of one approach and the need to introduce a completely new one (Ross et al. 2004). This ‘constant adjustment’ approach recognises the inherent disinclination of organisations and commanders to accept the need for such a radical change, and that it is extremely difficult to get an organisation to accept the new proposals as enthusiastically as they would have responded to the first set of options.

Any attempt to define a problem, even in the structured frameworks of mathematics or the ‘hard’ sciences, is a process that involves both extraction (accumulation of information) and shaping (manipulation of that information to create one particular research question) (Mitroff et al., 2004). Under such a system, any attempt to define a problem is moral, because it is only one of a multitude of (and possible infinite) other possibilities. If that is true of the clinical and hyper-managed environments of the hard sciences, then it is even more so within the chaos of emergency and crisis management. Whether it is the issues of wicked problems in trying to determine the limits of a non-linear, non-deterministic ‘problem’ such as urban spread, or the recognition-primed decision making model of the fireman responding to a forest fire and trying to build a cohesive picture of the situation on which he can then base future decisions, it is the attempt to create some sort of order out of what is, at first sight, a scene of chaos, that is the first responsibility of the crisis manager (Rittel & Webber, 1973), and which in turn is based on the experience and insight held by the experienced practitioner (Weick, 1988).

6.6 Embodied Expertise

The role of the ‘embodied expert’ is crucial to the concept of sense making, especially when that quality is required within the high-pressure environment of a crisis. Membership of the ‘embodied individuals’ club, within which experts from different disciplines recognise each other as ‘belonging in that group’, is not dependent on rank or job title, but is a trust-based relationship based on experience, insight and ability to contribute to the overall response project (Marsh, 1992). As such, even when these experts come from
different backgrounds, their ability to develop an advanced ‘situational awareness’ is comparable, given that they have similar levels of knowledge and experience of their own areas of speciality (Cooke et al. 2004). To paraphrase Cooke, there is homogeneity of capabilities even when there is heterogeneity of backgrounds, which results in the creation of expert teams, not just teams of experts (Salas et al. 1997).

Technically speaking, an expert is able to gather greater ‘value’ from available information that someone less skilled, and it is this ability to build a fuller picture from incomplete information that allows them to bypass analytical linear–based decision-making (Alison, 2015), and intermediary decision-making stages to reach a more advanced decision than would be possible with a novice (Jenkins et al. 2010). The value and quality of the decisions made is intimately related to the embodied knowledge which results from years of experience, and which is then able to be utilised in situations which are meaningful and familiar to the embodied expert (Lipschitz et al. 2001). This confidence in their own ability (or at least, the understanding that there may be little option), means that experts are content to take a decision based on ‘good enough’ rather than waiting to gather ever more information in order to make the ‘best’ decision.

Routine expertise is differentiated from adaptive expertise. Routine expertise is based on internalising skills so that they become second nature. Such expertise is developed through structured training and then repeated usage, under progressively more challenging situations (Dunn et al., 2002). However, although there is expertise involved in the attainment of such skills, they are strictly context specific, and do not imply that the person so enabled will have the KSAs (Knowledge, Skills or Attitude) (Ford & Schmidt, 2000) to create innovative solutions in response to new and unknown problems. The ability to operate in uncertainty is not just another issue in crisis management but rather a critical factor that is at the heart of all other considerations. Whether it is the initial question as to what just happened, the second question of what do we need to do about it, the issue of what impact any intervention will have, or the mere fact of not knowing whether commands and directions have been carried out, the gaps in knowledge about the actual situation are the significant issues that need to be managed. Even within the tightly disciplined environment of a military exercise, the ability to operate within that uncertainty is identified as the single most crucial issue (Waldenstrom, 2008).

In fact, the role of the creative experienced practitioner was highlighted by one of the founders of modern strategic thinking, Henry Mintzberg. The tendency for strategic planners to become ever more prescriptive, with a division between their role of developing solutions and that of the manager to carry them out in ways that did not allow for mistakes or errors, was a fundamental misunderstanding of the nature of strategic thinking. Mintzberg (1994) described the act of planning as being based on analysis and compartmentalisation, dividing any task into its component stages, so that the tasks associated with those stages become so formalised as to be automatic and de-skilled. Strategic thinking, according to Mintzburg,
is entirely different, based on skills such as intuition and creativity that would allow the ‘synthesis’ of a solution based on multiple possible inputs, each of which is judged as to its place in the overall solution based on the intuitive insight of the experienced practitioner. The process of solution development is not done according to a preconceived plan or schedule, but is by its very nature ‘messy’ (p.108).

A differentiating characteristic of the expert, or at least experienced practitioner, is their ability to maintain a picture of what is happening and compare that to what may happen in the future, both independently of what they do and as a consequence of their own decisions. It is this ever-evolving situational awareness that allows them to maintain a constant iterative comparative process that means that all decisions and all situations are in a constant state of flux, review and renewal (Weick, 1993; Weick et al. 1999; Schon, 1987; Cristancho et al. 2013). The creation of ‘shared commitment and understanding of the problem’ which allows disparate teams to work together, sharing organisational experience and expertise to create collective responses, is the outcome of repeated shared experience and cannot be conjured up within the pressure of an existing crisis event (Shanteau, 1992).

Critical as shared situational awareness is to sense making (Weick, 1993; Kendra et al. 2003), there are two very different aspects of sharing that are associated with developing group situational awareness (Cooke et al., 2000). One is the concept of sharing as in having interests in common, and the other is sharing as in distributing equally. When looking at how embodied experts develop shared situational awareness, it is clear that both meanings of the word have relevance and that one without the other would lead to a very limited understanding of what shared situational awareness is or how it can contribute to a successful outcome. Situational awareness itself develops organically through the interactions of the embodied experts, and although it is unclear where exactly the line is, it is accepted that the shared situational awareness associated with relatively small numbers of embodied experts allows for a dynamic interaction that creates value beyond the sum of its parts. However, there comes a stage where the expansion of the group beyond a natural decision-making or information sharing community means that the internal dynamic is lost, and as different personal and organisational influences come into play the level of decision-making becomes less effective (Cooke, 2004; Janis, 1972).

6.7 Trust

One of the significant issues at the heart of creating effective multi-agency networks is trust. In fact, it is so important that one widely-cited study on group dynamics went so far as to say that ‘Perhaps there is no single variable which so thoroughly influences interpersonal and group behaviours as does trust’ (Golembiewski & McConkie, in Cooper, 1975). One of the counter-intuitive findings that have come out of
trust research is that, rather than trust being a pre-condition for information sharing, it is in fact a consequence of it (Ibrahim & Allen, 2012). Trust is developed by sharing information, rather than the other way round. Trust is a self-generating quality in that if A trusts B in a critical environment, it is more likely that B will then see A as a trustworthy partner on a reciprocal basis. Trust in a potential partner is based on the belief that the trusted party has the ability to deliver what is needed, but is also making a personal or organisational commitment to carry through on that expectation, even if there are other competing demands that could challenge that commitment (Jonker & Trauer, 1999). As such, trust is as much based on ‘judgements of communality, ability, benevolence, internalized norms, and accountability’ (Alison et al. 2015:298) as specific operational requirements. Whilst it may not be possible to create immediate trust between various disparate organisations, it should be possible to create an environment where there is no distrust – which is often the case at the moment. As such, the development of trust can be the most efficient way of negating intra- and inter-group conflict (Han & harms, 2010). This can be done on both a strategic organisational level and an operational personal level. Although trust is ‘next stage dependent’ (in that however much I trust you, any betrayal of that trust is a deal-breaking event), it can also be developed and expanded on a case by case basis.

It is clear that the issue of trust is not a simple one. Trust implies that you are creating a dependency on the other person to actually deliver that which is required. The potential for failure is increased in the development of a trust-based relationship, but it can also considerably reduce the amount of complexity that is required in the planning process, as it can be presumed that the other party will provide the necessary activities, and therefore it can be left to them. This remains a critical issue, especially in situations that are more ‘non-normal’ than ‘run of the mill ’ crisis, such as the Haiti earthquake in 2010, the fifth largest ever recorded, that caused between 200,000 and 250,000 deaths and left the country, for all practical purposes, bereft of any national or support infrastructure. The lack of coordination between the various agencies that flew in to help, which was based on a failure to share information which in turn was based on lack of trust, turned out to be a critical factor in the low level of actual service delivery despite the massive amount of potential aid that was available (Coles et al. 2013).

6.8 EMONs – Emergent Multi-Organisational Networks

One of the central themes of this thesis is the need to move away from the mechanistic model of crisis management to a more organic model. Emergent multi-organisational networks (EMONs) conceptualise multi-agency response structures as social entities (Kendra & Wachtendorf, 2003) which emerge naturally to create their own working relationships in a dynamic, self-generating manner. This level of complex interdependence, largely self-managing and self-balancing but without any clear directing power (Kapucu,
suggests a management model divorced from any concept of design and planning but rather mirroring the concepts of ecological systems. Just as Naturalistic Decision Making is an attempt to identify what actually happens when an empowered individual meets a challenging situation, so the concept of EMONs is an attempt to describe what actually happens when individuals and organisations have to work together to create innovative solutions to challenging situations.

If they are seen as self-managing and autonomous social units, such ad hoc groupings (described as ‘self-designing organizations’ by Weick, 1997, and ‘epistemic networks’ by Rochlin, 1989), are actually very effective in managing crisis events – given the necessary level of support. It is the ability of empowered commanders on every operating level to balance the needs of process-driven decision making with the ability to develop innovative solutions towards shared goals that creates the possibility of ‘self-synchronizing’ teams based on ‘implicit coordination’ (van Bezooijen et al. 2007:7). Such implicit collaboration becomes the natural method of self-management when established command chains and communications networks fail in the heat of crisis response. Catastrophic failures often arise when there is the expectation that there will be a centre-led response operation, and when that fails there are no other options. The vacuum created by that lack of a formal command hierarchy can either lead to rapid deterioration and a spiral of impacts that create self-fulfilling crisis events (Drabek, 1985), or alternatively can result in bricolage, namely the ability to develop ad hoc and innovative solutions based on the external challenge and the available resources at hand (Weick, 1993:639). Under such circumstances it is natural for different groups within the community to come together, share resources and share the synergetic benefits from joint efforts and mutual support. For an EMON-style grouping to succeed, the relationship must be voluntary, there should be mutual or reciprocal activities, and participation in the network cannot affect the authority or autonomy of the members (Kapucu, 2005). This recognises that an EMON is truly a partnership of equals, without any pretence of hierarchical power or command relationships, rights or obligations, based on a mutual recognition of value and expertise of the other (Burns, 1963; Kapucu, 2005).

Comfort (1994), in one of the early papers on self-organisation, identified four traits that are characteristic of EMONs. Firstly, self-organisation is based on communication. If you are not part of the communication loop, then by definition you are not part of the team. Secondly, Comfort identified that the process of self-organising is ‘episodic’, to use Holling’s (1993) word in a slightly different context. As such, they consist of energy peaks and ‘basins of attraction’ in which partnerships are formed based on a range of natural pull factors. These could include organisational similarities, personal empathy, operational needs, the desire to be part of a larger group, or the willingness to follow the direction of a dynamic leader. Third is the fact that even in a self-organising system some groups exert influence over another, based on the needs of the dynamic changing situation. As such, the self-organising group will adhere to Burn’s description that ‘Responsibilities and functions and even methods and powers have to be constantly redefined through
interactions’ (Burns, 1963:17). The fourth characteristic of Comfort’s model is that multiple tasks are completed in parallel, so that even on an internal basis, there is a constant reviewing, assessing and redefining of immediate demands. This model conforms to the five qualities of small team organisations outlined by Mintzberg (1983), namely that they are managed by direct supervision, the strategy is set by the team leader, there is little formalised hierarchy, the structure is organic rather than codified, and the person in charge tends to make plans intuitively, which means that they are likely to be a reflection or extension of their own personality.

The understanding of how real teams respond to real crises suggests that, whatever the overall scale of the incident may be, at the granular level the immediate burden of dealing with the challenges that those crises throws up is based on small teams of responders using their own expertise to create collaborative and innovative responses, ‘in small temporary outfits where the stakes are high and foul-ups can have serious consequences’ (Weick, 1993:632).

6.9 Training for High-Stakes Decision-Making

There is no shortage of either literature or actual programmes dedicated to the study of how effective emergency management skills can be developed in individuals, teams, organisations and multi-organisation frameworks. Many of the models we have today can trace their roots back to the Critical Incident System developed in the US Air Force in World War II, that was used in the period immediately after the war to understand the characteristics of effective leadership and causes for both successful and failed events involving airline pilots and air traffic controllers (Flanagan, 1954), and which were still being used over half a century later (see Mishra et al. 2011). The issue is that the systems approach to training has largely involved the breaking down of complex tasks into sub-tasks, which are then tested on a success/failure basis associated with specific end results. Although these systems testing methods are appropriate to the highly organised (and measurable) key performance criteria associated with procedural tasks, they are not appropriate to judgemental and decision-making tasks (Klein, 1997).

In their study of emergency management training, Ford & Schmidt (2000) identified three challenges that face any capability development programme. The first concerns the development of personal and organisational skills that can be maintained and sustained over many years, before they are used in what are, by their very nature, rare events. In other words, how can ‘mastery’ (Senge, 1990) be created for events that may happen only once in a person’s career, or in the life cycle of an organisation? The second challenge is to create relevancy and transferability between the artificial construct of the training room or exercise environment, and the pressures of an actual crisis event. The third challenge is to create a genuine
capability-development framework that would be effective in a multi-agency setting, and which could then be transferred from the specificity of the training experience to the generalisation of multi-agency response operations.

A wide range of tools have been designed to simulate the decision-making environments that crisis managers will find themselves in, and which will bridge the gap between classroom theory and practical experience (Alexander, 2000). These range from simple ‘traditional linear’ training events where there is a cause, an event and a response, through to concept-centred exercises that are designed to introduce one specific aspect of emergency response, for example inter-agency communication, or integrated command and control, and finally to full-blown scenario training, which can itself involve differing levels of complexity and challenge.

Although there are differences in training exercises dependent on the amount of reality that they try to introduce into the training environment, all training programmes have at their heart the five dimensions of realism described by Drabek & Haas (1967), namely real groups, consisting of decision makers in their normal roles, interacting with others in the same way that they would in a real life crisis situation; realistic tasks that conform to the sorts of tasks that participants would perform in their real-life roles; ecological settings, so that participants are operating in an environment similar to that of actual situations and social systems, and interactions with other groups and the event itself, so that there is a feedback process involved in the training. The fifth criteria, that the training participants interact with other participants who are not aware that a training exercise is in operation, is extremely difficult to contrive within an emergency management training environment, given the scale of involvement and the potential impact of any such exercise.

This dependence on artificial and highly managed ‘ecologically invalid laboratory-based settings’ (Schneider & Shanteau, 2003), is in contrast to the reality of the crisis management decision-making context which is characterised by ill-structured problems, uncertainty, poorly defined goals, multiple feedback loops, time constraints, high stakes, multiple players, and conflicts between personal ideals and contextual requirements (Orasanu & Connolly, 1993; Alison, 2015). There is also the likelihood that within a manufactured training environment, the participants (and those observing/assessing them) may see their roles as to utilise official response protocols and operational procedures, rather than to develop innovative solutions and crisis-primed decision-making as would be the case in an actual crisis situation (Klein & Cooper, 1982; Trnka & Jenvald, 2006; Borodzicz, 2004). Their objective is not so much ‘to do something’, but rather ‘not to do something wrong’ (Ross et al. 2004). This is a common problem across the world. In Japan, which has perhaps the most highly developed emergence response system in terms of earthquake survival, the failure to respond to the tsunami/earthquake of 2011 had much the same impact there as the
response to Katrina had in the US – and for much the same reasons. ‘In essence, there is concern that the regional disaster prevention plans that have been created to satisfy those involved in local government will be useless when put into action. [Specific programmes] are just that, over produced systems that cannot be easily operated or revised. Ironically, these deficiencies are obvious to the governments that paid for them’ (Kawata, 2001:328).

The ability to recreate reality can be no more than an approximation at best, and current technology offers little more than a crude effort to give an impression of a proximity to reality rather than creating a truly immersive and credible experience (Alison, 2015; Rovira et al. 2009). This is not to deny the value of training, particularly in multi-agency and complex scenarios, but it does put a reality check on the efforts of some to infer that such experiences can recreate the adrenaline-fuelled pressure situation that is inherent in any crisis management event (Moynihan, 2009b). There is also the issue of participants in exercises using equipment and technology (primarily communication and command and control) that they are not used to (Bharosa et al. 2010). It is important to differentiate between training – learning what to do and how to do it - and exercising those skills in progressively more complex scenarios. If participants are failing because of a lack of understanding of the supporting technology, that is a waste of training time and can have a disproportionate impact on the roles and success of all other participating agencies. The purpose of training and exercising is to maximise the utilisation of valuable time and resources so as to practise in a way that will ensure success in an actual event.

6.10 Conclusion

The fundamental characteristic of any ‘new model’ of crisis management will have to be based on the ability to operate in complex environments. This will require an understanding of multi-agency collaboration and integration rather than a focus on either operational activities at the agency level or centralist decision-making at the strategic management level. The adoption of military-based command systems such as Concept of Operations and a centralized Homeland Security Information Network was a direct result of the desire to create such capabilities, but the focus of such activity then became the imposition of highly-managed systems, whether or not they were appropriate to the situations in hand. The missing component was the understanding that decision-making is best made at the local level, given the fundamentally ‘messy’ nature of such situations.

Naturalistic Decision Making allows an academic justification of such delegation of authority, based as it is on a dynamic relationship between the responder/decision-maker and the situation. Any attempt to impose additional levels of decision-makers will automatically result in a deterioration in the quality of decision, as well as an increase in the time needed to make it. The recognition of the importance of the
interaction between embodied experts, each of whom can interact with others in order to create innovative solutions, moves the whole concept of decision-making from a distanced, process-driven managerial function to a local, dynamic, personal one. The more that the value of such decision-making can be recognised and embedded in response organisations, the more effective they will be.

The evolution of such ad hoc groupings into EMONs gives a formal basis to informal activity. Although they may be ad hoc, they are neither random nor unstructured. In fact, the ability to create EMONs is a fundamental requirement in developing effective crisis response capabilities, given the need to collaborate with other organisations that are outside of one’s normal operating horizon. The creation of crisis management training programmes that focus on responding and adapting in collaboration with other people, rather than delivery of set solutions, creates the possibility of development of personal and organisational skills that will stand the tests set by actual crisis environments.
Chapter 7: Resilience

7.1 Introduction

A constant feature of post-event reviews is that the crisis management frameworks tasked with responding to major incidents are simply not robust enough to deal with the chaotic environments they are operating in. Rather than responding to repeated failures by creating more management, this chapter suggests that a new approach is needed, based on ecological and organisational resilience. Under this model, it is not so much the technical details of an organisation’s capabilities that are critical to success, but their ability to deliver those services within the reality of a crisis event. The chapter examines the qualities associated with resilience, its relevance to the concept of recovery, and the concept of ‘community capital’ which includes the social and inter-personal relationships which underpin effective multi-team and multi-agency collaboration. It concludes with an example of the impact of positive social capital in developing resilient response capabilities, which suggests that social capital is the quality that acts as the foundation for all other collaborative action.

7.2 Resilience as a Metaphor for Crisis Management

One of the emergent concepts of the last twenty years has been resilience, and the metaphor of resilience has been adapted by many disparate fields of research (Norris et al. 2008). Resilience has come to be accepted as a fundamental term within, for example, psychology and psychotherapy, whether in terms of individual survival/recovery from personal trauma (death, assault, emotional abuse) or post-disaster individual and community resilience, as in Hurricane Katrina (Dohrenwend, 1978). Resilient systems are beginning to be studied in a wider range of non-traditional areas, such as business, political science, emergency management, human physiology, human development, engineering (Longstaff, 2009), as well as material science, psychology, sociology and economics (Bruneau et al. 2003).

If we are to develop the ability to actually deliver emergency response into the scenarios where they are most needed, then operational resilience needs to become a core concept in all aspects of the planning, preparation and delivery of those services (Weick, 1993; Goldschalk, 2003). That is not to say that resilience is unknown in the world of crisis management. Wildawsky (1988) introduced the concept of resilience as a post-event factor, together with pre-event anticipation, as a strategy for reducing risk in uncertain conditions. Dr Louise Comfort, one of the leading authorities on crisis management, has taken resilience as one of her leitmotifs (Comfort, 1994; Comfort, Sungu, Jonhson & Dunn, 2001; Comfort, Oh & Ertan, 2009; Comfort, Boin & Demchak, 2010). Resilience as a factor of emergency management saw a surge in interest after both 9/11 (Tierney, 2003; Burke, 2005) and Katrina (Boin & McConnell, 2007; Norris et al. 2008).
Nevertheless, the repeated failures of crisis management operations for exactly the reasons that are associated with a lack of resilience highlights both the reality of its subsidiary status in crisis planning, and the impact that the failure to build in resilience as a central feature of crisis management has on subsequent response operations.

The value of the resilience approach to disaster and crisis management is that it changes the perspective from ‘control of an incident’ to ‘management of multiple consequences’. The movement away from the tightly-controlled mechanistic model of crisis management does not deny the responsibility of crisis managers, at every level, to ensure that their systems management processes are in order. The ability to create a level of systems sustainability is dependent on the availability of resources, but also on the ability of that organism/organisation to be able to access and utilise those resources. In order for a community or an emergency response operation to be resilient it needs a functioning infrastructural framework, whether it is the heart/lungs/brain/spine if we take the analogy of the human body, or the equivalent in the ecology model or systems framework.

7.3 Qualities of Resilience

Resilience has many qualities, but the fundamental concept implies some aspect of ‘bounceback-ability’ (Longstaff & Yang, 2008). Originally coming from material engineering, resilience denoted the ability of a material to absorb stress, maintain functionality and then return to its original state. In this sense, a rubber ball is resilient, a china plate is not. Typical definitions include ‘the ability of an individual or organisation to expeditiously design and implement positive adaptive behaviours matched to the immediate situation, while enduring minimal stress’ (Malak 1998:1); ‘the ability of a community to anticipate, prepare for, respond to and recover quickly from impacts of disasters’ (Mayunga, 2007:4); ‘the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks’ (Walker et al. 2004:5) and ‘a fundamental quality of individuals, groups, organisations and systems as a whole to respond to significant change that disrupts the expected pattern of events without engaging in excessive regressive behaviour’ (Horne & Orr, 1983:31). Kendra et al. (2003) described resilience as consisting of features such as redundancy, resourcefulness, effective communications and the capacity for self-organising in the face of extreme demands. Bruneau et al. (2003) were almost minimalistic as they defined resilience in terms of three simple functions: reduced failure probabilities, reduced consequence from failures and reduced time to recovery. Weick (1999) went further, and characterised resilience simply as ‘coping skills’. Whatever definition of resilience one takes, they all imply a high level of adaptability (Norris et al. 2008) and often tend to come back to the widely cited qualities as set out by the Multidisciplinary Centre for Earthquake Engineering Research (MCEER), which are Robustness, Resourcefulness, Redundancy and Rapidity (MCEER, 2006; Kapucu, 2005; Kendra & Wachtendorf, 2003). Bruneau et al. (2003) describe these four qualities in terms of processes.
(resourcefulness and redundancy) and ends (robustness and rapidity). Robustness describes the ability to deal with a range of sub-optimal operational environments, continuing to maintain service delivery capability despite the challenges that the surrounding environment may cause. Mayunga (2007) noted that resilience is a buffer, allowing the system to absorb a high level of disruption without losing its basic functionality. Resilience, under this understanding is not just a matter of recovery post-event, but how it interacts with its environment on an on-going basis. Resourcefulness relates to the ability to develop solutions that will allow the maintenance of operational functions despite internal and external disruptions to various aspects of those operations, and is associated with learning and coping. Redundancy is the quality that allows the organisation to continue functioning despite the failure of any particular part of the operation. Redundancy (spare capacity) is one of the critical aspects of organisational management, in that if managed correctly it ensures that identified critical failure points have multiple alternative delivery pathways that will allow operational status and service delivery to be maintained. It is a critical vulnerability of many emergency plans that they are full of single-path failure points, so that if one aspect of the operation fails, then the operation itself becomes non-viable. Rapidity is the ability of the organisation to adapt to changing circumstances in a speedy manner, developing innovative solutions and integrating them into their wider operating framework so as to minimise any potential disruption. Crises do not develop smoothly, but much like biological development, they are ‘episodic’ (Holling, 1996:31; Weick, 1993) in that they undergo ‘surges’ that are of much greater intensity, and have greater evolutionary significance, than the background activity that is the normal state of affairs. It is the ability of the response teams to recognise, understand and then adapt to these rapidly changing events that allows them to maintain an effective presence in the midst of a rapidly evolving crisis that would otherwise either overwhelm them or pass them by. A flood surge in a river, an avalanche or a mud-slide, a power-surge that can destroy support systems are all ‘crises within crises’ that require fast-action responses, often at exactly the time when there is the greatest loss of ‘sense-making’, situational awareness and organisational capability.

7.4 Resilience and Recovery

We can see from the above that although resilience is associated with ‘robustness, vulnerability and risk’ (Walker et al. 2006:5) the association of resilience as an antonym for ‘vulnerability’ is simplistic and misleading. Resilience as a concept should not only allow an organisation to recover better after a potentially catastrophic event, but should allow it to function more effectively in its environment to minimise the risk of that catastrophic event occurring. As such, resilience should be seen as a fundamental
value for any community (Paton & Johnston, 2001), rather than merely being used as ‘a sloppy synonym for flexibility’ (Boin et al. 2010:8).

Holling (1973) was perhaps the first person to see resilience in terms of complex systems adaptation when he took the term out of its traditional engineering environment, and looked at it in terms of complex systems interplay in the world of ecology. He identified that all dynamic systems are sustained through the tension between the forces of stability (efficiency, constancy and predictability) and change (persistence, change and unpredictability), pointing out that the characteristics associated with stability are those of the engineer, whilst those associated with change are those of the biologist (Hollings, 1996). As such, organisational resilience, or the attempt to manage it, runs in a continuum from bureaucratic control (which stifles creativity and punishes attempts to create innovative solutions to crisis events) to chaotic disorganisation, in which all organisational capabilities disintegrate in the face of rapidly changing environments, leading to ‘avalanches of disorder’ (Comfort, 1994:395).

One of the significant differences between engineering resilience and ecological resilience is in the approach to the concept of ‘recovery’ (Holling, 1973). In engineering terms, recovery specifically refers to a return to the pre-event state, so that if a metal is heated, when it cools it should maintain the form, function and qualities it possessed beforehand. In an ecological sense, however, resilience includes three separate qualities – resilience, adaptability and transformability (Walker et al. 2004). In this sense, rather than comparing ‘what is’ to ‘what was’, ecological resilience allows for an organism or organisation to transform itself post-event, but still maintain functionality, even if in a changed way or at sub-optimum levels (Bonanno, 2004). Part of this transformational capability goes so far as to include the ability to ‘degrade gracefully when it must’ (Allenby & Fink, 2005:1034). There is a direct parallel between the abilities of communities to recover post-disaster, the abilities of emergency response teams to overcome problems, and the path of recovery for individuals following traumatic events, namely, functioning despite distress, rapid recovery from distress, removal of distress, and then post-event growth and development (Norris, 2005; Bonanno, 2005).

7.5 Developing Resilience: Community Capital

Whether it is within a community context or a crisis emergency response team, the development of resilience is always a multi-faceted, portfolio approach, as it requires individual components as well as system-wide functions to be fully integrated in order to achieve a desired level of operational effectiveness. This approach extends to the long term development, as there needs to be a parallel process for creating specific resilience measures as well as creating the underlying infrastructure that allows for a more resilient organisation or society in general (Schaffer et al. 2008). However, the development of the inter-agency
working relationships that underpin the development of resilient working procedures is not something that can be achieved in the midst of a crisis event, but is the result of ongoing relationship developments through high-repetition interactions, whether in training environments or on joint operations.

Mayunga’s (2007) study of community-based resilience identified qualities of ‘community capital’ that could be considered universally applicable within any emergency response environment. These qualities that ‘could reduce vulnerability and increase community resilience…..include economic resources, assets and skills, information and knowledge, support and supportive networks, access to services and community values’ (Mayunga, 2007:5). This understanding of resilience suggests that ‘resilience is achieved by preparing, not for any particular event, but rather for the maintenance of a range of capabilities or functions that will be needed after any kind of event’ (Kendra & Wachtendorf, 2003:49). This conceptual framework of social capital can be easily adapted to the needs of a critical incident management system, or any corporate business continuity/resilience framework (Kapucu, 2005), and the ability to understand such issues and introduce them as part of a sustainable development process on a policy level can have significant benefits (Waugh & Streib, 2005).

The five factors associated with community capital are social, economic, physical, human and natural (Mayunga, 2007). This can be compared with the model proposed by Bruneau et al. (2003), in which the four dimensions of community resilience were listed as technical, organisational, social and economic. The concept of community capital suggests that the greater the development of such capital, then almost as a side-effect that community will inherently have greater resilience. In the event that a crisis situation does arise, there is a natural nexus formed by social capital, sustainability and disaster resilience. This is all directly applicable to the ability of post-event multi-agency response teams to maintain the highest of level of operational capability in the face of highly unpredictable, challenging and unstable conditions.

Social capital reflects the integration of the community, the way that members see themselves as parts of the greater whole, that they are interested in each other’s success and are committed to create the greatest good for the greatest number. Breakdowns due to the lack of social capital are usually one of the first issues highlighted in many post-disaster reviews. Economic capital is the financial resources that are used to support the community in general. It is one of the simplest ways of measuring the likely level of resilience of any organisation to a sudden, unexpected outside impact. In its bluntest terms, the more resources a community has, the more likely it is to minimise the impact of the original event and to return to a higher level of normal functionality quicker and more effectively. As a basic rule of thumb ‘an unhealthy or declining economy is an indicator of increasing vulnerability’ (Buckle, 2001), a lesson that is immediately applicable to the maintenance of crisis management capabilities in a time of budgetary and resource cutbacks. Physical capital consists of the critical infrastructure that supports the other functions of the organisation, such as IT, communications and data storage. In terms of managing a post-event
scenario, the physical capital becomes a defining issue in determining the ability of the organisation to stabilise, take control and then recover from the crisis event. Lack of physical capital and the resources associated with it has a direct negative impact on the ability of an organisation to respond to unexpected events. Human capital is the collective experience, insight, knowledge, skills and wisdom that is embodied in the personnel associated with the organisation. This is usually gained through education, training and experience, though it is also associated with how that resource is recognised and utilised as well as with the mere fact of its existence. Natural capital consists of those resources that nature provides, such as the landscape, water and the general eco-system within which the event is taking place. Whilst it is difficult to control natural capital, the ability to understand and work with it in a holistic manner is a significant aspect of community resilience.


One of the features of disaster management studies is that they tend to be failure-focussed. The Fort Worth Tornado response in 2000 is considered one of the few beacons of a successful emergency response operation, as discussed in detail by McEntire (2002).

The tornado that took place on 28th March, 2000 could not be described as a major catastrophic event. It was of short time duration, had relatively tight geographical and jurisdictional spread and caused relatively little damage (eight buildings destroyed and fifty-two significantly damaged). The aftermath of the tornado was limited to overturned cars, a city-wide power outage and ‘significant amount of debris in the streets’. However, the event was reported to have caused $450m worth of damage, enough for one observer to comment that ‘it looked like a war zone’. The immediate human cost was five deaths and forty-eight injured. However, in terms of a community working together both pre-emptively through planning and preparation, and during the event itself, the Fort Worth response seems to offer an almost textbook case of what went right.

The first thing that set the foundation for the successful response, according to McEntire, was a general attitude that emergency management was important, that something could be done about it, and that managers in various departments should accept the responsibility for ensuring that they had the networks in place to do what was needed. There was a proactive and supportive stance by city managers that fed down into all subsidiary agencies. Regular preparation and training was an integrated part of the city management calendar. Training was also task specific and realistic, and concentrated on incident command processes that involved information management and multi-agency integration. The training was so well designed that in the post-event review, ‘One respondent commented on the value of the experience by noting that the person who had scheduled the training activities must have “foreseen the future”’ (p. 377).
Previous experience, although not on the same scale, included a severe hailstorm and a church shooting. These experiences had been used to learn lessons and to develop a multi-agency framework that was able to adapt to the different challenges of a high-impact storm (Chua et al. 2006). The EOC (Emergency Operations Centre) was not only properly equipped with sufficient space for all of the relevant teams, but was also well managed. The EOC commander would ask for everyone’s attention every two hours, and each team or agency would update the room on what they were doing, and what help they might need. Key leaders would also hold a planned meeting each afternoon (for between 45 minutes and two hours) for an update on the bigger picture, identification of potential issues and reassignment of key tasks. This was seen by everyone as being of real value in helping develop a ‘big picture’ overall situational awareness beyond their own particular activities.

One paragraph in McEntire’s paper encapsulates all that is positive in community-based disaster response, and as such merits being framed and put on the wall in every emergency manager’s office:

One respondent stated that he knew the other directors by name and could talk to them about ‘fishing, deer hunting and that kind of stuff’. He also added, ‘this makes all the difference in the world.... When you walk in [to the EOC] and have a pretty good idea of who they are’. Others affirmed that they also interact quite frequently with the different department leaders ‘who are wonderful to work with’. Respondents were also well aware of the resources and contribution of each department as ‘people assumed their roles and fulfilled them beautifully’. Moreover, it was reported that the various agencies were willing to work together: ‘It was so nice to pick up the phone and say ‘I need 500 mats’ and they say ‘when and where do you want them?’’. It was also noted that there were also ‘no ego’s involved....[to say] it is not my job. (McEntire, 2002:377)

7.7 Conclusion

Many crisis management plans seem, in their very nature, to be fragile and brittle, in that once a crisis event has occurred, they lack the ability to adapt to the pressures of the external environment in which they are operating, and the underlying assumptions on which they are built often fail to survive first contact with the reality of the crisis situation. As such, they lack the critical quality of resilience. The underlying metaphor of resilience is that of responding and adapting to the external environment (of which they themselves are a small component), rather than trying to control that environment or impose solutions on it. In that sense, it is a dramatic change from the mechanistic command models that sees control as both the means and the ends of any solution.
By putting resilience at the heart of crisis management, it acknowledges the reality of the likelihood of significant (and potentially catastrophic) impacts on its own delivery systems, rather than assuming that such delivery capabilities will themselves be unaffected by the external event. A focus on resilience factors in the assumption that such impacts will occur, and therefore it is the ability to deliver solutions within such challenging circumstances that is the critical issue.

The concept of ‘community capital’, which is as equally relevant to the response agencies as to the communities that they are attempting to support, creates a framework through which such resilience can be developed, and which will have multiple other benefits beyond the limited (and hopefully rare) confines of emergency response and crisis management. The characteristic of resilience associated with ‘learning organisations’ means that an adherence to the values of resilience can create organisations that are in their nature less susceptible to failure, and therefore, in a Darwinian sense, have a higher chance of survival than other organisations around them that do not have those qualities.

As was demonstrated in the Fort Worth tornado scenario, the benefits of community capital can be seen in terms of immediate return and significant impact once a disruptive event of any sort has occurred. Given that such capital is developed on the personal and individual basis, there is the opportunity to introduce and normalise such relationships on an on-going and progressive basis, rather than trying to develop them once a crisis event has occurred.
Chapter 8: Creating High Reliability Organisations Within Crisis Management

8.1 Introduction
This chapter examines the concept of High Reliability Organisations (HROs) and demonstrates the relevancy they have to the development of effective crisis management capabilities on an organisational and multi-agency basis. It makes the case that the reason that crisis management often fails is that the situations they respond to are seen as ‘rare events’ and therefore appropriate capabilities cannot be developed on a ‘fail and learn’ basis. As an alternative paradigm which allows exactly that sort of learning from rare events, HROs are zero-failure organisations that operate in the highest risk environments but also have to contend with the challenges created by their own organisational limitations. As such, they are organisations that are focused on identifying weakness in order to prevent failures, rather than responding to failures once they have caused accidents (Flin et al., 2000). The chapter then looks at the difference between efficiency (which is the quality aspired to in centralised ICS) and reliability, which is the ability to deliver the desired service to the desired level. It is a quality that is focussed on ‘not failing’ rather than ‘achieving success’.

The chapter concludes by identifying the single most critical quality in developing HROs in high-risk operating environments as being an openness and honesty about organisational weaknesses, and an uncompromising commitment to eradicating those weaknesses on every level of operation. It can therefore be inferred that it is this level of openness and honesty that is the missing component in the current development of effective crisis management capabilities, and without which repeated failures will continue to happen.

8.2 The Nature of High Reliability Organisations
HROs are often seen as the supreme embodiment of high-design organizational micro-management, in that by their very nature they have to deliver a high (infallible) level of service delivery in what are often extremely complex operating environments, with the threat of catastrophic consequences for any failure (Mannarelli, 1996). As such, despite the fact that they seem to offer a potential model for effective management of high-risk operations, their high-design nature has meant that they have been considered as lacking relevance to the chaotic environment of crisis management. However, a different perspective was offered by Weick et al. (1999), who saw HROs as a reflection of a ‘mindfulness’ rather than a particular design approach. Under this model, the success of HROs was due to the fact that they focussed on reliability rather than efficiency, and on understanding how to avoid failure rather than concentrating on what created success.

Efficiency is a quality that is management driven, and that sees subordinate functions as requiring direction, control and standardization. Reliability requires a multitude of approaches, the responsibility to identify faults, and the ability to choose amongst a range of response options. The tension between...
efficiency and reliability is one based on design-led belief that one can design out problems (and that the
world will operate in predictable ways), and operator-led models which accept that even the best designed
system will need to have immediate operator input in order to respond to fluctuations in the working
environment (Schulman, 2004; Muhren et al, 2007). In its purest terms, efficiency is built on the belief that
‘if designed correctly, things will work’, whilst reliability is built upon the foundational belief that ‘we’d
better be ready when things go wrong’ (Landau & Chisholm, 1995).

Barry Turner, in his widely cited investigation of ‘Man-Made Disasters’ (Turner, 1978), identified the fact
that accidents were not the outcome of some random coincidence of events, but were actually the result
of organisational behaviour that had deliberately either ignored or misinterpreted a multitude of warning
signs. Effective HROs are those that are open to the fact that there is the need to be adaptive and
responsive and therefore are actively aware of the possibilities of the need to look for the causes of
potential problems that might lead to the need to respond appropriately. In an organisation where the
attempt to identify potential problems is seen as either unproductive or at worst potentially damaging to
one’s own career, then it is clear that the prevailing culture will be one of ignoring potential (and even
actual) threats, and therefore increasing the likelihood of eventual failure. The report into NASA and the
culture associated with the Space Shuttle Challenger disaster (1986) reflected exactly those concerns. A
fundamental aspect of the effective HRO is that everyone, whether managers or operators, worries about
the possibility of failure, so much so that ‘Worries about failure are what give HROs much of their
distinctive quality’ (Weick et al. 1999:90). This is in distinct contrast to many emergency management
programmes, which seem to presume that the event will unroll as predicted in the emergency response
plan, and that there is little or no need to take into account the possibility of change or failure (Clarke &
Perrow, 1996; Perry & Lindell, 2003). The main difference between HROs and crisis management is that in
HROs, failures are rare events (and management proactively try and bring them as close to zero as
practically possible), whilst in emergency management scenarios they are often, even if only in retrospect,
seen as inevitable outcomes of known organisational weaknesses.

The original HROs, nuclear power stations, were presumed to have been designed and built so effectively,
and with so many inbuilt redundancies that created a defence-in-depth against failure, that actual failure
could be considered to be so rare a (theoretical) event that it did not need to be taken account of. Once
the power station was built and running, it was presumed to just keep on running. It was only when the
inevitable failures did arise that it was seen that the complexity of the defence systems were themselves
adding to the likelihood of failure, as well as the impact of any failure when it did happen (Carroll, 1997).
This is an organisational culture that was mirrored in NASA in the lead-up to the Challenger Space Shuttle
disaster, in which the checks and fail-safe systems that had been the foundation of the high-reliability
service delivery until then were exactly the components that were removed under the pressure to adhere
to artificially imposed political and management time-frames (Vaughan, 1990; Landau & Chisholm, 1995).

Weick et al. (1999), set out the five attributes of a mindful organisation as being:

1. Preoccupation with failure (in which the possibility of failure is examined at every stage of an operation
   on a pro-active basis)
2. Reluctance to simplify interpretations (so that the inherent complexity of problems, and potential
   solutions, are accepted as part of the problem-solving process)
3. Sensitivity to operations (in which there is the realisation that solutions are only effective if they work
   within the realities of the operating environment, rather merely existing as paper-based options)
4. Commitment to resilience (in that resilience, and the ability to adapt to the widest possible range of
   challenging environments, is considered as a critical function in any operational plan)
5. Under-specification of structures (which means that individuals and teams have the freedom to develop
   their own working relationships, rather than being forced to adhere to pre-set organisational restrictions).

Whilst the attainment of all of these characteristics to an absolute degree may be more an aspiration than
a reality, they are nevertheless accepted as valuable and viable yardsticks for measuring the effectiveness
of high-risk operation (Hopkins, 2007). A alternative approach was set out in Cox & Flin’s (1998) study of
safety cultures in high-risk environments that identified safety as a primary goal, decentralized authority,
systems redundancy, organizational learning and senior management commitment as critical factors in
creating safe operations.

An organisational culture in which it has become normalised to ignore those issues that seem too big to be
dealt with or which would cause political embarrassment if they were acknowledged presumes a high level
of ‘group think’ and a tacit agreement to ignore exactly those issues that are in greatest need of attention
(Vaughan, 1997). In effective HROs the culture is exactly the opposite – to go out looking for potential
problems or causes of failure points, and to highlight and deal with them at the earliest possible stage – in
fact, before they even become problems that can be considered to have the potential to have a negative
impact (Schulman, 2004). Just as high-risk systems are designed to have redundancy and multiple fail-safe
layers built into them on a technical level, on an organizational basis this is reflected in the quality of
scepticism (Weick et al. 1999), which means that the individuals with the knowledge, experience and
insight to question official reports, designs and explanations are not only free to do so, but see it as part of
their core remit. It is this quality of scepticism that acts as a counter-balance to organisational hubris that
leads to the ‘drift towards failure’ (Woods & Cook, 2002) associated with increased organisational
complacency that in turn results in ‘managed failure’ and an inability to respond to surprises when they do
happen. The fact that a report claims that something is true is not accepted until it has been checked and
verified, but another person further down the line may well take it upon themselves to doubt that person’s findings as well, and to instigate their own checks and verifications. In this way, there is an inbuilt doubt system that acts as a refined, fail-safe mechanism to ensure that what is meant to happen actually has the wherewithal to deliver that service.

8.3 Reliability vs Efficiency

As is indicated in its title, the quality of reliability is central to the desired characteristics of an HRO. However, the understanding of reliability has often been misunderstood (Weick et al, 1999). In its generalised usage, reliability has come to mean the standardisation of outcomes, which in itself is dependent upon the delivery of stable operating conditions – whether through standardisation in a production line, or absolute control of all aspects of an operation such as in a nuclear power station. However, even within such highly managed environments, it soon becomes clear that the external operating environment itself is neither constant nor stable – there may be power fluctuations, changes in temperatures, disruption of supply chains or changes in the quality of the raw material, for example. Even within such environments, the ability to adapt and respond is fundamental to maintaining reliable service delivery. A study of US government management procedures pointed out, ‘Within a hierarchy-based system, the compulsion to micro manage in the name of efficiency strangles what potential there is for strategic wisdom, operation ingenuity and tactical art’ (Luttwak, 1982:20).

Rather than being a function of design or systems management, this understanding of reliability is grounded in the cognitive functions that lead to the recognition of change and the acknowledgement of the need to adapt, tied in with the technical capabilities, both individual and organisational, to develop the appropriate responses to the external fluctuations. The ability to recognise that such fluctuations, and therefore the demands on the organisation and operation flowing from those changes, are an integral aspect of operational management rather than exceptions or outliers, can therefore be regarded as the foundation for the development of reliability.

The ability to accept the ‘messiness’ of operations is part of the development of an HRO, and the desire for management to impose a control structure on that which is inherently unstructured in itself creates the likelihood of failure (Weick et al, 1999). In fact, the more controlling the management structure, the more likely that mistakes in planning or conceptualisation that take place higher up the organisation are to be embedded into all future plans, causing inevitable failure once they cascade down to the operational levels (Schulman, 2004). Given that it is the combination of complexity and the tight-coupling associated with highly complex organisations that causes the inevitability of systems-wide breakdowns, the ability to decouple different parts of the system so that they can act comparatively autonomously is one of the
foundations of the creation of HROs and the avoidance of highly impactful man-made accidents (Perrow, 1977).

8.4 Problems and Failures

The characteristics of failures within HROs, as opposed to organizations where the development process of potential problems is more extended, is that problems are considered as being unique and extremely time pressured. Therefore, every problem is accepted as serious, and there is an urgency to find not only a solution to the immediate problem, but to understand the causal chain that led to that situation. Operational failures are not only significant in themselves, but gain significance as indicators of organisational vulnerabilities that allowed those failures to happen. In most organisations, errors are identified as local events that do not reflect or impact on the overall operating framework. By contrast, in well-managed HROs, they are seen as harbingers of potential management weaknesses, and it is recognised that ‘causal chains that produced the failure are long and wind deep inside the system’ (Weick, 1999:90; Carroll, 1997).

The desire to become zero-failure organisations is a fundamental characteristic of HROs, given that they are not able to benefit from a trial and error based learning process, but have to learn significant lessons from what may be limited events (Carroll, 1997). This is in direct contrast to crisis management systems, which are seen to view the possibility of catastrophic failure with alarming nonchalance (Landau & Chisholm, 1995), and for whom the inability to learn from previous disasters is a significant factor (if not the most significant factor) in their continued failures (Donahue & Tuohy, 2006).

If one looks at the failures of supposedly high reliability organisations such as NASA’s experience with the Challenger and Columbia failures, or BP with the Deepwater Horizon oil spill, it cannot be claimed that these are ‘incompetent organisations’. They were extremely competent, with a high level of expertise at all levels of the operation, and people who were used to taking responsibility for doing their jobs well and properly. Space programmes and oil rigs are not places for people who cannot follow protocols. The problems occur when ‘following protocol’ is seen as a replacement for ‘doing the right thing’. The fundamental issue with crisis events is that they are so rare and so high impact, with such a range of cascading consequences, that it is literally impossible to create realistic plans for dealing with them. Japanese earthquake emergency response plans, for example, are possibly one of the largest ‘major event scenarios’ one could imagine, and yet both American and Japanese researchers have commented that the plans themselves are built of fantasy data that has no meaning in real life (Geller, 2011; Kawata, 2001). Similarly, following Katrina, the post event report declared that ‘Despite the understanding of the Gulf Coast’s particular vulnerability to hurricane devastation, officials braced for Katrina with full awareness of critical deficiencies in their plans and gaping holes in their resources’ (US Congress, 2006:5).
HROs are built on the belief that the starting point for everything is an acknowledgement of the truth, that is an acceptance of the challenges that any situation might create, as well as the failure points that exist that could lead to an inability to either manage or respond as required to those events. As Weick et al. (1999) report,

The major determinant of reliability in an organization is not how greatly it values reliability or safety per se over other organizational values, but rather how greatly it *disvalues* the mis-specification, mis-estimation, and misunderstanding of things. All else being equal, the more things that more members of an organization care about mis-specifying, mis-estimating and misunderstanding, the higher the level of reliability that organization can hope to attain. (Weick et al. 1995:104); see also Schulman, 2004:ii40

If one were to look at the description of HROs as set out in this chapter, and then to try and develop a framework that was the exact opposite of that, the final version may not be far from what we currently accept as the most appropriate form for crisis and emergency management.

Barry Turner, one of the leading authorities on HROs, was clear as to the underlying cultural assumptions that created the potential for high-impact failures.

One of the most dangerous kinds of inadequate management, and one with the greatest potential for disaster, is a situation where senior management have a blinkered, unrealistic view of their organization, its operations, its environment and its vulnerabilities, and use their authority to reinforce this closed view of their world. This condition, which has been called ‘groupthink’ (Janis, 1982), is particularly dangerous because such a management not only has power to influence events, but is also in a position to appoint staff who reflect its own prejudices and to overrule objections, warnings or complaints originating from those outside the organization who are not under their control. (Turner, 1994:217)

Such an approach can be particularly damaging in organisations where the primary objective, at least as far as senior managers are concerned, is no longer the delivery of the organisational or operational objectives, but rather the management of a political agenda. An efficiency based organisation where the underlying condition and functionalities that led to them being an HRO in the first place are gradually eroded, eventually (and often quickly) becomes a prisoner of its own expectations. The faults within NASA in the run up to the Challenger Space Shuttle disaster were well known, and came about as much through political pressure to maintain a set number of take-offs rather than acknowledging specific maintenance and management requirements (Romzeck & Dubnick, 1987). The attempt to maintain the illusion that everything was OK, while in practice ‘It did things that were actually stupid’ (Donaghue & Chisholm,
Tuner’s model of groupthink combined with wishful thinking. From a wider perspective, this cultural shift was the result of NASA changing from an organisation that ‘deferred to expertise’ (i.e. the people who knew how to build a space programme that could get a man on the moon), to one ruled by political bureaucrats who were more concerned with maintaining political and budgetary influence with the decision-makers in Washington (Romzek & Dubnick, 1987).

Mindfulness as a critical aspect of creating HROs able to respond effectively to changes in the external environment are based as much on the acceptance of the inevitability of failure, and therefore the need to prepare – and actively search – for it, as the ability make sense out of what is noticed (often based on the realisation of the significance of weak signals (Vaughan, 1986). The lack of mindfulness leads to a situation where the cause of failure is not an inevitable result of complexity and tight coupling, but rather, ‘They are alarmingly banal examples of organizational elites not trying very hard’ (Perrow, 1994:218). In many cases, those failures are not even a result of sloppiness or complacency, but active collusion and malfeasance. As was identified in the US’s most serious nuclear disaster, ‘Time and again (in the story of Three Mile Island) warnings are ignored, unnecessary risks taken, sloppy work done, deception and down-right lying practiced’ (Perrow, 1984:10).

8.5 Conclusion

It is a characteristic of crisis management, as demonstrated through the high-profile, high-impact events that are used at the basis for much crisis management research, that there is a failure to learn from rare events. As a result, the fundamental flaws that are the root cause for major crisis management failures are repeatedly identified as being significant factors in subsequent events. It is as though such failures are themselves seen as being part of crisis management process, and in that fact there is little that can be done to ameliorate them.

As an example of an organisational approach in which such failures are considered completely unacceptable, and which is geared towards a total success process, High Reliability Organisations offer a cultural and management template that holds many lessons for crisis management and emergency response planners. Despite the fact the HROs are associated with some of the most complex and highly-engineered systems in the world, there is an understanding that the ultimate quality is reliability (i.e. objective-focussed) rather than efficiency (i.e. process-focussed). Once the basic capability and service-delivery framework has been established, the efforts of the organisation as a whole, and every subsidiary department within it, is totally focussed on identifying things that could possibly go wrong. As is highlighted in the text, it is this obsession with eliminating failure that is the fundamental characteristic of HROs. As such, all problems, however seemingly minor or innocuous, are treated as signifiers of systemic
weaknesses that could have potentially catastrophic impacts. Under such a regime, all such problems are considered significant and time pressured. If they are known, they should be fixed – and it is someone’s responsibility to make sure that they are. It is the culture of non-acceptance of organisational weaknesses, allied to the ownership of that problem by someone who is responsible for ensuring that both the problem and the underlying factors that caused it are identified and resolved, that could be of greatest value in developing a similar culture within crisis management.

As has been repeatedly identified in the literature, the causes of many of the major crisis management failures considered to be the greatest threats to our communities are not the result of the external event, but rather due to inherent organisational weaknesses that were known, and systematically ignored. Given the increasing catastrophic impacts of the range of crisis events that we are facing, the failure to accept the responsibility to develop such high-performance crisis management frameworks can in itself be considered a moral and ethical issue.
Chapter 9: Conclusion

9.1 The Foundation of Effective Crisis Management

The secret of success in war, according to Sun Tsu over 2,500 years ago, was ‘Know thy enemy’. The equivalent in today’s crisis management environment is surely ‘Understand crises’. The reasons behind the repeated failures of crisis management operations are not unknown factors, unexplained phenomena or unique sets of circumstances. Rather, they are the direct result of in-built weaknesses and vulnerabilities that are an intrinsic part of our current crisis management frameworks. The need to be realistic about what a disaster scenario is likely to involve, and what challenges it is likely to set, is a prerequisite for the development of any effective response capabilities (Roe, 2009). In the event of a major earthquake, it is likely that roads will be impassable, communications systems will be down and communities will be isolated. The ability to get first responders into those situations, who can then make an initial assessment, get a simple command centre set up and then start coordinating the response with the command chain who are able to respond to needs and requests on a multi-agency basis, comes under what Quarantelli (1997:42) would describe as generic functions, in that they are likely to be common to any particular class of disaster independent of the specific local conditions. In highly dynamic environments, it is likely that the supporting infrastructural frameworks on which much of the response operation is predicated will simply not be available, and therefore rather than adding additional complexity, management frameworks should be outlined in the most general terms. Although crisis events are likely to have many of the same qualities, each individual problem will be idiosyncratic, and therefore has to be dealt with as a unique event (Eisenhardt & Martin, 2000)

If, as Rittel claimed, ‘The planner has no right to be wrong’ (Rittel, 1972:393), then the first responsibility is to acknowledge the reality of the threat, of the requirements of any solution that will be offered to deal with them. Modern crisis management demands an approach based on realistic assessment, a deference to expertise rather than political posturing, and an openness about what can and cannot be achieved within any particular management framework. The demands and challenges that cause crisis response operations to fail are not outliers or exceptional cases, but are fundamental issues that should be at the heart of response management.

None of the information in this thesis is new or unknown. It reflects points that have been made repeatedly in post-event reviews and reports from across the world. They were fixable then. They are fixable now. If they are not fixed, the same points will undoubtedly be made following the next disaster.
9.2 Research and Outcomes

‘Three decades ago, there was not enough theoretical material or research work on response to social crises and disasters to have warranted more than a footnote attesting to that fact. A paragraph could have summarized all the relevant work and activity of two decades ago. Even ten years ago, several pages might have sufficed to summarize totally the burgeoning activities in the area. The growth of the area has been exponential, not linear, and today the research efforts and theoretical advances have reached such a level as to force us to be highly selective in our coverage in this paper’. (Quarantelli & Dynes, 1977:23)

Given that Quarantelli and Dynes, both of whom are now regarded as being amongst the founding fathers of the academic study of disaster management, were writing almost forty years ago, commenting on events that had occurred up to thirty years before that, it seems relevant to ask why issues that were identified as critical even then remain unresolved, and continue to be the root causes of seemingly endlessly reoccurring disaster management failures. It is a central pillar of doctorate research that self-reflection is a significant part of the process, and yet there seems to be a lack of authoritative academics who are prepared to ask ‘Why are we getting it wrong?’ (Donahue & Tuohy, 2006). Despite the fact that there are literally hundreds of crisis management related journals and thousands of articles, all of which are readily available, it is a regular feature of crisis management literature that papers start off by decrying a lack of academic research into particular aspects of the field, many of which involve simple organisational functions at the heart of crisis and emergency management. The areas which it is claimed are lacking in substantive research include incident command systems dealing with issues outside of their normal situations (Moynihan, 2009); organisations working with unplanned partners (Ansell et al. 2010); incident command and leadership (Devitt & Borodzicz, 2008); management of collaborative networks (Brooks et al, 2012); information sharing (Mishra et al. 2011); organisational learning (Schein, 1993; Deverell, 2010); causes of organisational failure (Clarke & Perrow, 1996); knowledge management in disaster situations (Chua et al. 2006); knowledge management in inter-organizational project management (Bresnan et al. 2003) and interagency cooperation (Coles et al. 2012) to name just a representative selection.

The basic frameworks of crisis management are well understood. The four-stage process, consisting of preparation, response, recovery, and mitigation (Lindell & Perry, 1992), remains true, and it is doubtful that a radically new model will come along that disregards those principles. The defining characteristics of crises were identified and formalised by Hermann (1963), using language and models that are still accepted today. Burns (1963) described the adaptive management framework that was appropriate to a crisis situation over fifty years ago; Dynes, Quarantelli and Kreps (1972) set the framework for disaster planning research over forty years ago; Quarantelli (1982) laid out his ‘ten research-derived principles of crisis
planning’ over thirty years ago, and followed up with ‘ten criteria for evaluating the management of community disasters’ (1997). Dynes (1994) made it clear that a hierarchical command and control perspective may limit coordination, and Auf Der Heide (1989) identified communications as the foundational prerequisite for effective coordination, and that a lack of them would create significant disruption. And yet, despite the fact that all of these issues are so well known that they are almost axiomatic, even in a successful emergency response such as the one associated with the Fort Worth Tornado, a post-event review of that response found that coordination efforts were hampered by ‘information challenges, a lack of communication between the field and emergency operations centre, equipment failures, language barriers and a command and control mentality’ (McEntire, 2002:376).

For this reason, I believe that the lessons concerning the changes that need to be made should not be searched for in crisis management literature, but rather in general management literature. That is to say, the issue is not to become better at responding to crises at the agency level (most agencies have a good understanding of that already), but rather to have more sophisticated understanding of what is required to create effective crisis management capabilities. Subjects that would come under this heading would include sociotechnical systems theory (Walker et al. 2008), organisational learning (Argyris & Schon, 1974; Argyris, 1977; Engerstrom et al. 2000), interagency coordination (Moynihan, 2009), government integration (Scholl et al. 2012), knowledge management (Chua et al. 2006), and organisational learning systems (Schein, 1993).

9.3 From ‘Command & Control’ to ‘Support & Adapt’

The issues involved in the development of an effective emergency management capability are both strikingly simple and horrendously complex. They are simple because they are known, accepted and understood. There is nothing in this or any other paper that would be considered to be an earth-shattering innovation. The secret to effective response on the ground level is not esoteric – it is, in its simplest form, to let agencies who know what they are doing get on with their job. The role of the coordination network, at whatever level it is operating, is to support, empower and enable those teams, groups and agencies, rather than to control and direct. This approach does not deny the validity of the centralised command system - in fact, it is dependent on it. This is not an issue of revolutionary change, but rather incremental change that has a transformationary effect (Ansell et al. 2010:214). However, the barriers to this implementation of this model of crisis management arise due to the fact that the changed role of the ICS implies a cultural change that would impact on every aspect of design, preparation and delivery of emergency response. If it were so simple, it would surely have been achieved by now, but there is perhaps
nothing harder than cultural transformation, whether it is at the personal, organisation or political level, even when there are clear benefits for the people and organisations involved (Devitt & Borodzicz, 2008).

The focus of disaster planning is principles of response rather than process management (Perry & Lindell, 2003). Given the levels of complexity, instability and dynamic change that are intrinsic to even the smallest and most local of incidents, the belief that you can create pre-set templates which the local responder must adhere is not only fallacious, but counter-productive. The problem with military-style hierarchically managed command and control systems as typified by ICS is that they see themselves (and are seen by others) as essentially controlling mechanisms. This is perhaps natural, as military hierarchies tend not to reflect an admiration for collaborative community-based decision making. However, the problem with ICS is not that they are or are not there, but rather with the nature of the role that they are expected to play. If, rather than controlling and directing, they can become a framework for operational support, then they could in fact find a role that would allow their considerable resources and expertise to have a real impact on the operational level. This concept of the ICS was expanded by Moynihan, who identified that the ICS offered a middle path between the hierarchical ICS and the unformed EMON model: ‘A network governance approach challenges these competing perspectives by recasting the ICS as a formal mechanism to foster network coordination’ (2009:4).

If emergency management is seen as a system that enables such collaborative frameworks to be supported, then the main building blocks are there. This centralised support function would suit perfectly the skill sets of a centrally-commanded ICS and the military skills associated with operating in inhospitable environments. In fact, there is a model of organisational transformation that could act as an exemplar for the field of emergency management, and that is the transformational Revolution in Military Affairs (RMA) that was undertaken by the US military at the beginning of the century (DoD, 2001). This decade long programme to transform the US military from a Cold War-style monolithic organisation to one that had the speed and agility to respond to the new security environment of post-Cold War asymmetric threats is immediately applicable to emergency response. It defines the transformation that it needs to undergo to consist of ‘a process that shapes the changing nature of military competition and cooperation through new combinations of concepts, capabilities, people, and organisations that exploit our nation’s advantages and protect against our asymmetric vulnerabilities to sustain our strategic position, which helps underpin peace and stability in the world’ (DoD 2001:2). The process is based on four conceptual and aspirational pillars - strengthening joint operations, exploiting intelligence technologies, concept development and experimentation, and developing transformational capabilities – which are directly applicable to a similar process to transform disaster response capabilities.

9.4 Crisis Management and Personal Responsibility
The problems and challenges associated with creating a new generation of crisis management capabilities are not unknown, and it is certainly not the case that there is a lack of academic papers or organisational mission statements, but rather that the suggested solutions are not realistic. There is often an organisational belief that the development of a written plan is the same as planning, and that once that document has been produced, the ‘preparation’ stage can be considered to have been successfully completed (US GAO, 2003). As one influential paper put it, written plans are often no more than ‘fantasy documents’ (Clarke & Perrow, 1996), that are then given the status of ‘sacred documents’ (Perry & Lindell, 2003:343), which it is unacceptable to question, review or amend. It is often the case that the more rare and complex the potential event, the more detailed and complex the response programme. The likelihood is that even the people who are tasked with managing simple jobs within the plan, will not understand or be able to fulfil their roles (Perry & Lindell, 2003), and that critical failures will arise early as people who are used to routine work functions are suddenly put into high-stress crisis environments with all of the information and pressure surges that that implies (Clarke & Perrow, 1996).

The lessons learned from high reliability organisations, described in Chapter 8, are clear. Even within the highly managed environments of HROs, the system weakness that lead to operational failures, and even those that can be considered as catastrophic, are not the result of technological breakdowns (though they may be causal factors), but are rather embedded within the organizational culture within which they are manifesting. The ultimate responsibility lies with the management to do what is right – what is known to be right – and that responsibility grows the farther up the management chain they go. The defining characteristics of HROs - an acceptance of the constant possibility of failure, and a determination to prevent it at every opportunity; an openness to what is real and actual rather than what is easy or presumed; and, above all, an absolute commitment to creating zero-failure organisations at every single stage and level of an operation – are immediately applicable to crisis management events. If the lessons from HROs were taken on-board by crisis and emergency response managers, many of the institutionalised weaknesses that are the root causes of so many of the catastrophic failures that are associated with crisis and emergency responses, could be eradicated, and a culture of successful service delivery could become the norm.

9.5 For the Future: Global Problems, Local Solutions

In simplistic terms, the recommendations of this thesis could be summed up as ‘Do better’. The central message has been that there is nothing that is not known, or that requires breakthroughs in either technology or systems management. All of the lessons highlighted are common knowledge, and have been repeatedly identified as being either the direct cause of, or at least contributory factor to, catastrophic failures.
There is no secret to success, but the foundation for the development of a more effective crisis and emergency management capability is undoubtedly based on sustained leadership by those who have an insight and understanding into what is required and how it can be achieved. The on-going collaboration between academics and practitioners, which has already been recognised to a significant degree by both sides, has led to a growing community of crisis managers who are comfortable discussing their needs in terms that were previously confined to university lecture rooms. However, the value of the embodied expertise will not be fully realised until there is a general culture, whether at political, agency or operational level, that no longer allows ‘planned failure’ to be an acceptable option. Just as crises do not ‘just happen’, neither do crisis response failures. It is the willingness of political and organisational leaders to accept the responsibility that comes with that awareness, that will allow the lessons highlighted in this thesis to be utilised or not. One of the reasons that critical event plans do not work is because they are so rare that organisations, and particularly multi-agency frameworks, do not have the required level of experience to learn lessons, gain skills and develop organisational capabilities (Clarke & Perrow, 1996). It is for that reason that one of the principle aspects of creating ‘rare event’ capabilities is that critical events frameworks must be utilised on every available opportunity. As an example, seeing an emergency response framework as an all hazard response system, rather than being focussed on counter-terrorism or disaster response, means that it could be triggered whatever the nature of a critical event. This allows the whole system to become normalised as far as critical response protocols are concerned, so that once a genuine serious event does occur, the fundamental response process will be known and practised.

In the same way, the normalisation of integrated multi-agency interactions will create a shared capability that will set the foundation for the development of the innovative solutions that are demanded by any crisis event, and will start the process of eroding the cultural barriers that are the cause so many more crisis management failures than are operational ones. It is the ability to create those multi-agency networks, based on shared training, operational experience and, above all, mutual professional respect, that will be the game changer that allows crisis management to attain a level of professional integrity and service delivery that would be expected as standard by any other profession.

However large-scale and high pact a crisis maybe, the consequences and responses are almost always on a local, community level. The ability to develop the integrated working relationships comes both from the organisational culture, but also from simple personal relationships. Local leadership is a critical issue in the development or otherwise of such working relationships, and if the system was designed to allow and encourage such local networks to be developed, that would undoubtedly have as great an impact on crisis management and emergence response planning as any academic paper or government policy review.
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