Developing an Incident Command System Framework for Natural Hazards in the United Arab Emirates (UAE)

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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DEDICATION

“The love of a family is life’s greatest blessing”.

This research is dedicated to my devoted family, my father and mother, my beautiful wife, and my lovely daughters, Ghalya, Haya and Mezna; who are true gems, and my siblings; who are always close to my heart, no matter how far away I am.

DECLARATION

The research contained in this thesis was solely undertaken by Saif Alawadhi. This is to declare that none of the work has been submitted to the University of Salford or any other institute prior to this submission.

Furthermore, the author has never used or submitted part of the research in this thesis in support of another qualification or degree programme at any other University or learning institution, either in the UK or another country.

SAIF AlAWADHI

ABBREVIATIONS LIST

AIIMS	Australian Inter Service Incident Management System
C2	Command and Control
CAQDAS	Computer Aided Qualitative Data Analysis Software
CDF	California Department of Forestry
CDGC	Civil Defence General Command
COBR	Cabinet Office Briefing Room
EFA	Exploratory Factor Analysis
EM	Emergency Management
EM-DAT	Emergency Events Database
FEMA	Federal Emergency Management Agency
FIRESCOPE	Fire Fighting Resources of Southern California Organised for Potential Emergencies
GSB	Gold, Silver, Bronze
ICS	Incident Command System
ISO	International Standard Organisation
JESIP	Joint Emergency Services Interoperability Programme
KWt	Kruskal Wallis test
LESLP	London Emergency Services Liaison Panel
MOI	Ministry of Interior
NCEMA	National Emergency Crisis and Disaster Management
NPIA	National Policing Improvement Agency
NRF	National Response Framework
SCG	Strategic Coordination Group
SOPs	Standard Operation Procedures
SPSS	Statistical Package for the Social Sciences

TCG	Tactical Coordination Group
TETRA	Terrestrial Trunked Radio
UAE	United Arab Emirates
UK	United Kingdom
USA	United States of America

PUBLICATIONS

1. ALAWADHI, S. and INGIRIGE, B. 2015. A Conceptual Framework for Incident Command System in the United Arab Emirates. The 12th International Postgraduate Research Conference (IPGRC15). The University of Salford, Media City. UK. pp. 422-430.
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ABSTRACT

It is beyond dispute that natural hazards cause significant damage to physical and human domains, with more disasters occurring in the last 25 years are increasingly linked to climate change. Therefore, there is a growing need to minimise the dangers and threats faced by individual countries. Due to its geographical location and environmental conditions, the United Arab Emirates (UAE) is particularly exposed to various natural hazards, resulting in both the infrastructure and urbanisation being at risk. The uncertainty and complexity of emergencies requires particular arrangement responses from emergency agencies, such as the civil defence, and police services to share in minimising the impact of the emerging threats. The reoccurrence of hazards and their impact suggest that the implementation of the emergency response system and the incident command are wrong, or that there is a gap found between the theory and practice in emergency response. Consequently, the UAE has realised the necessity for implementing an appropriate hazard response system to avert and mitigate the potential consequences of the hazards and to deal with future emergencies. This has proven beneficial in the identification and evaluation of the primary vital factors and gaps in the implementation of the incident command system, in particular, the Civil Defence General Command (CDGC) agency used as a case study for this research. Thus, this research aims to develop an incident command system framework based on a feasibility assessment to facilitate emergency response, increase capacity, and enhance resilience of the CDGC in dealing with hazards in the UAE.

To achieve this aim the research employed exploratory sequential mixed method approach to collect and analyse the required data. In the first stage, qualitative semi-structured interviews were conducted with Gold and Silver commanders (*n*=15). These commanders were selected due to their high positions in their departments, with the Gold commander in the role of a general director, and the Silver commander as a deputy director at the CDGC agency. In addition, thematic analysis was used to identify key critical factors of the incident command system, which were; implementation, organisational, individual, barriers and driver factors in the current deployment of the incident command structure. The second stage of the investigation employed questionnaires survey to measure and examine the perceptions and values of the Bronze commanders (*n*=153). These commanders were selected due to their job roles in the operational field as they being first responders to incidents. A Kruskal -Wallis test (KWt) was used to examine whether there were any significant relationships between the independent variables (CD departments, job position and academic qualification) and the

dependent variables (the incident command system factors) at level (p <0.05). Thereafter, further questionnaires were collected from experts (n=11), which helped in achieving the UAE incident command framework validation. A sample size of experts was selected to reduce bias associated with a decrease in the possibility of data response. Generally, the higher commander ranks tended to reveal excellent judgment regarding the research results, in accordance with their years of experience, which was more than 11 years and above.

The realisation of key contributions to awareness and understanding completed the knowledge gap by presenting a developed incident command system framework that addressed the key factors associated with the successful implementation of the incident command system adaptable to the UAE's environmental conditions. This research identified and evaluated the critical factors of implementation, organisational, individual, barrier and driver of the incident command system in the CDGC agency in the UAE. The barrier factors were treated statistically to build an improvement strategy for an effective emergency response. This research has practical implications for the incident commanders as it actively assures improved operation of the incident command system currently in place, so that it enhances the capabilities within the CDGC agency during emergency response operations. By doing so, emergency agencies in the UAE can be more effective and efficient. As a result, the proposal of a new framework contributed to a more detailed and less confusing system that overcome the identified barriers and aided successful emergency management.

CHAPTER 1 INTRODUCTION

1.1 Introduction

The United Arab Emirates (UAE) has recently increased its responsibility for emergency management and as a result, an incident command system has been developed to fulfill their response. Despite these relentless efforts, the system is suffering from such weaknesses as in the organisation, direction, control, and non-optimisation of resources, along with a command disorder and duplicity of functions in some cases. Such defects have often contributed to causing chaos, exhaustion, and attrition of those responsible. To be efficient and effective in managing emergencies, preparation is required, and this can only be achieved if the organisations maintain a continuous cycle of coordination, training, equipment, exercise, evaluation, and corrective actions; they are also required to have operational procedures for dealing with various kinds of emergencies and incidents in which they participate.

This chapter aims to provide a general introduction to the rationale, objectives, and aim of the research project. The body of the present thesis consists of eight chapters, which tackles the likelihood of natural hazards occurring in the UAE, the consequences, and the potential challenges that emergency response agencies face. Therefore, the management of hazards and the involvement of the incident command system are employed in this thesis as a research problem. The research project also sheds light on the motives to study the UAE's emergency response framework, the UAE's emergency response practices and the assumptions that have been targeted to develop an appropriate incident command system framework. Likewise, the present study seeks to address the current issues related to the UAE incident command system to identify solutions and necessary improvements in its efficiency and accuracy.

1.2 Research Background

Whenever natural or manmade disasters occur, they damage property and infrastructure, cause human loss, and disrupt both social and economic activities. As a result, resilient societies have started building emergency response structures designed to minimise the impact of disasters and increase safety (Jackson et al., 2010). Despite the resilience resulting from the public awareness of health and safety issues that have taken root in everyday practices, the number of disasters worldwide has grown to a significant extent (Xu and Zlatanova, 2007, Steigenberger, 2016). According to Guha-Sapir et al. (2015) disasters affected more than 141 million people globally in 2014. Consequently, the emergency response systems, in readiness for any disaster, are essential. However, in developing countries such as the UAE, emergency response systems have experienced challenges owing to several factors. Moreover, according to Steigenberger (2016), when disasters strike in developing countries, the severity of damage caused is correspondingly larger because they have less capacity to build and maintain response capabilities.

The sources and physical causes of the natural disasters are quite varied and often specific according to the type of disaster, such as earthquakes, floods, tsunamis, dust storms, tropical cyclones, or an extreme rise in temperature and droughts (Shaluf, 2007, Guha-Sapir et al., 2014, EM-DAT, 2015). According to Thomas et al. (2013), the Asian and Oceania continents are the most affected regions, with approximately 90% of the population suffered from natural disasters and their consequences. With the Arab states in Asia, experiencing seismic events (seismicity) that pose a physical threat of earthquakes and other disasters. Therefore, there is a necessity for these Arab states to pay considerable attention to the operation of a strategic preventative plan to meet the challenges of natural disasters (Dhanhani, 2010). Figure 1.1 below provides an overview of the types of natural disasters that occurred from 1971 to 2010 globally that caused nearly 3 million deaths with massive casualties (Thomas et al., 2013).

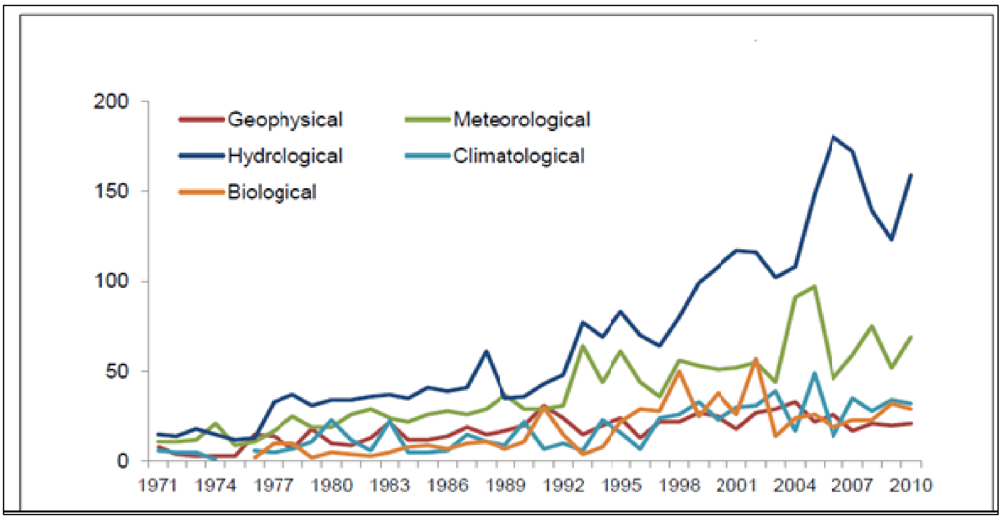


Figure 1.1: Global frequency of natural disasters by type source (Thomas et al., 2013)

Precisely, the UAE is located geologically close to the edge of the Arabian Plate adjacent to the Iranian plateau and close to the Zagros Fault zone, all of which are characterised by seismicity (Wyss and Al-Homoud, 2004). Thus, the UAE is vulnerable to natural disasters such as those experienced in Fujairah, including the Al Qurayah flood in 1995, the Masafi Earthquake in 2002 and 2007, the Al Taiwan landslide in 2005, the Tropical Gonu storm in

2007, the Sharm Flash flood in 2009, and the Ashobaa Cyclone in 2015 (Masudi and Ali, 2015, Kumar, 2013, Kazmi, 2014, Yagoub, 2015). The recent occurrence of such natural disasters provides evidence that the UAE has not yet experienced such a magnitude of earthquakes or flooding over the past long years nor have the historical records registered such disasters. However, the preparedness to deal with such disasters took place in 2012, when the UAE introduced its current system into operation.

According to Owen et al. (2016) emergency events are complex and unpredictable but can be managed by local emergency agencies if the emergency does not exceed their capacity. Emergency response agencies play a crucial role in the reduction of the impact of disasters and emergencies on human lives and property loss, regardless of the magnitude of the disaster. However, to deal with emergency situations effectively and efficiently, the emergency response agencies must take serious steps, such as search and rescue and rehabilitation, to save lives and properties (Subramaniam et al., 2012, Madry, 2015). Noticeably, researchers, governments and emergency agencies are increasingly recognising the importance of response approaches to different types of natural hazards and emergencies (Nascimento and Alencar, 2016). Nevertheless, it is widely acknowledged that there is no perfect way to reduce these negative impacts of disaster (Moe and Pathranarakul, 2006).

In the UAE, the Ministry of Interior (MOI), which is one of the most vital federal ministries in the country, is the overall agency responsible for ensuring community safety by providing security, peace and stability to all UAE community citizens and residents in the event of emergencies and disasters (NCEMA, 2014a, MOI, 2016a). The MOI collaborates with the National Emergency Crisis and Disaster Management (NCEMA), which are both under the supervision of the UAE's Higher National Security Council, which manages disasters by categorising disasters and emergencies into three main levels. Level 1 (national) is the National Security Advisor, and the NCEMA. Level 2 (federal) is led by the MOI, while level 3 (local) is under the Emirate of the Civil Defence General Command (CDGC) (Baliga et al., 2012, NCEMA, 2013). Thus, under the MOI, the CDGC is one of the most vital directorate general departments and is a leading agency for overseeing emergency response operations. It is an immediate respondent in saving people's lives, properties, and sources of national wealth during emergencies.

Although the UAE has an emergency management system is being operated, there is a need for further improvement, as it is still vulnerable to natural hazards that can cause severe destruction. Therefore, an enhancement of the UAE emergency response agencies capacity could have a potential impact on people's lives and the environment. As an element of positive governance, the improvement of critical concepts in emergency management would provide a crucial effort towards the reduction of natural disaster impacts. Perhaps, the UAE can make efforts like the Federal Emergency Management Agency (FEMA) in the USA and the Cabinet Office in the UK, to develop formal incident command systems. Consequently, the UAE emergency response agencies could build an effective and efficient response capacity. For instance, the US's FEMA employs an Incident Command System (ICS), to manage and respond effectively to emergencies at a federal level (Arbuthnot, 2008, FEMA, 2008a, Moynihan, 2009). While in the UK, the formal command and control structures for emergency response capacity are built around a Gold, Silver, Bronze (GSB) incident command system as provided for by the United Kingdom's Civil Contingencies Act 2004 (Kirby et al., 2014, Mishra et al., 2015). Nevertheless, the approach model for emergency response in developed countries is adapted for specific situations in developing nations such as the UAE. Chapter two provides a comprehensive detail of the UAE's natural hazards and the incident command system used to tackle them.

Furthermore, in the UK the practice is a hierarchical, standardised and command system that enhances communication and reduces confusion between emergency commanders, in order to gain more effective incident management (Crichton and Flin, 2002). Notably, the UK's GSB incident command structure has categorised response agencies into two main categories, category 1 responders include fire services, police, rescue, and local authorities, while category 2 includes transport agencies, electricity and gas suppliers (Cabinet Office, 2013a, Devitt and Borodzicz, 2008). The management of the incident command structure's function in a single agency (Category 1) is carried out by three main levels; Gold (Strategic), Silver (Tactical) and Bronze (Operational). Thus, the UK's GSB incident command structure establishes a bottom-up approach, which means that local authorities, without any involvement from Central Government, manage most emergencies. Thus, the UAE could learn to improve its emergency system by focusing on the practices of the USA and UK emergency agencies, where both use a robust command structure.

1.3 Research Rationale

The UAE has been witnessing unprecedented economic growth and social welfare and is currently one of the fastest growing emerging economies. This rapid development is primarily attributed to the oil revenues that boost the UAE as a reputed hub for the international business and trade, resulting in massive urbanization and associated infrastructure development (Al-Awadi and Saidani, 2010). However, the geographical location and geological features of the UAE place the country at risk of a catalog of natural hazards and environmental misconduct, that could lead to cascading effects on the urban population (Yagoub, 2016). Consequently, the combat and mitigation of generated damages from impeding hazards requires an accurate emergency management system.

As previously mentioned, the UAE is vulnerable to the negative impacts of natural hazards mainly due to it being located near seismicity (Al Marzooqi et al., 2008, Alsenaani, 2013, Kumar, 2013). Regarding natural hazards, the significant risks are generated from cyclones and storm surges leading to flooding. Moreover, the threat of earthquakes is also a potential risk due to its tightly spaced and crowded urban areas. Earthquakes have been felt in the UAE most notably in the northeast region, which is close to the Zaragos Fault in Iran (Kumar, 2013, Kazmi, 2014, Yagoub, 2015). For instance, an earthquake occurred on the Masafi in 2002 area, while the northern region also suffered from two non-serious quakes in 2007. These two cases have given rise to considerable concern from experts, who indicate that the UAE might be susceptible to severe earthquakes in the future (Rodgers et al., 2006, Yagoub, 2016).

Additionally, the Tropical Cyclone Gonu had a considerable impact on the Eastern region of the UAE (Kumar, 2013). Recently, the Cyclone Ashobaa generated strong winds and waves in the Arabian Gulf; however, there was no direct impact observed (Masudi and Ali, 2015). These natural hazards have caused extensive damages and failure of emergency response agencies. Many of these hazards have been devastating for the lives of the population and the environments.

Subsequently, it is believed that the UAE’s emergency response system may experience structural problems, which could result in many casualties. The primary emergency response agency that oversees emergency operations is the CDGC, which operates under the MOI. At the operational level, the core responsibility of the CDGC is to analyze and improve the emergency response system. In the UAE, the natural hazards and their likelihood of occurrence were ranked sixth most likely to happen and fifth of severe events (Goby and Nickerson, 2015). Notably, the emergency response agency has previously failed to deal with severe disturbances adequately. Such a failure could be connected to embedded structural problems, and inadequate interagency coordination, command, control, and information sharing. For instance, Dhanhani (2010) indicates that when the MOI dealt with the Tropical Cyclone Gonu in 2007, a lack of knowledge and the mismanagement of responsibility between the tactical and operational levels were observed.

To fill the professional gap in knowledge, this study proposes to identify appropriate solutions of the drawbacks of the present emergency response system, along with mitigating the weak integration and considerable confusion of responsibility between the different agencies. Improving such approaches requires the development of a reliable framework for an incident command system that increases the CDGC's capacity and resilience for dealing with the hazards facing the UAE. This includes identifying, learning, and implementing the best practices for emergency response and incident command systems from countries that have demonstrated their capacity and resilience when handling disasters. This implies that the CDGC is actively looking towards benchmarking its emergency response system with those performing best globally, such as in the UK and the USA. This improvement to the emergency response capabilities at such levels is crucial because it will increase public protection and limit hazards.

Dhanhani (2010) adds that in practice, an emergency entity, such as the CDGC agency fails to perform concerning their responsibilities when a natural hazard occurs, due to a lack of knowledge, experience, or confusion in the command system. This leads to the need for emphasis to be placed on the importance of incident command systems, which could help to improve the capability of emergency response agencies when dealing with hazards that may affect people's lives and the environment. Thus, these shortcomings and challenges are indicative that the CDGC is suffering from some structural problems, which require urgent action to improve its capacities. It is imperative that the UAE's MOI and CDGC agency not only conduct exercises and drills for testing the effectiveness of emergency procedures, but also aim to implement viable strategies to highlight the problems and arrive at potential solutions and increases the CDGC's capacity and resilience for dealing with the hazards facing the UAE.

Although the UAE has implemented the UK incident command system; certain obstacles regarding the operations and outcomes of the adopted system have been identified. A comparison between the UK and the UAE is required because the UAE incident command system is taken from the UK incident command system and has been adapted to meet the UAE's need for an effective emergency system. Therefore, the categories of the system, its advantages, how the systems work, their structure, command approach and how they technically follow the same procedures regardless of their terminology are all identified and provided in this research.

Nevertheless, Abu-Rahma and Jaleel (2017) point out that the UAE's emergency response capacities and resilience problems are partly associated with the differences in cultural dimensions between the UK and the UAE. Thus, while attempting to learn from the UK and US's emergency response system, the UAE must recognise the current national variations such as native sociocultural norms, the governmental machinery capacity and the availability of needed resources. The UAE society has a low rank in uncertainty avoidance compared with the UK community, which has less concern about uncertainty. Moreover, the UAE focuses on short-term planning, that poses a challenge to its effectiveness, contrary to the UK where planning is often focused on long-term effectiveness (Fadol and Sandhu, 2013).

There is also a difference in knowledge and experience regarding management capabilities in the UAE (Bin Taher et al., 2015). Indeed, the UAE differs from the UK and the USA regarding its population profile and demographics. For example, in the UAE most of the population comprises of foreigners (expatriates) who speak different languages, which makes the UAE slightly different in culture compared to the UK. According to the World Bank 2016 census, the UAE's total population was about 9.26 million of which the majority (above 85 percent) are expatriates (The World Bank, 2018). The UAE is ranked in the sixth position of the global areas hosting the largest numbers of international migrants as job seekers with approximately 8.3 million in 2017 (United Nations, 2017).

Seemingly, the UK and the USA have better developed systems concerning the UAE, which is a developing country. Both the UK and USA's incident command systems are significant examples because of their approach to emergencies, which according to Mishra et al. (2015), promote the proper implementation of the command system resulting in better performance during disasters. It is also notable that a priority for the CDGC's emergency agency in the MOI is the adoption of best practices of emergency response. This implies that the CDGC is actively looking towards benchmarking its emergency response system with those performing best globally. In fact, in 2012, the UAE adopted and implemented the UK's incident command structure as a system for responding to different types of emergencies and disasters (Alteneiji, 2015, Khaleej Times, 2015). However, this system needs further customisation to correspond to the challenges of the natural hazards faced, ultimately becoming more UAE specific.

From the UAE's MOI practitioner perspective, significant problems have been encountered in relation to the clear definition of roles, responsibilities, and the commanders' capabilities. This has resulted in confusion when effectively responding to emergencies, which causes significant delays even though the UAE CDGC runs advanced system (Alteneiji, 2015) .Notably, developing countries such as the UAE still lack essential competencies for responding to unpredictable events (Steigenberger, 2016, Madry, 2015). Furthermore, Dhanhani (2010) reveals that although the hazards types were managed in accordance with the best abilities of the local CDGC, the response towards emergencies at the local level remains problematic (Alteneiji, 2015), and the blame is partly due to the government needing to establish and implement emergency management policies (Kumar, 2013). According to Kirby et al. (2014), applying the incident command structure from theory to practice remains enormously challenging. This is because the problem does not only rely on the establishment of a standardised structure, but also about the participants awareness to the emergency responses and response structure (Coppola, 2015).

Remarkable challenges during its implementation include; a lack of situational awareness, ineffective interdepartmental communication channels (Moeller, 2006), an unclear chain of command (Lam et al., 2010), confusion in authority and responsibilities, and failures in command and control (Lamb et al., 2014, Jensen and Thompson, 2016). In the case of the UAE emergency response, the problems noted were related to the personal characteristics among commanders, due to differences in culture between the tactical silver commanders, who were unable to develop an understanding of the hazards (Waring et al., 2018). The tactical silver commanders also lack qualifications as some commanders were selected for their level of commands based on their job positions in their organisation (Uhr, 2017). Such a selection dependent only on position and not on command qualification leads to potential disadvantages when implementing the system and collaborating with other levels of command, leading to a lack of understanding of the bigger picture of emergency settings (Groenendaal and Helsloot, 2016). Incident commanders rarely implement their authority to command, as some incident commanders are more concerned about the details rather than examining the overall situation; this affects their ability to make decisions. Arguably, the rigidness of the conventional hierarchical structure proves to be ineffective when addressing unpredictable situations, especially when it comes to applying the system in practice. Therefore, there is a need for further investigation into evaluating the management of emergency response in practice and the introduction of a framework for the incident command system as a solution (Groenendaal et al., 2013, Owen et al., 2016, Uhr, 2017).

Subsequently, the diagnosis and highlighting classification of drawbacks enables an evaluation of the current emergency response system adopted in the CDGC and is vital to identify and investigate any challenges or barriers. The analysis and comprehension of the effectiveness of the current adopted structure will critically inform the design of a framework for an incident command system to be effective in responding to the hazards the UAE encounters frequently. The framework includes five major factors namely; implementation, organisational, individual, barriers, and drivers. This research will significantly establish and analyse these significant factors concerning the effective implementation of an improved CDGC, which recruits best practices, like those implemented by developed countries such as the UK and the USA. The investigation is also expected to provide an insight for the UAE government, policymakers, and the CDGC agency, in respect of emergency response by highlighting the required improvements for the current applied command structure, which will lead to the protection of international and national investments from human made and natural hazards.

Importantly, the author of this thesis chose this subject matter for several significant reasons. Firstly, it was felt that there was a responsibility for pointing out the deficiencies of the emergency response system in the current structure applied in the UAE’s CDGC agency, particularly as the country is vulnerable to the hazard of future severe, natural and manmade disasters. Moreover, the author has served as an employee in the UAE government for more than 23 years, and from a practitioner’s perspective, there have been significant problems encountered, related to the roles, responsibilities, and abilities of the commanders when responding effectively to emergencies. Notably, insufficient responses to emergencies from the CDGC commanders put the community at a higher risk. The author notes that, since the implementation of an incident command system performs well in the US, the UK, and other European countries (in the developed countries in general), the UAE has experienced a delay in adopting incident command practices. Thus, the rational from studying the UK and USA’s incident command system is that these frameworks can be used for all types of hazards and they form the basis for an effective emergency response system. To this end, the UK and USA’s incident command systems, as developed approaches can help identify places where the UAE’s CDGC agency should improve to harness its performance. Consequently, the findings generated from this study could contribute to the robustness of the UAE’s CDGC agency with the accomplishment of a better performance.

1.4 Research Aim

The core aim of this research study is to develop an incident command system framework based on a feasibility assessment to facilitate emergency response, increase capacity, and enhance resilience of the Civil Defence General Command (CDGC) in dealing with hazards in the UAE.

1.5 Research Questions

The proposed research questions addressing the research problems by focusing on the embedded technical and operational drawback identified in the current incident command system:

1. What are the best practices of incident command systems recognised by emergency agencies in the UAE and in developed countries?
2. What are the current key fundamental factors that affect the implementation of the incident command system within the CDGC in the UAE?
3. How the major factors influence the effective implementation of the incident command system within the CDGC in the UAE?
4. What is the greater role that can be played by the UAE proposed incident command system framework to assist the CDGC agency in different emergency response?

1.6 Research Objectives

The research objectives to achieve the research aim are covered in several parts of the thesis, so that each part can be addressed separately; the proposed research aim specifies what needs to be studied. The proposed objectives seek to complete the knowledge gap identified in current professional practices of the UAE emergency management operations.

To achieve the main aim of the research, the following specific objectives are purposed in order to facilitate achievement and success:

1. To identify and evaluate the current emergency management practice adopted by emergency agencies in the UAE.
2. To investigate and analyse the critical factors and principles of practices, of effective incident command systems in developed countries.

3. To develop a conceptual framework based on the main elements that contribute to the development of resilience focused on the best practices of incident command systems in developed countries.
4. To critically analyse the identified factors of incident command system implementation within the emergency agencies, concerning the CDGC in the UAE.
5. To evaluate a unified incident command system for improving the UAE's incident command system performance during emergency response.
6. To develop and evaluate the proposed UAE incident command system that will facilitate the improvement of the management of emergencies.

1.7 Contribution to Knowledge

Much research has been widely conducted on various natural disaster and emergency management. However, scholarly research studies on incident command systems for emergency response agencies within developing countries context, such as the UAE, are quite limited. Hence, one of the main contributions of this study is to develop a framework that bridges this gap. Secondly, it creates an awareness of the importance of key fundamental factors that affect the implementation of incident command systems within emergency response agencies. Thirdly, it extends previous research on incident command systems by looking at the drivers and barriers of implementing such systems in the UAE context as a case of developing countries. Fourthly, it extends the body of knowledge on disaster and emergency management, incident command systems, and emergency response agencies. In addition, the framework evaluates key fundamental factors of both the UK and the USA incident command systems, which have been under-researched in the literature. Notably, this is the first empirical study that addresses key fundamental factors regarding the application of the incident command system for emergency response services within the UAE context. In the UAE, there is insufficient empirical research regarding the effective use of incident command systems that could contribute to its quality of emergency response. Thus, this study aims to fill a gap in the UAEs' research literature, as an example of a developing country facing similar natural hazard conditions, which could be used within similar contexts.

The research contributes to the practice by proposing a new framework for incident command specifically in the context of the UAE government. The framework will have some features that are proposed to approach and manage major incidents due to its facility to illustrate the main key factors affecting incident command implementation and adoption in the UAE. This is because the framework recognises the most important key factors for command and control systems. Furthermore, the proposed framework enhances multi-agency emergency services, through an analysis of what factors will impact commanders and organisations during their response to emergencies or major incidents. These factors will be taken into consideration to reduce the impact of challenges through the identification of solutions that may enhance emergency response capabilities when implementing the incident command system in the future.

1.8 Research Scope

The scope of this research is limited to examining the incident command systems in developed countries, particularly the GSB (Gold, Silver, and Bronze) in the UK and the Incident Command System (ICS) in the USA, in relation to the UAE's CDGC agency. This study examines the UAE's CDGC agency hierarchy and identifies key factors affecting the incident command system in practice. Specifically, it focuses on CDGC agency (local - level 3) where it aims to identify key factors that affect the incident command system as a unit of analysis in practice. In category 1, it explores incident command levels of response to an emergency at the Gold, Silver and Bronze level. In addition, it involves experienced commanders who are experts in the field of emergency response, mainly those in high positions in the departments of the CDGC agency. This includes the Gold commander, who is either a general director or a director at the civil defence department from each of the seven CDGC departments, and the Silver commander, who is either a deputy director or the head of an operation section at each of the seven civil defence departments.

The analysis concentrates on the incident command system as a current best practice and identifies implementation factors that can affect successful employment and management of an effective emergency response. The investigation is limited geographically to the confines of the borders of the UAE, and it should be noted that the MOI sponsors this study, and thus the findings of the study will make a contribution to the development of the incident command structure used by emergency services in the UAE. However, it does refer to other neighbouring countries where necessary, mainly in clarifying or contextualising issues related to the UAE's emergency response. Furthermore, the UK, the USA, and other European countries are mentioned in relation to the UAE's incident command system.

1.9 Thesis Structure

The structure of the current research study is structured into nine chapters in the following order as shown in Figure 1.2 below:

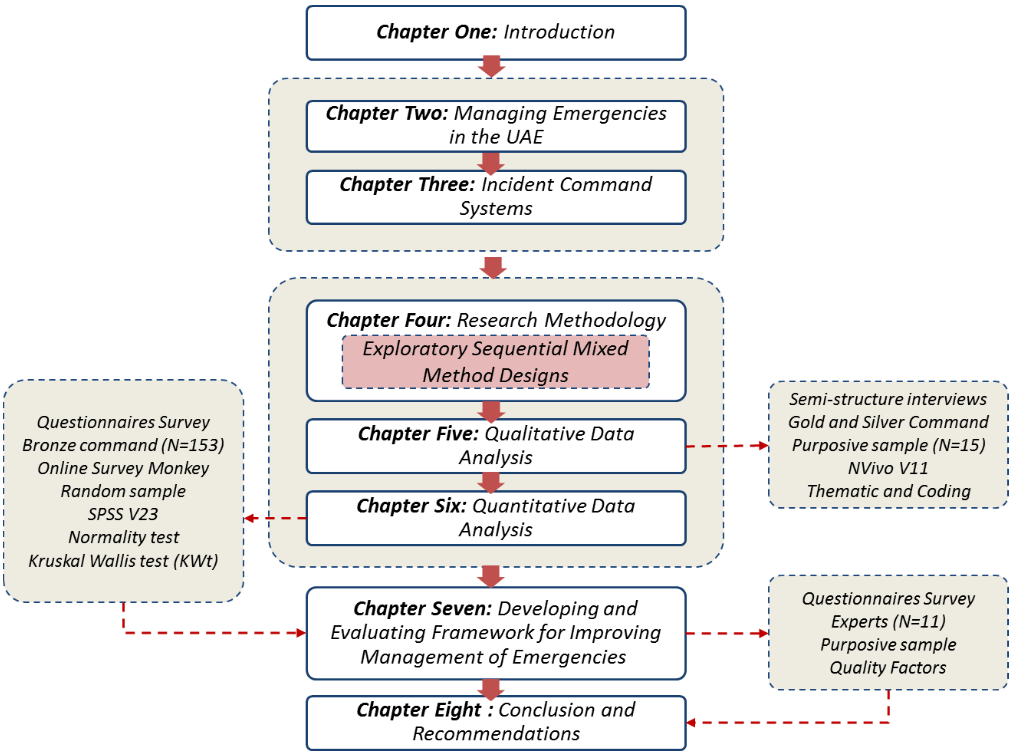


Figure 1.2 Research process

1.9.1 Chapter 1: Introduction

This chapter introduces an outline of the thesis structure, including the background of the emergency response and incident command structures. After gaining an insight into the context of the subject, with the investigation confirming a shortage in the literature available during exploration of the topic, a research rationale is identified. In the next section, the research aim, research questions, and objectives are provided, along with the research's contribution towards existing knowledge and literature. Finally, the structure and design of the thesis are summarised at the end of the chapter.

1.9.2 Chapter 2: Managing Emergencies in the UAE

This chapter illustrates the types of natural hazards and the history of their occurrence in the UAE, by providing details and the history of such threats. An understanding and recognition of the Ministry of Interior (MOI) and the Civil Defence General Command (CDGC) directorate are provided to justify the selection of the CDGC agency as the case study of this thesis. This chapter also contains the roles of the NCEMA and the CDGC during emergency response, with a critical analysis of the available literature on emergency response frameworks implemented in developing countries such as the UAE. The purpose of identifying such literature is to recognise the principal elements, resulting in the provision of an overview of emergency response frameworks being used in the UAE. The purpose of this literature review is to evaluate the current emergency response systems, as well as the best practices of the UAE incident command system and the natural hazards faced by the country.

1.9.3 Chapter 3: Incident Command Systems

Chapter 3 aims to provide a general and specific literature review, to outline the background of the main focus of this research; the Gold, Silver, and Bronze (GSB) command structure being used in the UK, followed by an outline of the Incident Command System (ICS) structure being used in the USA. It also identifies the evolution and up-to-date development of both command structures. In addition, detailed literature about the factor for the implementation of the GSB command structure is provided. Along with the key factors affecting the implementation (both organisational and individual), the barriers faced during the process of implementation, and the drivers of the command structures are detailed.

In addition, this chapter illustrates the process of developing the conceptual framework for the study. It conceptualises a framework in light of the available literature, to explore and investigate the phenomenon in-depth and identify the key fundamental factors affecting the incident command structure in the developed countries.

1.9.4 Chapter 4: Research Methodology

This chapter explains the research methodological approaches undertaken towards the achievement of the research aim and objectives. For the requirement of this thesis, this chapter elaborates the methodological assumption adopted in the study, which is followed by Saunders' research model, the research strategy, research choices, and research techniques. The current study follows the philosophical stance of pragmatism on the basis of the nature of its objectives and research questions. A single case study has been selected as the research strategy to achieve the primary aim. Furthermore, the present study adopts an exploratory sequential mixed method research design, as a method of triangulation, generalisation and use of both qualitative as well as quantitative data collection techniques, which provide an in-depth and breadth understanding and explanation of the problem.

This design starts with a qualitative approach and is then followed by a quantitative approach for the primary research and data collection methods. In the first stage of the sequential mixed methods design, semi-structured interviews are used to collect the qualitative data and identify key fundamental factors, which are the root cause of the stated problem's subject area. Thematic qualitative content analysis is deployed on the qualitative data with the support of Nvivo v11 software. Subsequently, in the second stage of the research approach, an online questionnaire survey is conducted to correlate the quantitative findings. Furthermore, descriptive and inferential analyses are conducted on quantitative data by using the Statistical Package for the Social Sciences (SPSS) v23.

1.9.5 Chapter 5: Qualitative Data Analysis

This chapter analyses the data collected by semi-structured interviews from the Gold and Silver commanders (*n*=15), to extract the qualitative findings. Thematic qualitative content analysis with the support of NVivo v11 identifies the key fundamental factors for the framework, which illustrates the key areas affecting the successful adoption of the incident command system in the CDGC agency. Furthermore, the thematic analysis provides a base for the design and development of a survey questionnaire, used for the second stage of the data collection process adopting a sequential mixed method approach. More importantly, this chapter compares the differences between all the factors of the conceptual framework, compiled from reviewing the literature and the responses of the semi-structured interviews.

1.9.6 Chapter 6: Quantitative Data Analysis

This chapter presents the quantitative findings of the survey questionnaire, which collected data from the Bronze commanders (*n*=153) of the incident command system in the CDGC emergency agency. Furthermore, the quantitative data is analysed using the Kruskal Wallis test (KWt) technique to identify any significant relationships between the incident command key factors (dependent variables) and the CD departments, academic qualification and job position (independent variables) within the UAE through the SPSS v23 software package.

1.9.7 Chapter 7: Developing and Evaluating Framework for Improving Management of Emergencies in UAE

This chapter discusses the findings extracted from both primary data sources (qualitative and quantitative) in light of the reviewed literature. The fundamental findings from the analysis of the semi-structured interview data, as well as the survey questionnaire data, are discussed and explored to achieve the aim of the study. Each factor from each analysis section is discussed, to identify the key areas and develop a proposed framework for the CDGC agency in the UAE. The incident command framework will be developed based on the results of the survey questionnaire and validation from experts. Finally, the validated incident command framework is presented to be adopted for the CDGC agency of the UAE, to improve the emergency response process.

1.9.8 Chapter 8: Conclusion and Recommendation

In the final chapter of the thesis, conclusions are drawn to achieve the aim and objectives of the study on the basis of empirical findings. This chapter explains the research limitations and elaborates the recommendations for the CDGC agency in the UAE, in accordance with the research findings. Finally, the key contribution of the research towards existing knowledge and recommendations for future research, are suggested at the end of the chapter.

1.10 Chapter Summary

It has been observed that in spite of the well-equipped and well-trained UAE civil defence agencies, commanders may still lack the knowledge and experience that their counterparts have in developed countries. The incident command system was implemented in the CDGC, so that different response agencies could come together in the spirit of open-minded collaboration and build mutual understanding and cooperation. In order to do so, there is a need to establish clear lines of command and responsibility. As a result, the incident command system can provide a categorised and ranked hierarchy, which provides clarity and accountability to officers and their staff. This study is aimed at providing a better understanding of the clarity of command, so that confusion and conflict among local emergency response agencies, as well as local and regional multi-agencies can be avoided. Any level of minimisation in this confusion can lead towards increased efficiency in emergency management and the provision of a solid foundation for progress. Nevertheless, additional steps are needed to increase, enhance or improve the capacity of emergency response agencies in the UAE and deal with its manmade and natural hazards. This study has discussed the gaps in the emergency response phase in general, and the implementation of the incident command system in the CDGC in the UAE in particular.

Emergency response through a standardised incident command system is part of the UAE's current government strategy, although it is not yet developed enough. In this manner, what is sought with the execution of this research is to design a unified and articulated incident command system framework for emergency response in the UAE that allows an improvement in the attention made by the MOI institution to be able to standardise emergency response procedure and have adequate management of resources.

CHAPTER 2 MANAGING EMERGENCIES IN THE UAE

2.1 Introduction

This chapter provides a detailed background of the UAE and explains its demographics, potential hazards records, and information about current emergency response practices and levels. In addition, it sheds light on the Civil Defence General Command (CDGC) incident system, as well as discussing how to improve the public awareness towards emergency response activities to mitigate or reduce the hazards caused by humans or nature.

Globally, the significant increase in emergencies and disasters has necessitated the deployment of strategic responses to deal with the consequent dangers posed by these calamities. Indeed, governments are responsible for deploying federal schemes to augment their nation's readiness for these tragedies. Inevitably, all countries, whatever their level of development, have emergencies. However, the latest trends point to an increase in their frequency and magnitude, as the triggers of the main threats are gaining ground and the vulnerability of populations is exacerbated by different dangers. Consequently, the preparation, effective response and recovery of emergencies are among the most urgent challenges facing the international community. Therefore, their administration can have a significant impact on state and civilian preparedness through measures such as the endorsement of funding initiatives, the development of new policies and the initiation of new programmes.

Furthermore, a calculated response to an emergency requires a detailed understanding of the environmental issues related to the causes of disasters for facilitating an effective reaction. As mentioned previously, the UAE possesses minimal experience in managing natural disasters adequately, as has been recognised during the past occurrences, due to a lack of accumulated expertise and available data built up from lesson learned in this domain. Therefore, the UAE imported the incident command system from the UK to assist in managing such emerging environmental problems as those recently witnessed. Thus, this chapter also addresses the operational experience issue of the system through discussion of the physical geography and geology, along with any potential human factors involved in the emergency practices of the system. Accordingly, this chapter will identify the role of the CDGC agency response to natural hazards and emergencies in the UAE. The purpose of this literature review is to evaluate the current emergency response, as well as the best practices of the UAE incident command system and the natural hazards faced by the country. This also examines the role of the CDGC agency in the management of emergencies and its efforts in customising the imported UK incident command system to adapt to specific environmental features. Nevertheless, such modification and customisation of an imported incident system could be applied to similar disaster condition in developing countries.

Additionally, this chapter aims to provide the readers with some background information about the UAE by explaining both its demographics and its geographical location particularly regarding the eastern part of the country closer to the areas under the seismic belt that make the country vulnerable to natural hazards such as earthquakes, tsunamis, and floods. Furthermore, it will discuss the UAE's potential hazards, current emergency response practices and levels, and its CDGC incident command system. Highlighting the need to increase and improve the capacity and resilience of the CDGC towards emergency response activities in order to face or reduce hazards caused by either humans or nature by following and applying the international standards of emergency response to such destructive hazards.

2.2 The United Arab Emirates (UAE) Background

The United Arab Emirates (UAE) is one of the Middle Eastern countries located in southwest Asia, to the east of the Arabian Peninsula, bordering Saudi Arabia in the west, Oman in the southeast, and Qatar in the northwest, it lies between the Arabian Gulf and the Gulf of Oman, along its southern side is the 60 km wide Strait of Hormuz (El Chaar and Lamont, 2010, Basha et al., 2015). Therefore its location can be divided according to its two main oceanographic regions, the Arabian Gulf coast and the Gulf of Oman coast (the Indian Ocean) (Jordan et al., 2005). The coastline of the UAE, bordering both the Arabian Gulf and the Gulf of Oman, totals approximately 1318 km (Alsenaani, 2013, Hamza et al., 2011). The Arabian Gulf is about 1000 km long and 200-300 km wide (Kumar, 2009). The majority of the coastal areas in the UAE are located along the Arabian Gulf to the west side of the Strait of Hormuz (Jordan et al., 2005). As mentioned previously, the UAE is located near the margin of the Arabian plate that is closer to the area of the seismic belt, thus making it became more prone to natural disasters.

The name of the UAE derives from the fact that it became a seven-emirate federation on the 2nd of December 1971. The seven emirates are Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaimah, and Fujairah. Abu Dhabi is the capital and second largest state. The official language spoken there is Arabic, and the religion is Islam. The country covers about 83,600 sq. km, including a number of islands (See Figure 2.1 below) (MOI, 2013, Al Abed et al., 2008).

Figure 2.1: UAE Location Map source (Alsenaani, 2013)

2.3 Socio-Demographics of the UAE

The United Nations (2017) approximated that the total population in the UAE was 9,400,145 by mid-2017 with immigrants comprising of more than 88% of the entire population. The World Bank (2018) estimates that this population has increased to 9.54 million in 2018. In 2017, 72% of the population was male, whereas the remaining 28% was female (United Nations, 2017). An analysis of the population by age found that 65.9% of the population was between the ages of 25 and 54 years, whereas the age group of between 55 and 64 years formed 5.7% of the entire population. Most of the UAE population are between 25 and 54 years, which could be attributed to many of the immigrant population of working age. The population distribution by emirates showed that Abu Dhabi had the highest population of approximately 4.1 million, followed by Dubai and Sharjah at 1.72 million and 1.53 million respectively. While, Ras Al Khaimah had 0.95 million people, followed by Fujairah and Ajman with populations of 0.67 million and 0.38 million people respectively. Umm Al Quwain had the lowest population with 0.19 million people (United Nations, 2017). Approximately 86.1% of the population live in urban settings. The predominant religion is Islam whose members form 76% of the population. Christians make up 9%, whereas other religions form 15% of the population (Cordesman, 2018). Arabic is the official language of communication in the UAE. However, other languages such as English, Urdu, and Hindi are also used (Raddawi and Meslem, 2015).

The number of international immigrants has increased rapidly; in 2000, the UAE was ranked 15th among the top twenty countries hosting international immigrants with 2.4 million. This number had increased to 8.3 million in 2017, causing the country to be ranked in the sixth position. The United Nations (2017) also reports that approximately 8,313 international migrants moved to the UAE in 2017, bringing the total proportion of immigrants to 88.4%. The UAE is characterised by an open economy that records a high per capita income and immense annual trade profits. The country, which boasts of a great international trade standing and large public funds invested in real and fiscal assets, is the centre for international trade in the Gulf area. The UAE is bestowed with enormous oil and gas resources and ranks eighth among the biggest oil producers globally. Around 90 % of oil production in the UAE takes place in Abu Dhabi (Shayah, 2015).

2.4 Background to Hazards in the UAE

Despite this improvement, there is still a considerable concern as to the capabilities of the emergency response infrastructure, specifically the organisational capacity of the CDGC agency when responding to the various hazards that the UAE potentially faces. The following section discusses these types of hazards in more detail.

2.4.1 Earthquakes

The UAE has witnessed earthquakes of moderate intensities over the last 30 years. As it is located in an earthquake region, that is affected by different seismic sources, most notably a source in the region of southern Iran (Mwafy, 2012). A major source of high magnitude earthquakes to impact the Arabian Peninsula region is the Zagros Fold Belt in Iran (Kumar, 2013). Notably, the UAE is more exposed to natural hazards than other Middle Eastern countries (Wyss and Al-Homoud, 2004). The Zagros Mountains comprise of a folded belt that extends for about 1500 km in a northwest-southeast direction along the western part of Iran (Malkawi et al., 2007). Located near the edge of the Arabian Plate and close to major causes along the collision zone, the UAE is close geographically to Iran and lies to the south of one of the most active zones in the world (Wyss and Al-Homoud, 2004).

Therefore, the UAE is not safe from the hazards of earthquakes. The highest intensity recorded was a magnitude of 5.1 on the Richter scale, which happened in the Masafi area in 2002 (Yagoub, 2016). The Zagros Fault had previously caused an earthquake in the northern region of the Emirates in Masafi, reaching a degree of 5 magnitudes on the Richter scale (Kumar, 2013). According to Al-Shaqsi (2015), figures relating to seismic activity in the UAE and Oman show that the frequency of earthquakes occurring in the Eastern region of UAE is very high.

In 2013 a severe earthquake, measuring 6.3 on the Richter scale hit the western coastline of Iran and was also felt in the UAE. The earthquake’s shockwaves reached Abu Dhabi, Dubai, and Sharjah. Ultimately, there were no casualties and no damage to property (Kazmi et al., 2013). Moreover, more recently, in 2014 an earthquake measuring 5.1 in magnitude struck Qeshm Island in Iran. The shock was felt deep into Abu Dhabi and Dubai, although no damage or casualties were reported (Kazmi, 2014, Yagoub, 2015). In summary, many important towns and villages in the UAE are in earthquake zones; notably in Fujairah and Masafi. Thus, the evidence demonstrates that the UAE as a region has been, and will most likely continue to be, subjected to natural hazards. Even though the tremors have a small magnitude, their succession has become a crucial topic in research, which has necessitated additional assessment from topographical, geological, engineering and communal standpoints.

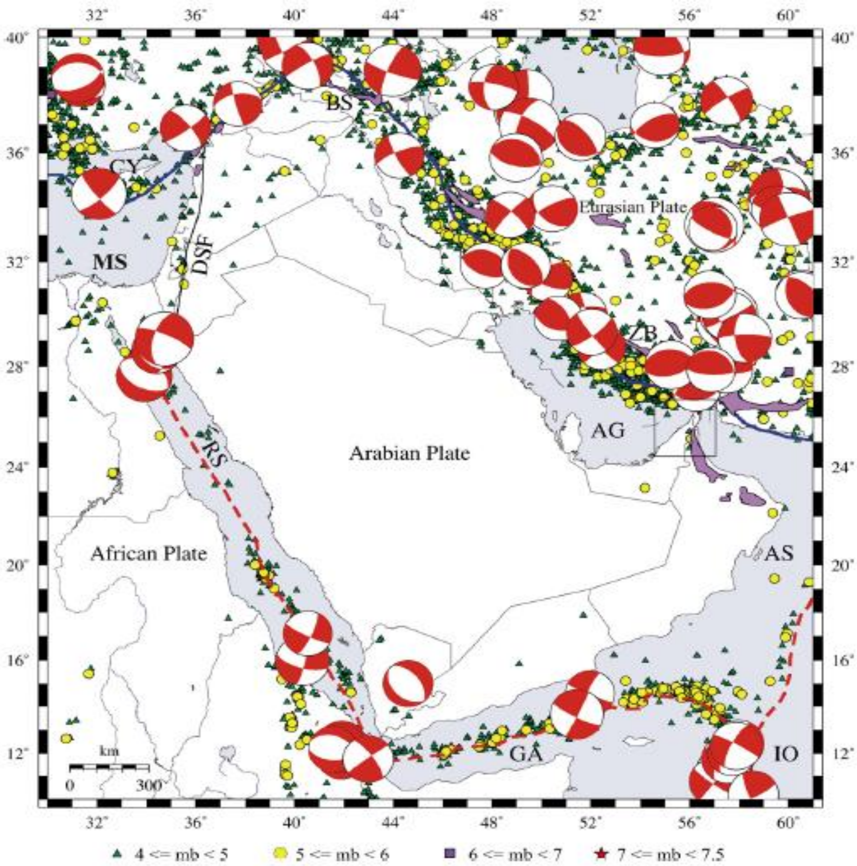


Figure 2.2: Seismic earthquakes in the UAE from Zagros Belt (Al Marzooqi et al., 2008)

2.4.2 Tsunami

Tsunamis pose another significant problem within the UAE, as they continue to claim half of all recorded losses; as well as being the cause of floods and earthquakes, which have the potential to damage the country. The term ‘Tsunami’ derives from Japanese, and describes a sea wave produced by a large scale event causing a disturbance under the ocean over a short time frame (Jordan et al., 2005). A sudden movement in the ocean floor can be triggered by landslides and earthquakes (Heidarzadeh et al., 2007). Tsunamis are gravity water waves, which usually cause high loss of life and property damage in coastal areas. In 2004, the largest Indian Ocean tsunami in Indonesia off the northwest coast of Sumatra, which occurred because of an earthquake with a magnitude of 9.0 on the Richter scale, resulted in more than 225,000 deaths within a few hours, leaving about a million people homeless (Geist et al., 2006). Within approximately 7 hours the resulting waves reached the UAE coast, but only produced small waves with minor effects (Jordan et al., 2005).

Formerly, the Arabian Peninsula countries were thought to be safe from tropical storms. However, the cyclone Gonu provided evidence that these natural hazards can occur in the Gulf of Oman. In 2007, the cyclone Gonu struck the Arabian Peninsula and was recorded as the most powerful cyclone since the Makran earthquake that occurred in 1945. The Gonu caused a significant amount of rainfall, estimated to be 27 times more than the average annual rainfall in Oman. The cyclone had a significant impact on Oman’s infrastructure, economy, and community, costing an estimated 4 billion dollars, 49 lives, and left more than 20,000 people homeless (Al-Shaqsi, 2015). More recently in 2015, authorities in the UAE had to deal with the cyclone Ashobaa. Although Ashobaa made strong winds and waves in the Arabian Gulf, there was no direct effect of the cyclone on the UAE as it went further south and impacted Oman (Masudi and Ali, 2015). This literature highlights that the recent and severe cyclones of Gonu and Ashobaa have pointedly raised the issue of climate change, and the recognition of the Eastern region of the UAE being exposed to natural hazards.

2.4.3 Climate Change

Climate change could have a significant impact on rising sea levels, affecting the growing number of inhabitants living in coastal areas, through exposure to the risk of flooding (UN/ISDR, 2004). The rise in global temperatures is causing glaciers to melt in the coldest regions of the planet, and the water released causes rising in the sea level (Alsenaani, 2013). According to the Climate Change 2014 Synthesis Report further global average surface temperatures will rise meaning that globally sea level rises are expected in the future (IPCC, 2014, Westra et al., 2013).

Currently, in the UAE, the average annual temperature in summer is between 28°C and 49°C. Whereas in winter, between December and March, an average 70% of rainfall occurs. In the Eastern region, floods can occur resulting from heavy rainstorms, such as cyclones (Alsenaani, 2013). According to UN/ISDR (2004), hydrological hazards, especially floods, are the most common type of natural hazard, affecting many people. Therefore, arguably, erosion and flooding due to the rise in the sea level and storm events pose a severe threat to cities in the UAE. With the rise in sea level is likely to be one of the most significant aspects of climate change affecting the country.

2.4.4 Dust Storms/ Shamal

Dust storms are a commonly encountered environmental hazard in the Arabian Peninsula and Arabian Gulf countries, taking place frequently during the year (Prakash et al., 2014, Hamza et al., 2011). A variety of problems can be triggered by dust storms, such as reduced visibility that could lead to an increase in the level of traffic accidents, damage to satellite telecommunication systems, air pollution, and breathing related diseases, such as asthma and cancer (de Villiers and van Heerden, 2011, Gherboudj and Ghedira, 2014). In addition, these hazards can affect aviation and transportation, resulting in airport shutdowns, that can lead to delayed departures and sometimes accidents for the affected aircraft (Basha et al., 2015, Prakash et al., 2014). The Arab Gulf and Middle Eastern countries suffer from a collection of large volumes of dust particulates in the atmosphere, and the UAE, in particular, suffers from dust storms during several months of the year, with their peak occurrence being during May and August (Basha et al., 2015, Prakash et al., 2014).

A Shamal is a sand storm that frequently blows on the Arabian Peninsula. Shamal is an Arabic term used to describe the dust storms but translates into English as North. de Villiers and van Heerden (2007). p, 340 define the Shamal *"as a north to north westerly wind with a mean hourly speed of 17 kn, or more that blows for at least three hours in a day"*. In 2012, the UAE was affected by a dust storm, which covered a large area and disrupted human activities. Consequently, many airports were closed, because of the impact of the dust on visibility (Prakash et al., 2014, Basha et al., 2015). Shamal winds are responsible for most of the dust storms that occur and recently these unstable weather conditions that hit the UAE in December 2017 resulting in heavy flooding.

2.5 Overview of Managing Emergencies in the UAE

Several studies have reported on the hazards mentioned and have also indicated the potential for these disasters to reoccur in the future. The UAE is suffering from many natural hazards, such as earthquakes, tsunamis, climate change, and dust storms (Kumar, 2013, Alsenaani, 2013). Unfortunately, there is a shortage in the statistical database concerning national natural hazards that have occurred in the UAE (Al Khaili and Pathirage, 2014). It is usually expected that countries prone to the vulnerability of natural disasters have implemented arrangements to respond to these challenges. These arrangements consist of operational and functional capabilities that can be used to respond to coincident emergencies. Within the UAE context, the urgency of establishing emergency management policies is high since the immediate impact of the various hazards on the community is critical. Thereby; the emergency agencies in the UAE have the responsibility of planning and implementing these policies within an emergency response framework to respond to these hazards.

2.6 Current Emergency Response Practices in the UAE

The UAE has seen recently seen a period of rapid economic development and is among the fastest growing economies in Asia. This development is due to the growth of industrial, trade and oil revenues that have led to considerable improvements in the UAE’s overall infrastructure (The World Bank, 2018). As indicated above, with the increase of vulnerability to hazards, the UAE government has established the National Emergency Crisis and Disaster Management Authority (NCEMA) under the Supreme Council for National Security. The purpose of the NCEMA is to coordinate and unify the efforts of the local, federal and national emergency agencies and combat threats at the local, federal and national level (NCEMA, 2007). In this context, the definition of resilient cities emerges. Resilience is the ability of a system, community, or society to maintain or recover its functionality in the event of a disruption. Therefore, a city is resilient when it has the property to ensure its functionality so that the people who live and work in its territory, especially the most vulnerable, survive and thrive regardless of the occurrence of extreme events (Brogt et al., 2015).

According to NCEMA (2013), emergency management protocol agencies include key ministries and organisations that carry out certain roles and responsibilities based on their specialities. The Ministries of Foreign Affairs, Health, Environment, and Water and Electricity municipalities are among these key organisations. The MOI supervises the role of the CDGC agency to prevent an emergency occurring or reduce its impact. A federal plan is set out by the CDGC agency to manage the disaster with particular reference to the MOI, this reflects the lack of clarity among the roles of government entities, and there is confusion regarding the competency and responsibility between the federal and individual Emirati institutions. Therefore, the NCEMA uses "Taware'e wa Azamat, - Crisis and Emergencies" a quarterly magazine, to serve as a communication bridge between the authority and other administrative establishments as well as between the various segments of the UAE community. It has also formed partnerships with other agencies to facilitate timely responses to emergencies (NCEMA, 2018). The introduction and identification of emergency response current practices in the UAE raise the question of whether the emergency response activities comply with the NCEMA protocols in terms of responsibility, comprehensiveness, participation, capability, communication, resilience, and continuous improvement. This question reflects the ability of incident commanders to respond effectively to major or minor incidents as suggested by the SOPs. Consequently, investigating emergency response activities in the UAE will highlight the strengths and weaknesses of the emergency response steps.

Another key factor is the immediacy of action, which contributes to the management of the effects of an emergency and ensures stability after an event occurs. The term emergency describes a hazard or incident which is sudden and unexpected and causes massive problems to people, property and the environment. According to Haddow et al. (2014) a hazard is typically any emergency event with negative consequences, that requires one or more local emergency services such as the police and fire agencies to respond. Although emergencies can be man-made or natural, in reality, elements of both types are usually inter-related. However, most of the literature characterises four main phases for Emergency Management (EM) by: mitigation, preparedness, response, and recovery, as shown in Figure 2.3 below (Baird, 2010).

Emergency response is the immediate response to actions that are taken to save lives and property; it involves crucial activities such as search and rescue, shelter provision and medical assistance (Madry, 2015, Wex et al., 2014). It is the most complex phase compared to the other EM functions, as it includes high stress, extremely pressurised time, and limited information (Coppola, 2015). Hence, it can be observed that the term emergency response refers to events or situations that can be managed by a local agency through the process of standard operational procedures (Altay and Green, 2006).

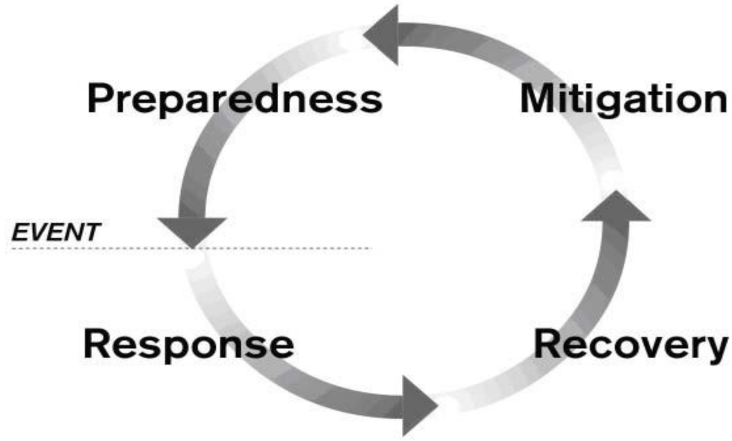


Figure 2.3: Emergency management lifecycle source: (Baird, 2010)

For the purpose of this research, the response phase is the focus because it is the stage that covers all of the required activities needed to save and maintain human lives. This stage is indeterminate, as it can last for days or many months, depending on the severity of the event. It is also deemed the focus of this research because as a disaster unfolds, the first responders are usually local police and civil defence fire services, not state or federal agencies. Their roles and responsibilities are to secure the location scene, save lives, minimise damage to property and the surrounding environment and start the process of restoring order. Consequently, this research will focus on the response phase, to reduce the impact of the hazards on the search, rescue and emergency relief services. Furthermore, this is a phase where critical decisions should be made by the responders.

In the context of the UAE, a response is defined as: *"All procedures taken as a result of an emergency, a crisis, or a disaster, mitigating their effects and offering aid and support for society"* (NCEMA, 2007, p.19). This definition emphasises the continuity of the applied procedures by emergency agencies in order to reduce the impact of disasters and support society. That is to say, the development of an emergency management process was determined to place the UAE at the forefront of developed countries. Some of the proposed strategies include establishing the prerequisites of business endurance, permitting quick recovery through collective planning and synchronising communication at the national and local levels. A National Response Framework (NRF) was also developed following the inception of the NCEMA to oversee response standards and appraise all activities related to emergency management. The NRF was developed by the NCEMA to comply with the international standards in the context of disaster management, effectiveness, and performance. This framework calls for collective participation and cooperation between individuals and agencies when faced with the challenges and emergencies (NCEMA, 2013). The UAE's NRF has response principles that are aimed at ensuring the efficiency of the emergency response organisations toward mitigating disasters. Table 2.1 illustrates the key principles of the UAE NRF for managing emergencies.

Table 2.1: NCEMA National Response Framework (NRF) (NCEMA, 2013, p.9)

Principles	**Context**
Responsibility	Organisations at all levels, including governmental, local and non-governmental are responsible for ensuring readiness. Agencies need to develop emergency plans and understand their roles and responsibilities, by taking part in training and exercises.
Comprehensiveness	All threats and hazards should be planned for, regardless of their magnitude and type.
Participation	Strong coordination across response agencies is required, including shared objectives and common understanding of roles and responsibilities.
Capability	Response agencies should strengthen their capacity to ensure effective response to all types of emergencies.
Communication	Emergency response should be supported by effective communications systems, common procedures and protocols to ensure the right information is conveyed to the right person.
Resilience	Emergency response encourages the use of innovative, scalable strategies to build the capabilities necessary to address the challenges associated with complex emergencies.
Continues improvement	Lessons should be drawn from previous events, training, and exercises, in order to improve emergency response

Emergency and disaster management has recently evolved within the UAE with great ambition to practice emergency management effectively on the ground. The establishment of the NCEMA has helped to organise the field of emergency response, which had limited documented materials and literature. However, firstly, the NCEMA has exercised effective guidance in the field of disaster management and has demonstrated endless success through the accurate review and examination of reports and procedures used in practice. Secondly, published literature from the UK has been exploited and applied as the UAE emergency response framework, and standards are the UK rooted. The similarity between the two frameworks provides a similarity in emergency response procedures.

Moreover, the UAE's NRF principle is similar to the UK principle (Cabinet Office, 2013a, McMaster and Baber, 2012). The first principle is responsibility, which means that all organisations (both governmental and non-governmental) have the mandate of being ready and prepared for emergencies. In accordance with the responsibility principle, all emergency response teams at service will be obligated to participate to the extent of their abilities and facilitate training in self-protection and emergency action plans. Whilst assuming the functions that they are assigned in the application of the incident command system. The idea behind this training is to find the weak points and to improve them. By having an adequate emergency plan, one can reduce the impact generated by catastrophic events. The principle is similar to the preparedness principle of the emergency response in the UK that seeks advance readiness to deal with emergencies. Equally, a lack of preparedness in basic emergency response units will weaken emergency response activities such as planning, control, consultations, rescue procedures, coordination and incident organisation. This means that the management in place requires experience that is correlative with involvement, skills, and planning. As the service must seek balance through the development of management mechanisms, that allow the use of the available resources with maximum efficiency and effectiveness. However, a disturbed and disorganised environment, along with the working conditions in which the rescue professionals are placed, such as stress, physical exertion and excessive work rhythm, tend to make the emergency response somewhat mechanised and impersonal, thus hindering the emergency response team from fulfilling their professional roles technically.

The second principle of comprehensiveness stipulates that risks should be planned for regardless of their scope, similar to that of the UK's anticipation principle. However, an absence of road map documentation towards hazard management and its further preparedness framework constitutes another weakness in the context of the CDGC agency in the UAE. As this lack of documentation has resulted in a lack of contingency planning, which must be presented in the initial definitions, and it is around this that the entire emergency management is set up. Initially, it is important to establish the policy and objectives and goals for the incident command system in the CDGC agency. The policy can be defined as a set of means that achieve the desired effects, that is, the objectives. In this way, the policy provides the framework for the establishment and critical analysis of the objectives. For this, it must be appropriate and sufficient considering the nature, scale and potential impacts foreseen for the activities, products, and services. Furthermore, the objectives should complement the other objectives of the CDGC and should always be measurable, containing information such as: where are we; what one needs to improve; how much one wants to improve; and even when this outcome is expected to be achieved.

The third principle of participation underlines the need for sharing information and resources among organisations that respond to the emergencies. According to Flin et al. (2008) exchanging information between command levels is an essential part of communicating effectively during a task. Having a good incident command to assess information will support emergency services decision making to ensure public safety. The NRF framework of the UAE forms a framework for interoperability that seeks to ensure all aspects work together towards achieving emergency tackling. In major incidents, the collective efforts at local or federal levels are critical to the success or failure of the emergency management process. In this way, the CDGC must ensure the continuous identification of tasks, the assessment of hazards and the determination of the necessary controls.

Another principle applied in the UAE framework is the capability to ensure effective response to all types of emergencies. Capability for emergency response includes actions to be taken to manage emergencies for minimising the risks and reducing health consequences by involving the necessary actions in a timely response (Kapucu et al., 2009). Knowing the hazard consists of the identification of threats and vulnerabilities, as well as the resources available for emergency management. Consequently, it is possible to prepare for known threats and develop responsiveness more efficiently and effectively.

Communication plays a key role among emergency team members during emergency situations. As command levels through the exchange of effective communication during emergencies contribute to a successful decision-making process, which assures public safety. The transfer of information between the different command levels requires a great deal of resilience and training because the faster the information is communicated, the quicker the response is made. Indeed, the quality of information plays a primary role in the decision-making process and effective emergency response. However, the rate of response from emergency agencies is attached to the availability and flow of information. Therefore, within this framework, emergency agencies need to gain information, with communication being an essential component in emergency response. Thus, effective communication provides clear instructions on the current status and guidance on measures that require immediate action. The efficient direction of communication is one of the main challenges of public power during the calamity process. In this sense, the quality of information focuses on warning of the imminence of a disaster, the planning of relief work and support to victims, rehabilitation and the reconstruction of the affected areas.

To build and enhance the resilience for all types of emergencies in the UAE, a recovery capacity must be established to improve the system or make the systems return to their original state. These actions can and should be considered, allowing for their implementation time, and those that aim to restore vital systems to support minimum operational standards should be prioritised and implemented in a timely manner. For the CDGC, the ability to recover is associated with business continuity. The capacity for emergency response should be proportional to the identified scenarios and may mitigate their impacts on people, the environment and property. The definition of the necessary response and resilience is accomplished by looking at information on the expected consequences of the scenarios, along with vulnerability analysis, always considering the history and lessons learned from the organization's responses and others with related activities.

For the development of disaster risk reduction actions in any area of activity, it is fundamental to know and characterise local conditions by identifying specific regional aspects that allow preparation to avoid or eliminate risks, maximising the capacity of an emergency situation (Kapucu et al., 2009). The prevention, preparation and response planning of the impacts of these events on the population, whether of natural or anthropogenic origin, are essential and are the object of action of the emergency response team involving the promotion, surveillance and health care. Therefore, proper human resource preparation is required to maximise the capacity of the emergency. The training of the agents constitutes a preparatory action that creates operational conditions for the execution of the response (Subramaniam et al., 2010). This preparation includes activities geared towards the development of capacities, tools, and mechanisms that allow beforehand an adequate and effective response to disasters, such as early warning systems and the evacuation of populations in areas of hazard, in collaboration with other institutions of society.

The principle of improvement highlights the process of “know how” emergency response, which has been implemented and demonstrates how this implementation can be continued to achieve the aims of an emergency response process. More importantly, the results obtained in the phases and stages of the incident command system must be duly recorded, documented and evaluated, and then the improvement actions indicated should feedback to the entire system, assisting in the evaluation of the policy and the previously established objectives. The information will then go through a circuit of planning, implementation, measurement and evaluation, critical analysis and improvement. It is fundamentally important to establish methods based on the monitoring of the indicators and on the suggested actions for improvement to measure effectiveness.

2.7 Emergency Response Levels in the UAE

In the UAE, the MOI is responsible for providing security, peace, and stability to all UAE community citizens and residents. Furthermore, it is one of the most vital federal ministries in the country. Since the establishment of the UAE on the 2nd of December 1971, considerable attention has been directed towards its national security. This attention has led to an expansion in the responsibilities undertaken by the MOI, with the result that security and safety have become noble objectives for the government to achieve (MOI, 2016a). Subsequently, on the 25th of June 1972, the MOI of the UAE was issued according to the Cabinet Decree No.1, which defines the MOI's roles and duties (Alaajel, 2005). The MOI adopted a seven-point strategy to achieve key objectives. Two main key points of the strategy relate to ensuring readiness in times of emergency and disasters, and the second key strategy involves delivering the highest levels of safety for civil defence (MOI, 2016b).

With regards to the level of readiness, this is dependent on the complexity of the incident and the preparedness of the various local, regional and national bodies. Thus, it is concerned with Institutional strengthening and development which refers to the policies, systems, and processes that are designed to organize and manage developmental policies and objectives, including disaster risk reduction. The Leadership strategies for capacity development seek to increase the leadership capacity of individuals, groups, communities, and organisations. With knowledge referring to the measures available to develop capacity for knowledge creation and growth, through education, training, informal and on the job training, knowledge transfer and responsibility, which determines the approach that the commanders and rescue teams take when dealing with their obligations.

In the UAE, the emergency level is split into four stages that are dependent on the extreme nature of the occurring disaster (NCEMA, 2013). Emergency level four is usually coded green. This means there are low levels of danger associated with it. This level of emergency exists when a single local agency handles the incident with the support of one or more local lead agencies such as the CDGC. Level three, which is coded yellow, means that the danger is just above level four. This level of emergency exists when a leading federal agency such as the MOI supports one or more local emergency response agencies in managing emergencies. While emergency level two means that there is a high possibility of danger. It is usually coded as orange. This level means responding to a series of emergency events, of a potential continuous impact, and requires support from multi-federal agencies. In this level, all major emergencies are controlled and supervised by the NCEMA. The highest level of emergency is emergency level one. This level is coded as red. At this stage, the situation has continuous large-scale consequences and requires immediate support at the top national level to respond to the emergency. To this end, emergency specialists agree that there is a casual relationship between the lower level and the next higher level emergencies as illustrated in Figure 2.4.

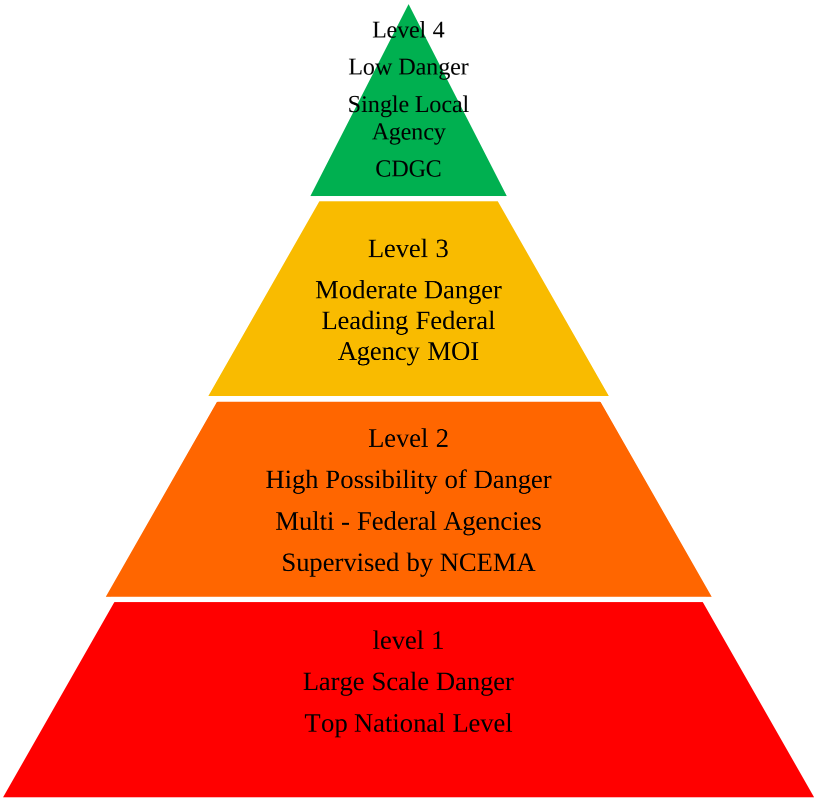


Figure 2.4: Emergency response levels in the UAE

Within the UAE's NCEMA protocol, emergency response to a disaster depends mainly on the level of the emergency. There are three categories of emergencies which are level-labelled and based on the type of incident and the emergency agencies involved in the emergency response process (NCEMA, 2013). The local level response is associated with a level four emergency. The federal response takes over when it is deemed that the emergency has reached level three. Through the lead federal agency, the disaster is mitigated under the supervision of the NCEMA. The National response in the UAE is responsible for responding to a level one emergency. This is the most extreme emergency situation which requires top-level clearance for any reactions to it. It is the most severe form of emergency that can be recorded. The emergencies classified under this level have the potential to quickly spread and have devastating impacts. Accordingly, the NCEMA framework is considered as a comprehensive management process which defines potential threats and the impact of these threats on individuals, the society and at the national standard. The identification of the possible threats assists emergency organisations in improving organisational resilience and effective responses that will assist in protecting the interests of individuals, societies and the country. Nevertheless, enhancing greater resilience and stability requires investment in institutional and governance capacities, with a focus on the management of emergency and the strengthening of preparedness and response capacities. It also requires the recognition that hazard reduction, prevention, preparedness, response, recovery, and development are directly related to each other.

Finally, it was noted earlier that the study focuses on local level response agencies and their role in emergency management within the emergency response management protocol of the NCEMA and the NRF. The involvement of local level response agencies is based significantly on the severity classification of disaster and the capacity of the local emergency agency to deal with emergencies. However, local level emergencies can be managed by the CDGC agency and all activities of response to emergencies, which do not exceed the capacity of the CDGC. On the other hand, the federal and national response requires a response from multi-agencies that exceed the capacity of the local level.

2.8 Civil Defence General Command (CDGC) Incident Command System

The Civil Defence General Command (CDGC) is one of the most vital general directorates departments within the UAE's MOI. One of its roles includes the creation of emergency planning for disasters. The CDGC of the UAE is an emergency management organization, whose goal is to ensure that the UAE is among one of the safest nations worldwide. The Supreme Council for the Federation issued decision No (4) in 1976, which established the CDGC (GDCD-D, 2015). This decision charged the CDGC with protecting the public, ensuring safety and protecting sources of national wealth during emergencies and disasters across the emirates. Furthermore, this was in accordance with the UAE Federal Law No (23) in 2006, the Cabinet decision No (24) in 2012, and the MOI decision No (505) in 2012, concerning the civil defence services (MOI, 2012a, MOI, 2012b). The CDGC is also tasked during emergencies to form teams needed to carry out response and relief operations for the restoration of normal life in all affected areas. This includes research and development into new tools and techniques to improve its capabilities (GDCD-D, 2015). In addition, the CDGC is a leading agency overseeing emergency response operations, by managing multiple agencies, such as the police and ambulance services which act as support agencies (NCEMA, 2014a).

The CDGC deals with the safeguarding of human lives, public and private property, as well as the provision of help during global disasters. Apart from safeguarding the well-being of individuals, which is the primary source of livelihood in the UAE, that needs to be protected (WAM, 2016a). It mainly deals with fire emergencies all over the country. Although, the role of the CDGC is not only to deal with fires alone but with all types of emergencies. Hence, the importance of working closely with the MOI, the NCEMA and other response organisations to deal with all types of hazards and achieve its objective of protecting the lives and property of residents. The emphasis on better response services was also reported by the Chief of the CDGC agency at the MOI, who indicated in a report by WAM (2016b) that the importance of leadership and a human element in emergency response, along with the development of commanders is one of the main pillars of progress in developing a response infrastructure.

The human factor is critical in response to emergencies. indeed, leadership and command skills amongst the CDGC officers are developed through collaboration in training with three top response training schools in the world namely: the Canadian, the British and the Singaporean governments (NCEMA, 2014a). Thus, in the UAE, the Federal and local agencies that are specialised in emergency management, also need to follow specialised scientific research and review the international practices available for effective emergency response (NCEMA, 2017). Officers who are eligible for nomination to the key position of Gold command are listed as the major general and strategic heads of the Dubai Civil Defence. These positions hold strategic roles, which are defined as the overall executive command of all concerned agencies, including the fire, police and health departments (CDGC, 2015b). The Gold commanders manage all resources within their jurisdiction and create strategies for the incident response. Nonetheless, tactical decisions are delegated to the Silver command, whose main role is the strategic supervising of the incident response. Operational commanders and Senior Managers of the Dubai Civil Defence are eligible for appointment to this position. The Silver command takes charge and is liable for devising the tactical scheme to be followed by their service to attain the strategic goals. Additionally, the Silver command is expected to oversee and provide any operational responses to the Bronze commanders without any direct involvement. Therefore, the Bronze command is the third in rank in the incident command system. Officers in charge of crews and stations and qualified operational majors are eligible for appointment to the Bronze command. These officers serve operational roles such as the provision of emergency responses in close scenes and the management of resources related to the services provided.

The decision-making process of the Bronze command is provided based on eight considerations. These include the situation at hand, the tactics required, additional assistance in terms of resources, the safety needs, the teams required for supervision and deployment, a review of the plans, updating the plans based on the situation and the mandatory requirement for dynamic risk assessment before committing teams (CDGC, 2015b). On the other hand, the decision-making process of the Silver command involves describing the incident, assessing life risk, estimating hazards, determining the control measures as well as the taken actions and services isolated, resources requested and their location, other agencies involved in the rescue mission, the mode of operation and the most recent message delivered to the control room. The decision-making command of the Gold command is similar to that of the Silver command apart from the requirement of a brief from the Silver commander. Thereafter, a specific order of instructions is followed. The generic decision-making process follows three main rules of identifying the problem, considering the available options and making a decision.

However, the SOPs file, which is the only evidence concerning the implementation of the incident command system in the UAE's CDGC, has limitations. The SOPs file only addresses the role of commanders and does not mention any key fundamental factors affecting the incident command system implementation. Furthermore, there are insufficient articles available on the adoption of the incident command system in the UAE. Therefore, it is impossible to pinpoint the exact issues encountered in the implementation of the incident command system. However, the SOPs file shows numerous similarities between the UAE and the UK GSB systems. For example, the strategic, tactical and operational levels of command in the UAE system are typical to the UK system. However, there is an element of bureaucracy in the UAE command system, which is evident in the need to affirm the person in charge when taking over command. Bureaucracy is a distinguishing characteristic of the US ICS system, which has been associated with a number of shortcomings as reported by Jensen and Waugh (2014).

The UAE government supports civil defence commanders to enhance creative abilities among emergency force community. The CDGC provides a chain of command that clearly demonstrates the functional hierarchy of commands within the civil defence departments. The organisational structure for the CDGC is illustrated below in Figure 2.5 (CDGC, 2016). The

CDGC consists of seven civil defence departments distributed geographically across the seven emirates of the UAE. The largest four Director Generals of; Abu Dhabi, Dubai, Sharjah, and Ajman, have considerably larger manpower and resources than the other three Directors but these larger departments serve a much larger population as well. The CDGC headquarters are located in Abu Dhabi, the capital of the UAE. Each of the seven emirates has its own civil defence department, which plays a role in the emergency response at the local level. All civil defence departments are coded as "CD" followed by a serial number; "CD1, CD2, CD3, CD4, CD5, CD6 and CD7".

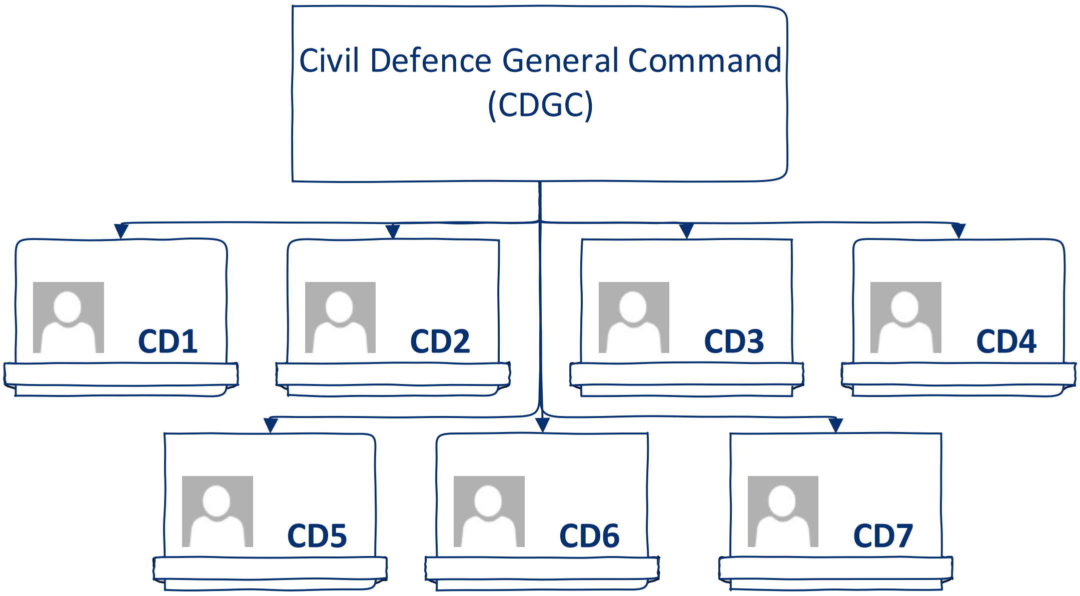


Figure 2.5: Organisation structure for CDGC source (CDGC, 2016)

Due to considerable business development in the UAE, the emergency response infrastructure must have the capacity to protect international and national investments from both manmade and natural hazards. As it was indicated previously, the UAE faces several environmental hazards, and this is expected to rise in the future (UAE GN, 2014, UAE GN, 2016). Thus, there is a need for continued efforts when responding to these disasters, with an exchange of global experiences between developed countries, that indicates the advantages from best practices and a comprehensive preparedness to deal with all the phases of emergencies and disasters. In response to the improvement of the UAE's CDGC practices against natural incidents and to change the real and historical tendency of the occurrences of certain incidents, it is necessary to adopt several measures and actions. These measures will enable the country to adapt to emergencies so that the incidents cause the minimum level of damages, in addition to facilitating the maintenance of an acceptable level of operation and structure. Such a change aims to stimulate local governments to invest in increasing resilience through the adoption of a set of essential steps that can be implemented by the civil defence authorities and emergency commanders and contribute to sustainable local development in conscious way.

2.9 UAE Civil Defence Standard Operation Procedures (SOPs) Manual

As a result, the CDGC has adopted best practices from the UK of the incident command system to address emergencies and disasters based on international best practices and prescribed benchmarks, enabling it to achieve a better response to incidents. Offering the best response in emergencies is a core responsibility of the CDGC, and commanders at all levels are required to adopt clear roles and responsibilities to deal with different types of emergencies (Khaleej Times, 2015). In accordance with this role, the General Directorate of Civil Defence Dubai has prepared unpublished documents describing best practices and standard operating procedures (SOPs). These SOPs establish incident command procedures, in order to safely and effectively achieve specific operational objectives within critical timescales (CDGC, 2015a). In addition, they also provide SOPs for various levels of command: Gold, Silver and Bronze (CDGC, 2015b).

The use of the SOPs is crucial to attaining the primary goal of the MOI, which is to guarantee preparedness by offering a fast and efficient response to all hypothetical emergency circumstances in the UAE. The guide controls leadership and decision-making regulations in all instances and phases. It also highlights the value of procedural underpinnings for calamities, emergencies and disaster management and as one of the Civil Defence's major strategic objectives, it facilitates quality responses, develops leaders and plays a role in the advancement of human resources.

The availability of clear, accurate and simple procedures clarifies the roles of each leader or participant in all stages of addressing incidents and calamities. This information is valuable to rescue teams as well as firefighters. In addition, it makes up the organisation's institutional work at management, managerial and policymaking levels (Khaleej Times, 2015). The SOPs guide also includes the tenets, standards, and values that should be adhered to by firefighters and other members of the response team. The standard exemplifies a scientific approach to integrating team and leadership roles in various incidents and makes it possible for leaders to appraise individual and team operations based on assessable measures and defined markers, which enhance work values and facilitate a scientific appraisal of the plans in the field. Furthermore, the plan gives a regulatory role-making for collaborative actions in major emergencies based on a proactive and detailed disaster management approach.

From a civil defence viewpoint, the guide's objective is to direct emergency management leadership at the accident location by pursuing precise goals for safe and effective outcomes within reasonable time frames as other corresponding emergency services proceed with their operations . Operational command at the scene of the emergency should be flexible enough to respond to the nature of the incident, its magnitude and extent of severity. Each team at the site is expected to have someone charged with ensuring the management and safety of the group. In this regard, all members of the civil defence team should receive training to help them recognise and evaluate the hazard machinery, which facilitates the development of an adaptable and safe strategic plan to handle all possible hazards.

The SOPs guide was implemented towards the end of 2012 following a succession of classes, exercises and preparation workshops, which were conducted in all civil defence departments in the UAE and were attended by managers and their teams. The directory contains various crucial leadership elements, and a multi-stakeholder command system is employed. Three main hierarchical grades for field leaders exist Gold, Silver, and Bronze. Bronze is the primary and lowest level of command. In the occurrence of an accident, a civil defence commander, who is at the Silver level of leadership is expected to assume leadership onsite following an accident. However, if the magnitude of the accident is beyond the decision-making capacity of the Silver level, management should be transferred to the Gold level, which is the highest level. This command is set in motion when the involvement and assistance of several establishments are needed to mitigate the crisis. Nonetheless, the Gold level of command is hardly ever used. Its main roles include scheduling, guiding and articulating hazard management schemes.

Despite its responsibility, the majority of employees working in the CDGC department are police officers, as evident from their rankings and qualifications, although they take on different roles from those employed at police headquarters, which are also within the jurisdiction of the MOI. However, the main hindrance encountered by the CDGC when reacting to natural hazards is the lack of national government legislation, along with the level of qualification required to influence operational emergencies. Qualification is understood as the capacity to face unforeseen events (Young et al., 2013). To this end, the CDGC in the UAE is oriented towards unforeseen actions or events that require a continuous acquisition of skills. This definition insists on emphasising the fact that competence, defined as assuming responsibility, is a social attitude, before being a set of professional knowledge.

Therefore, in order to increase competence in the CDGC, it is necessary to create the best possible conditions for rescue teams to accept responsibility. It also implies the need for creating the conditions for its command structure to delegate a part of their responsibilities. Lamb et al. (2014) note that when emergency commanders must make suitable decisions, they tend to visualise the situation from what they have learned from experiences and previous training. Yet, being qualified to command differs from being capable of commanding, if the individual has finished the course, and the qualification has been awarded, the commanders still need to apply their learning in true situations, in other words, the commanders require qualifications and experience together to support their decisions in their response to emergency incidents.

In a study conducted by Alawadhi and Udeaja (2018), it was noted that an apparent lack of research regarding the dissemination of good practices across the emergency agency was an obstacle to enhancing resilience. The rationale for this research and the main reason for undertaking it is based on the need to improve the emergency response structure in the UAE, by investigation of the application of the incident command structure in the CDGC and the identification of the gaps and barriers that occur during response to emergencies and natural hazards.

It has been observed that the SOPs do not outline the factors used by commanders in extreme events, rather they emphasise a better understanding of what constitutes extreme emergencies and the relevance of examining the incident command to deal with them. More simply, SOPs suggest certain practices for every level of disaster through the so-called incident command system, which assumes certain responsibilities to certain organisations. In the face of dealing with an emergency, one of the factors that can influence the rapid and adequate beginning of intervention is the self-confidence of the commander present at the moment of occurrence. The organisation of SOPs makes commanders the central element in this process. Consequently, incident commanders must have acquired the knowledge and skills to deal with emergencies in an immediate and systematised way, to implement and evaluate the outcomes of the interventions considering them by priorities.

One of the major factors that have affected the implementation of the CDGC command system is the identification of roles and responsibilities during the natural hazards within the system. The pedagogical strategies should facilitate the integrative construction of knowledge, reflexive observation and experimentation by immersing oneself in the incident, so as to transmit security to the various actors. The construction of knowledge, reflexive observation and self-emersion in incident treatment requires the identification of roles and responsibilities of the teams involved in the emergency response activity. It is evident that the identification of these roles and responsibilities are overlooked when natural hazards occur (Kumar, 2013). Indeed, this means a vagueness of how the incident command system operates and how it constitutes to a better understanding. This especially occurs when there are uncertainties or unique emergencies; as the SOP's prevent innovative ideas and insist on taking the usual practical steps to deal with the incident (Penton et al., 2013). The devastating impacts of emergencies on the lives of the population and the environment have created the need to study the implementation of the emergency response system and the incident command in the UAE in order to find the gap between the theory and practice in emergency response.

The CDGC plays a major role in saving people's lives, properties, and sources of national wealth during emergencies. This includes responsibility for managing emergencies via operational command and control. However, issues in command and control and leadership during emergency management raise major concerns (NCEMA, 2014b). Accordingly, the sequenced impacts of hazards suggest effective emergency management procedures in terms of command and control and emergency leadership. To this end, it can be concluded that there is evidence of some barriers being identified during the response of the CDGC to the Gonu cyclone, which had a considerable impact on the Eastern region of the UAE; where these limitations represented a lack of cooperation between commanders. According to Dhanhani (2010) the CDGC's response to the Gonu exposed a lack of shared knowledge and experiences at and between the tactical and operational levels. Hence, there is insufficient shared historical experience or repository of skills to deal with the confusion of responsibility, that often arises between different agencies and federal structure as demonstrated during the Gonu incident.

Furthermore, there are other issues concerning decision making and limitations in the information, that constitute barriers when dealing with incidents and problems in the CDGC's incident command system. On New Year's Eve 2016, a vast fire incident occurred at The Address Downtown hotel in Dubai city centre. The Address Downtown hotel fire had the potential to have a considerable impact especially on the international image of Dubai, as there were thousands of revellers attending the New Year's Eve celebration which was also being televised live worldwide (BBC, 2016). According to WAM (2015), although the civil defence units managed to contain the fire and evacuate the area, there were 16 people injured with some suffering medium injuries due to smoke inhalation.

The most challenging issue during the immediate response was the multiple decisions made by the emergency commanders to solve a problem. Sarwat (2016) points out that in the most difficult issues, multiple decisions were considered by emergency commanders on how the crew would safely get into the building with all their equipment, evacuate everyone and put out the fire quickly before it spread. As a consequence, the situation required effective coordination between the responders under intense time pressure entailing critical decision making (Subramaniam et al., 2010). These decisions were affected by vital factors, like the uncertainty that was caused by the limitations of information about the emergency. Furthermore, time pressures resulted in an urgency to make a decision from a commander as soon as possible (Kapucu and Garayev, 2011). In most, if not all the incidents, the CDGC was one of the primary category 1 units tasked with responding to the emergency.

Within the UAE's CDGC context there are problems concerning the selection of commanders and their positioning within the command structure, thereby, unqualified commanders may recruit sensitive leadership positions. However, inevitably, a lack of standardised nomination procedures could bring the wrong person to the wrong position. The literature has pointed out that the selection process depends only on position rather than on command qualification, which will result in disadvantages in the collaboration process between the incident commanders and thus, may lead to a misunderstanding concerning treating incidents (Uhr, 2017, Groenendaal and Helsloot, 2016). In incident response, incident commanders rarely surrender their authority to commands because they are importantly concerned with incident details rather than detailed explanations about the incident, a matter which affects the decision-making process. To this end, the situation may bring confusion in authority and responsibility or misunderstanding and unavoidable failures in command and control during the practice of the emergency response process (Lamb et al., 2014, Jensen and Thompson, 2016). Hence, these limitations in implementing the command and control procedures raise major concerns and require further investigation.

It is noted that good CDGC practices include role arrangements for commanders to manage emergencies, while it focuses on the amendments of barriers and limitations in terms of roles and responsibilities. Given the fact that the emergency response system in the UAE rarely pays attention to the incident command system, this has created a gap which gives urgency to conduct this research to improve the CDGC capacity for managing emergencies. More importantly, it is urged that the size of support required by the CDGC agency to prevent the consequences of hazards is challenging to determine. Hence, it is essential to understand from previous arguments that there is a lack of commander's qualification, a lack of coordination between commanders and a lack of nomination standards for emergency response such as the incident command system, which is all evident in the current practices of the CDGC agency.

One such deficiency which refers to a gap in implementing the emergency response system is the absence of the documentation of the incident command system procedures to respond to emergencies. This general understanding reveals a lack of system evaluation, although the SOP's provide guidance for the best practices of command and control standards. This gap not only limits effective response for emergencies but also limits the ability to initiate an effective capability building process. Thus, the procedures of emergency response should determine mechanisms for sustaining and utilising lessons learned from past practices, which become essential to ensure better arrangements for a future emergency response framework for the CDGC.

Finally, the literature review and case study have identified some gaps concerning the current practices and arrangement for the command system during emergency response. The first gap is that the CDGC lacks sufficiency in mitigating the impacts of emergencies and it lacks effective response to an emergency. Indeed, the importance of the incident command system is firstly, to justify its relevance to the effectiveness of the emergency response process and secondly, to identify the gaps in its implementation in the UAE context. The reasons for this gap being identified in the incident command system may vary. It is also evident that the UAE incident command system is still at its early stages and requires more evaluation, which will enable the CDGC agency with a mandate to respond to incidents and learn lessons from past occurrences and international best practices in the field.

Therefore, this research has identified crucial gaps which strongly support the need for recommendations to help in improving and implementing the incident command system in the CDGC. Despite these gaps, it is fair to assume that the nature of events and challenges have also made current practices less effective. Within the scope of gap identification as per the previous documents and case study, it is possible that there are a few more gaps to detect in chapter three. Hence, further investigations are to evaluate the incident command system's current practices to understand the context of the system better. The outcomes of evaluating the CDGC current practices are also crucial for identifying best practice in the current system that may be used as a mechanism for lessons learned, as well as drivers for advancing an effective system for dealing with future emergencies. However, despite the improvements witnessed in the UAE at the emergency management level, emergency response systems still need to pay considerable attention to building capacity and capabilities of emergency management in the UAE.

From the above discussion, the UAE will face potential future hazard stress, and there is a need to address and minimise the risk of natural disasters and to investigate key challenges facing emergency services when responding to an emergency. In short, as discussed above, in recent years the UAE has developed significantly, and the community of the UAE has then suffered from natural hazards. As a result, these hazardous aspects were taken into consideration in response to incident command system implementations that took place during emergencies in the UAE. From this review, it is evident that emergency response preparation and investigation of the incident command system are crucial to the success of countries and their economies because they help circumvent many disasters.

2.10 Chapter Summary

This chapter reveals some related information about the UAE and explained in depth its demographics, potential hazards, current emergency response practices, the emergency response levels in the UAE, the CDGC incident command system, and the need to increase and improve awareness towards emergency response activities, in order to face, mitigate or reduce hazards caused by humans or nature. The incident command system in the CDGC in the UAE has been explained in order to understand its nature and mechanisms. However, there is limited information concerning the implementation of the incident command system in the UAE, which identifies a knowledge gap in the application of this country's system. Common problems include difficulties transferring the operations from theory to practice, delays in structure settings, communication setbacks and inadequate qualifications and experience. Notably, key lessons learned from this review can confirm efforts to improve these emergency response systems.

CHAPTER 3 INCIDENT COMMAND SYSTEMS

3.1 Introduction

This chapter attempts to accomplish the second research objective in this research study (to investigate and analyse critical factors that are influencing the effective implementation of the incident command systems used in emergency response in developed countries). It attempts to explore implementation factors for adapting and identifying the key organisational and individual factors, barriers and drivers of the Gold, Silver, and Bronze (GSB) implementation in the UK, and the Incident Command System (ICS) applied in the USA. Both countries are advanced in emergency response infrastructure and their command structures are recognised internationally, this is one of the reasons why the CDGC agency adopted the UK's GSB structure. In addition, as indicated previously in chapter one, when comparing both the GSB and ICS literature, a lack of research into the UAE incident command structure was identified. Hence, this research attempts to study the subject further, in particular with regards to it is implementation in the UAE. Furthermore, although the CDGC agency has adopted it as a structure for command and emergency response, this command system has not been investigated yet.

Consequently, to achieve the third research objective of this study, which is to develop a conceptual framework for the requirements of emergency response using case studies based on the best practices of incident command systems in developed countries, key fundamental factors, barriers, and drivers need to be identified. The generated results will assist in proposing a set of recommendations, with the purpose of introducing an effective command structure for improving the current emergency response system. This chapter explores the GSB command system in the UK and the ICS in the USA, identifying the types of implementation, organisational, individual, barrier and driver factors that can be faced during the implementation of the structure. These factors are proposed and justified through a detailed review of the emergency response literature. Furthermore, these factors will be adopted by the researcher to design an initial conceptual framework detailing how the incident command system should be implemented in the CDGC agency.

To begin, the research project started with a process of searching for articles from multiple databases such as Emerald Insight, ELSEVIER, EBSCO, Science Direct, Web of Science and Google Scholar. Besides, government documentation from the UK authorities being reviewed, such as the Cabinet Office, HM Government, the London Emergency Services Liaison Panel

(LESLP) and the National Policing Improvement Agency (NPIA). In addition, from the UAE, the National Emergency Crisis and Disaster Management Authority (NCEMA), the 'Taware'e wa Azamat' magazine (in English), sufficient newspaper articles and websites were also reviewed. In order to cover a large proportion of research articles, the search concentrated on keywords to meet the criteria, that included: 'Gold, Silver and Bronze Command', 'Emergency Response', 'United Kingdom', 'United Arab Emirates', 'United States of America', 'Command and Control' and 'Incident Command System' in different countries.

3.2 The Concept of Command and Control

The term 'Command and Control' (C2) originates from the military domain, and it refers to the management of personnel and resources. The command and control are decision making processes, which include vital tasks such as planning, directing, coordination and control functions. This structure has been designed to ensure that the commander has the ability to plan, analyse and make decisions to accomplish missions on the scene (Liao, 2000). As mentioned previously, different emergency agencies such as the police, fire and health agencies coordinate in the case of an emergency. Commanders are represented from these agencies, with the officers aiming to prevent and reduce death and damage through the command and control of efforts (Van Der Haar et al., 2014, Van Der Haar et al., 2017).

According to Stanton et al. (2008) the command and control activities can be categorised and may contain monitoring, organising, directing, communicating, and controlling sources to manage incident (Sommer et al., 2017). Thus, the principle of C2 has become a similar approach to management in many types of organisations. Consequently, the concepts will work efficiently outside the military C2 domain (Wallenius, 2002). Hence, command and control are vital concepts in the UK single agency emergency response, with the concepts of C2 often referred to as the Gold, Silver and Bronze levels in a single agency (Cabinet Office, 2013a). The C2 is considered to be crucial terminology for organisations concerned with responding to emergencies (Crichton and Flin, 2002). Nonetheless, many attempts have been made to identify a standard of the term (Arbuthnot, 2002) and several authors in the literature have argued about the definitions of C2 and what it really means.

Command involves the exercise of the legal authority and responsibilities of the emergency commander, or an agency to make someone do something (Coppola, 2015). It requires a high level of experience and decision-making skills (Crichton and Flin, 2002). According to

Arbuthnot (2002) command is defined as *"The authority for an agency to direct the actions of its own resources (both personnel and equipment)."* In very simple terms, according to Coppola (2015) command refers to an authority to make someone do something.

Control, on the other hand is more about gathering information and monitoring function. It is about keeping things on track as a process of the management of control and power (Herath, 2007, Crichton and Flin, 2002). Thus, control refers to structures created by the command to manage risk. It also refers to the power of direction and the limits of command authority of people and organisations or other decision makers (Coppola, 2015). It is used to ensure all participants will do what an organisation wants them to do, and will not do anything that the organisation does not want them to do (Herath, 2007).

The command and control function is carried out through sets of interrelated elements that develop the necessary actions to provide the command. The set function is involved in developing the knowledge of the situation, constituting the necessary support for decision-making, the transmission of orders and the control of their execution with the relevant knowledge of the situation, in order to exercise the authority and direction that constitute the necessary support for decision-making and, in turn, fulfilling the target mission.

3.3 The UK Organisation of Incident Command System

The principal issue in managing an emergency effectively is the inter-organisational coordination required between participating agencies because of a lack of a structured authority, as has been indicated in the past literature. From the 1980s, the academic community has made great efforts in the development of the incident command structure, that defines the roles and responsibility of the emergency agencies (Chlimintza, 2008). In the early 1980s, urban public disturbances in the UK mainland brought new challenges. As a result, the need to review service responses for dynamic situations was required by the police. One of the main outcomes of this review process was the development of the GSB command structure based on the premise of the military command and control system (Pearce and Fortune, 1995).

The management of emergency response and command and control structures that function in a single agency are carried out by three main levels of Gold, Silver, and Bronze (GSB). Whereas, the structure of a multi-agency is known as the Strategic Coordination Group (SCG) and refers to the Gold Group. While, the Tactical Coordination Group (TCG) level, refers to the Silver Group. Although, the operational levels may be organised differently in exceptional circumstances (Cabinet Office, 2013a). Within the three main levels of command and control in each organisation, there are specific commanders, who coordinate the strategic, tactical and operational groups effectively (Chlimintza, 2008). One of the advantages of the GSB approach is that it utilises different agencies in complex situations, and the clear responsibility of each, allows the information to flow across different agencies, subsequently delivering an overall strategy in an effective manner (Kirby et al., 2014). However, there is some disagreement that the centralised command and control structure is less effective than the decentralised coordination structure, and that it provides flexibility among emergency agencies (Groenendaal et al., 2013).

It is important to note that, the Civil Contingencies Act 2004 categorises responders into two main categories. Category 1 responders have responsibilities to prepare emergency plans, advise and inform the public in an emergency event, and enhance coordination with other local responders (Cabinet Office, 2004). They include police services, fire and rescue authorities, health protection agencies, local authorities, and the environment agency (Cabinet Office, 2013a). Whereas, category 2 consists of organisations such as the transport agency, electricity, gas suppliers, telecommunication providers and other agencies (Devitt and Borodzicz, 2008).

Responding to any emergency in the UK at the local level is a basic building block. The concepts are based upon the individual agencies' responsibilities, through local resilience forums, emergency services, and local authorities. Both category 1 and 2 will participate in the event of an emergency within its area (Cabinet Office, 2013c). The UK's command and control principles are flexible enough to be used in a wide range of emergencies (Cabinet Office, 2013a).

Notably, a single agency possesses an authority to operate the command and control function over their personnel. Nonetheless, no single agency practices the command and control authority over another single agency. Although, multi-agencies can exercise the coordination function between the involved agencies activities, but not a command function. However, as shown above, the UK's (Gold, Silver, Bronze) system is considered as a standardised command, control and coordination operation, that is used to manage emergency responses, disasters and planned events effectively. The GSB is a fundamental management approach that adopts a standard format allowing response managers to identify key incident concerns, intervention priorities, and objectives. Commanders operating under this framework are introduced to a system known to be flexible and scalable for all hazards, that provides a common response framework appropriate for all events, regardless of size. In other words, it presents a set of organisational best practices for emergency management. The GSB has a proven record of accomplishment in the domain of emergency response and disaster management. It also improves the management of interventions by leveraging a combination of facilities, equipment, human resources, procedures, and communications within a typical organisational structure.

Consequently, this research will only concentrate on the command and control function as it applies to a single local agency, whereas the coordination function applies within the multi-agency response. As indicated, the level of command, control, and coordination are defined based on the types of emergencies that are either single or multi-agency response.

3.3.1 Levels of Command in a Single Agency Gold, Silver and Bronze (GSB)

Three are three primary levels to structure the command and control in a single agency level. However, one of the three levels of Gold, Silver, and Bronze (GSB) will typically be implemented and take place (Cabinet Office, 2013c). The three layers of the command in the GSB structure define the roles of the commander at each level and do not depend on the rank within agencies. Across the UK, whether the response generated is small or large scale emergencies, the levels of command are used for both multi-agencies and a single agency. Therefore the emergency agencies are familiar with the three levels of command and with the roles and responsibilities of each level (Eyerman and Strom, 2008). It is a basic structure for cooperation and leadership management during emergencies. Although coordination and facilitation are provided by regional level, the actual response to emergencies will remain at local levels, for the most part, 'Blue Light' services such as the police, fire and ambulance services (O'Brien and Read, 2005, Mishra et al., 2015). According to Kusumasari et al. (2010) there is a global understanding that local agencies play a significant role in emergency response operations.

As indicated previously, the term GSB means three common structures of command, which have been used in response to emergencies as alternatives military levels of command (Ministry of Defence, 2007), with each level having responsibility for strategy, tactical and operational activities. As mentioned, these levels of command are used across the UK for all scales of local emergencies, and the agencies are familiar with all roles and responsibilities (Eyerman and Strom, 2008). The Gold (Strategic) is the level where decisions are made and it is a boundary phase between the emergency response agency and the main governmental organisation, which is responsible for providing resources and logistics. The Silver (Tactical) is the level where the allocation of resources is responsible. The last level is the Bronze (Operational), which deals immediately and directly with responding to the emergency (Alexander, 2008, Mishra et al., 2015). As shown in Figure 3.1 below.

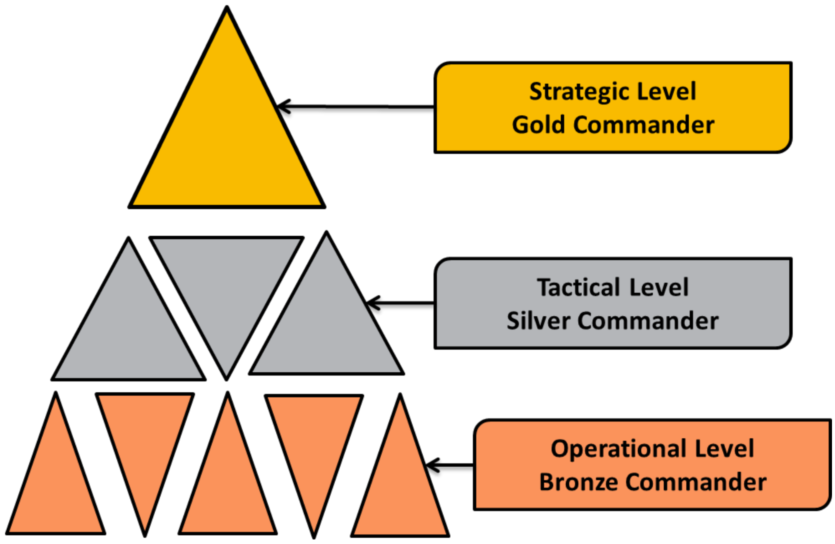


Figure 3.1: UK GSB command structure adopted from (Mishra et al., 2015)

The concept relies on the relationships between the three levels, as the effectiveness of the coordination will be determined according to the links between the structures as a whole (Pearce and Fortune, 1995). The GSB command structure is used to describe staff leadership, and it categorised roles and responsibilities. Nonetheless, according to Chlimintza (2008) tensions between the three levels of command can arise. In the study of Chlimintza, interviewees asserted that determining suitable tactics from silver command had failed, which had led to the passing on of the silver responsibility to the bronze command.

Given these points, the level structure of the GSB system allows effective and efficient management of incidents through the integration of a combination of facilities, equipment, personnel, procedures, and communications, for operation within a typical organisational structure designed to enable this type of incident management. A basic premise of the GSB is its broad applications. It is used to organise both short and long term operations at field level for a wide range of emergencies, from small to complex incidents that are either natural or human-made. The incident command framework (the proposed framework) of this thesis is a combination of the US's ICS and the UK's GSB systems. It is promoted to be used by all levels of the governmental entity at national, state, local, or institutional levels. It is also to be used by many private and non-governmental organisations in the UAE without replacing the structures as defined for emergency management.

The Figure 3.1 above illustrates the UK GSB command structure in a single agency. The subsequent subsections will demonstrate a few examples of the three GSB roles and responsibilities at each level.

3.3.1.1 Strategic Gold Commander

Most emergencies may involve only operational (Bronze) or both operational and tactical levels of command (Bronze and Silver). If the scale of the emergency or the level of decision making is beyond the silver commander's authority, or if the emergency is larger than anticipated, then the strategic Gold command is required (HM Government, 2008, LESLP, 2015).

In the UK structure, the Gold command sets the strategy for operation and articulates a set of objectives (Kirby et al., 2014, Kahn and Barondess, 2008, NPIA, 2009b). It operates at the strategic level, with the Gold commander responsible for emergency management. The Gold commander is the senior officer in an organisation and is responsible for the situation and in charge of all the senior officers involved in the scene (Pearce and Fortune, 1995, Owen et al., 2016, HM Government, 2008). Furthermore, the gold command is always leading from a remote location to the emergency (Arbuthnot, 2008). If the Gold commanders are not located in the emergency location, video conferences or telephone are used to contact, share knowledge, information and situational awareness (Andrew, 2012). The Gold commander does not directly get involved with the operation on the scene, as the role is to only participate in political and policy level decisions beyond a single organisation. This is usually the view of a situation, when it is intended to be of long duration, that could be resolved in days rather than hours (Kirby et al., 2014).

The Gold commander is responsible for determining the strategy and observes overall command of the emergency. While the Gold commanders should not make tactical decisions, they should guarantee that any tactics deployed from the Silver commanders are appropriate and meet the strategic objectives. These responsibilities include the following examples to name a few (HM Government, 2008, JESIP, 2012):

- Set, review and update a set of strategic plans;
- Approve and review the progress of the silver commander's tactical plan;
- Provide the response resources to the emergency;
- Ensure the effectiveness of the command structure;
- Handle the media and communication with the public;

- Work and consult with other stakeholder agencies.

3.3.1.2 Tactical Silver Commander

The Silver command operates the second level of the structure. The Silver commander is the senior member of the organisation and the tactical commander of the incident, who takes command of the scene (NPIA, 2009b). An essential aspect of the Silver command role is leading the responsibility of developing all tactics, that will meet the strategic aim and objectives that have been set by the Gold command, through the formulation of a tactical plan to deliver the objectives (Kirby et al., 2014, LESLP, 2015, Kahn and Barondess, 2008). Silver commanders are seen to be the coordinators of the emergency response, and due to the complexity, uncertainty and time pressure in the environments, they need to make effective tactical decisions. They also need to work with the Bronze commanders, with whom they may not have worked before (Mishra et al., 2015). Another main aspect of the Silver role is the coordination between other agencies. Moreover, initial priorities need to be arranged such as the level of urgency or the resources required, to plan and assess threats and consider the necessity for a Gold command (Salmon et al., 2011, Kahn and Barondess, 2008). It is probable that the silver command decides whether there is a need for a gold command at the scene if one is not in place (Arbuthnot, 2008). Andrew (2012) argues that, the Silver commanders are not located at the scene, they will also work from a remote distance and closely with other Silver commanders from other organisations in case of a multi-agency response. Instead, they are located in the operation centre, where they can maintain good communication links (Kirby et al., 2014).

Individual response organisations may refer to the tactical level as the silver level; in business terms this may be known as the middle managers (Moore and Lakha, 2006). When a single agency is recognised as a lead responder, this agency does not have the authority to command and control participants from another agency (Ministry of Defence, 2007).

The Silver commander has responsibilities for the following examples, to name a few (HM Government, 2008, JESIP, 2012):

- Appoint Bronze commanders for achieving tasks;
- Achieve the strategic objectives of the Gold commander by developing a tactical plan;
- Confirm the exciting plan is deployed by the bronze commander;
- Collect information to evaluate the threat;
- Ensure that resources are adequate;

- Maintain effective communication with the other Silver commanders of multi-agencies.

In order to have a comprehensive understanding of the Silver command roles, the researcher took an opportunity to participate in a Silver command training course held in Abu Dhabi between the NCEMA and the Cabinet Office from the 8th until the 12th of November in 2015. A certificate of attendance for the programme was awarded upon completion (See Appendix A).

3.3.1.3 Operational Bronze Commander

The operational level involves work that can be immediately undertaken onsite. This level may be referred to as the Bronze level (Cabinet Office, 2013a). It is considered the lowest level at which activities are coordinated and the highest level at which immediate action is provided to take appropriate actions to save lives and assess the emergency (Salmon et al., 2011). The Bronze command is the third level in the command structure and follows orders from the silver commanders (Groenendaal et al., 2013). In more detail, they have the responsibility of implementing silver tactics into action. Bronze commanders will be selected to work at the scene of an emergency (Kirby et al., 2014, Alexander, 2008, Salmon et al., 2011), and they are often required to be in close contact with those they are directing (Kirby et al., 2014). Furthermore, Bronze commanders operate, direct and control the efforts of their teams so that the objectives which have been set by the Silver command can be achieved (Arbuthnot, 2008, Kahn and Barondess, 2008). In addition, bronze commanders may be separated into various locations, and types of activity, so different Bronze commanders from each agency may be present at the same location.

To achieve the above objectives, they need to have an understanding of the tactical commander’s plan, tasks and whether there have been any actions that have been restricted. The first person who arrives on the scene will automatically become the Bronze commander. This commander will be responsible for taking action and managing the event until a more senior commander arrives. An operational commander is provided by each agency, focussing on its tasks and roles. Participants at the bronze level, work at a specific site to carry out tasks such as making cordons, search and rescue operations and handling traffic. A single commander leads a bronze group and is usually a local police commander. An important function of the bronze group might be to manage assessment when there is a high level of coordination, due to the scale and difficulty of an emergency. In some cases, a temporary transfer from one agency to another one may be required to lead the operational response at the scene (Cabinet Office, 2013a). In the case of a widespread geographical emergency, bronze commanders from multi-agencies may take responsibilities for different scenes (Andrew, 2012). One of the key practices that is shared across all levels is the operational briefing. These briefings have shown to encourage participation from all agencies and help coordinate the whole response effectively. They are particularly used to address any clarity required regarding roles, responsibilities, and channels of communications during a response operation (Stott et al., 2008).

The Bronze commander has responsibilities for carrying out functional or geographical tasks related to the silver tactical plan. This will include some of the following examples (JESIP, 2012, HM Government, 2008):

- Gather all the relevant information about the emergency;
- Identify the hazards and risks of situation awareness;
- Establish and maintain effective communication with the silver commander;
- Brief more senior officers about the emergency;
- Document all operational decisions.

3.4 The United States Incident Command System (ICS)

In the US, multiple emergency agencies use different command structures to manage responses to the emergency, with the most famous structure being the Incident Command System (ICS) (FEMA, 2008a, Taber et al., 2008). The concept of the ICS in the US is similar to the GSB structure in the UK. However, the US ICS structure focuses on functions, and the UK GSB structure focuses on behavioural features (Launder and Perry, 2014). This means that the ICS focuses on the functions of the incident commanders, command staff and general staff. The ICS functions are categorised into: operations, logistics, planning, and finance (For more details see Appendix B, which summarises some of the functions).

The ICS was initially established through cooperation between a number of multi-agencies from federal, state and local government authority made in response to multi accidents. Including county fire departments such as the California Department of Forestry (CDF) in the federal and state government to defeat wildland fires during the 1970s in California (Bigley and Roberts, 2001, Moynihan, 2008a, Moynihan, 2009). The CDF is considered to be one of the first agencies participating in the development of the ICS, testing the first version and adopting the structure as a standard structure for managing all types of emergencies. The principle of the ICS was established in the US more than forty-seven years ago when wildfires started in the southern region of the state of California in 1970. At that time there was no mechanism structure to control a large scale emergency, which involves multi-response emergency agencies. Therefore, there was a lack of coordination and operational problems. Consequently, this event resulted in 16 deaths, the destruction of 885 homes and approximately an economic loss of 233 million dollars (O'Neill, 2005).

After this event, a group of seven fire agencies established a union called the Fire Fighting Resources of Southern California Organised for Potential Emergencies (FIRESCOPE), with the aim being to review and control future coordination between regional fire agencies (Sharma et al., 2015). This force identified a number of problems that affected response to the emergency, and all these problems led to the development of the original ICS structure for emergency management. Thus, FIRESCOPE made essential efforts to identify several problems, such as a lack of situation awareness, a lack of communication, a lack of resources (Moeller, 2006), an unclear chain of command, and no adequate operational plan (Lam et al., 2010). Jackson et al. (2004) have also identified the following problems; a lack of common command structures, a lack of common terminologies and communication practices and the lack of a mechanism for effectively allocating resources.

The researcher reviewed several studies that were carried out between 1995 and 2018, which investigated the UK's GSB and the USA's ICS incident command systems. The relevant research identified and focused on the implementation factors, namely the organisational, individual, barrier and driver dimensions of both systems in the context of their respective countries. Table 3.1 and Table 3.2 below illustrate a comparison of the preliminary findings of both systems, derived from the related literature.

Table 3.1: The UK GSB literature

Dimension		(Pearce and Fortune, 1995)	(Flin and Slaven, 1996)	(Brunacini, 2002)	(Crichton et al., 2005)	(Arbuthnot, 2008)	(Chlimintza, 2008)	(Devitt and Borodzicz, 2008)	(Stott et al., 2008)	(Kirrage et al., 2007)	(McMaster and Baber, 2012)	(Kirby et al., 2014)	(Mishra et al., 2015)
Implementation and Drivers	Better Cooperation	√											
	Clear Roles and Responsibilities											√	
	Information Flow									√		√	
	Achieving goals											√	
	Recognition of the hierarchy	√											
	Minimise Confusion									√			
Individual	Decision Making			√	√		√						√
	Situation Awareness			√	√								
	Cooperation			√	√								
	Lack of Qualifications and Experience					√	√	√					
	No SOPs following						√						
	Personal Conflict						√						
Organisational	Coordination										√		
	Training and Exercising				√								

Barriers	Transferring from theory to practice	√					√
	Lack of Clarity of Command and who is in Charge		√	√	√		
	Lack of clear roles and responsibilities				√		
	Inflexibility in structure	√					√
	Not always fit a particular emergency	√					
	Overlap in Command			√			
	Lack of Qualifications and Experience					√	√
	Lack of SOPs understanding			√			

Table 3.2: The US ICS Literature

Dimension		**(**Bigley and Roberts, 2001**)**	**(**Anderson et al., 2004**)**	**(**Buck et al., 2006**)**	**(**Lutz and Lindell, 2008**)**	**(**Moynihan, 2008a**)**	**(**Taber et al., 2008**)**	**(**Arora et al., 2010**)**	**(**Lamb et al., 2014**)**	**(**Jensen and Waugh, 2014**)**
Individual	Training and Exercising								√	√
	Lack of Knowledge and Understanding				√		√			√
	Qualifications and Experience			√			√		√	√
	Commander Characteristics									√
Organisational	Importance of SOPs		√			√				√
	Lack of Coordination Between Organisation			√						
	Training and Exercising				√					√
	Resource and Logistics							√		
Barriers	Transferring from Theory to Practice						√			
	Delay in Structure Setting						√			
	Lack of Knowledge and Understanding				√		√			√
	Lack of Qualifications and Experience						√			√
Drivers	Organise Chaos						√			√

	Coordinate Action			√	√	
	Support any Type of Emergency	√	√			
	Better Communication		√			√
	Clarify Leadership and Command issue					√
	Increase the Safety of Responders					√
	Information Sharing		√			

Both the UK's GSB and the USA's ICS systems are structured to achieve the same purposes. However, there are some similarities and differences between the two concerned systems. The UK's GSB system practically integrates the implementation and driver under one dimension. In contrast, the USA's ICS system only undertakes the driver's dimension and neglects the implementation one. In other words, the UK's GSB is structured around five dimensions, with the implementation and driver dimension combined into one dimension, whereas the USA's ICS is structured around four dimensions, as shown in Table 3.1 and Table 3.2 above. This is because when the researcher reviewed the literature, it was not clear to differentiate between these dimensional factors and whether they were related to either the implementation or driver dimension, due to the differences in the definitions of the dimension terminology in the literature. Consequently, the researcher has integrated both systems to find the similarities and difference between them.

3.5 Conceptual Framework of Incident Command System

This section gives further details concerning the development process of the conceptual framework for this current research. The conceptual framework is essential for a study as it identifies the key issues, while simultaneously identifying evidence from the literature to support the study's contribution through: (1) identifying the gaps in the literature; and (2) illustrating the relationship between factors. Thus, this section outlines the conceptual framework of the current study, as follows:

- The first part (Section 3.6) discusses the importance of designing a conceptual framework,
- The second part (Section 3.7) discusses the critical implementation, drivers, organisational, individual, barriers, and factors extracted from the literature review.
- The third part (Section 3.9) outlines the development of the conceptual framework.

3.6 The Importance of Designing a Conceptual Framework

The conceptualisation of the phenomena under investigation will enrich the research material and illustrate the relationship between themes and factors. This will enable improved connections to be established through an exploration of the research components and themes, in order to illustrate the research problem (Jonker and Pennink, 2010). A conceptual framework underlies the research and graphically explains the critical factors of the main issues that are to be investigated. It provides the researcher to build logic relationships between factors and variables (Voss et al., 2002). Similarly, Rocco and Plakhotnik (2009) pointed out that the conceptual framework will guide the researcher to be selective for important aspects which should be included in the study. Therefore, the conceptual framework is a guide for addressing concepts that help to identify main areas during the study progress, the map which guides the researcher to focus throughout the research area (Easterby-Smith et al., 2012, Rocco and Plakhotnik, 2009).

Miles et al. (2014) described a conceptual framework as a system of assumptions, concepts and theories that informs and supports the researcher, or as a set of broad ideas and principles that form a key aspect of the research design, thus reinforcing the essential themes selected by the researcher. Hence, Jabareen (2009), p. 51) defined a conceptual framework as *"a network, or a plane, of interlinked concepts that together provide a comprehensive understanding of a phenomenon"*, thus representing an internationally formulated system to explore study themes, or factors of the framework as a whole (Jonker and Pennink, 2010). While Saunders et al. (2016) note that this enables a researcher to undertake a data collection procedure to evaluate the most appropriate emerging themes present in the data, this approach is related to an exploratory study, in which it develops a conceptual framework to guide a researcher with subsequent work.

Moreover, it is important to note that a conceptual framework assists in the selection of key elements to identify issues arising during the data collection process (Saunders et al., 2016). Thus, a conceptual framework can be revised and finalised until the data collected has been analysed. Similarly, Christensen (2006) viewed a conceptual framework as a road map capable of being employed to address questions throughout the literature review, for instance when a researcher needs to review the literature in order to justify the study rationale. Establishing a conceptual framework assists in identifying many essential factors and elements of interest in the research (Miles et al., 2014). Therefore, as a result of the above factors, the conceptual framework for this current research is based on the three main requirements for the literature, as advised by (Marshall and Rossman, 2014, Jonker and Pennink, 2010). The main elements which should be considered when designing a conceptual framework are:

- That it delivers significant evidence in support of the study and thus contributes to the knowledge within this field;
- That it conducts a careful review of the literature; and

- That it identifies a gap in the literature in order to contribute to the industry.

The presence of such a conceptual framework enhances the progress of the study and assists the researcher in identifying a set of contexts or ideas. Thus, the development of a conceptual framework is founded on a comprehensive literature review, and prior to the commencement of data collection for the case study. This approach needs to be taken into consideration by the researcher when focusing on the research area and actors, as it can identify the boundaries of the research, and thus identify gaps in the CDGC command structure. Accordingly, there is a necessity for such a coordinated effort of the various specialists in different areas of knowledge and professional practice, to participate in finding proper solutions to the encountered problems. In addition, the demand for a general conceptual framework could allow better understanding and the exchange of sufficient knowledge amongst them. A coordinated effort would be a guide to relevant studies to ensure the compatibility of the various products developed by these areas.

Furthermore, the availability of a general and interdisciplinary conceptual framework is particularly important because, on the one hand, the practical use of the results of scientific-technical studies by emergency prevention and response personnel is difficult, partly due to the poor communication of it with other researchers in the field. On the other hand, the exchange, integration, and use of diverse and often rich professional experiences are almost impossible due to the lack of common terminology and approaches, which makes it difficult to understand and share the results.

3.7 Key Factors Identified for the Development of the Conceptual Framework

The key issues relating to this research arise from a review of the comprehensive literature that was undertaken in order to understand and develop the conceptual framework. The main key issues recognised from the literature review can be summarised as follows:

3.7.1 Implementation and Driver Factors

The UK government ratified the Civil Contingencies Act in 2004, including essential guidelines for emergency response (Linney et al., 2011). In the UK, there are three main command hierarchy levels, Gold, Silver and Bronze (GSB) that operates during emergencies within a single agency (Groenendaal et al., 2013). The first implementation factor in the UK

GSB system is better cooperation, as reported by Pearce and Fortune (1995). In the UK, urban riots on the mainland necessitated the creation of the GSB command structure. This three-tier chain of command consists of levels that execute mutually-exclusive roles at different locations. Accountability for tactics, scheme, and processes are assigned to three distinct roles in an identifiable hierarchy. The officers working in distinct geographical areas conduct conventional policing as a solitary activity in response to occurrences. This dissimilar deployment requires cooperation but does not call for command and control. The success of this system depends on the strength of the association, which is a factor in communication between the levels and their surroundings. Therefore, the success of the UK system relies heavily on the level of cooperation, which emphasises the existence of enhanced cooperation in the GSB system (Uhr, 2017).

Other factors with respect to enhanced cooperation in the GSB system are the existence of clear roles and responsibilities, the information flow and the achievement of goals, as described by Kirby et al. (2014) in reference to the Cumbrian spree killing that led to the demise of 12 people. The UK recognises serious and vibrant policing events such as the spree killing as critical occurrences where the efficacy of police reactions has a substantial impact on the confidence of the affected parties. A chosen Gold commander establishes a primary strategy for the monitoring function and communicates a succession of distinct and unambiguous goals. The silver commander then implements this plan by developing and synchronising a strategic plan to attain the objectives, including mobilising the required resources. Ultimately, several Bronze commanders are chosen, each tasked with executing and overseeing specific elements of the working plan.

Gold and Silver commanders are unlikely to be available at the scene of the emergency because they are expected to be present in furnished operations centres to enable effective communication. On the other hand, Bronze commanders are present at the scene of the operational activity because they should be close to the people under their command. The main benefit of the GSB approach is the capacity to maintain responsibility and accountability even in multiplex scenarios where various agencies are involved. Additionally, the system permits the adequate flow of information across various positions and agencies, which facilitates the effective execution of the overall strategy (Kirby et al., 2014).

Moreover, Kirrage et al. (2007) emphasise the importance of the flow of information in the GSB system, when describing an epidemic of Legionnaires disease that took place in 2003 in Hereford, West Midlands UK. The declaration of the epidemic sparked media, political and public interest for some weeks after the event and a collaborative initiative was necessary to enable this flow of information between various local and neighboring teams.

Driver factors of the GSB system in the UK include reducing the misunderstanding during the emergency and recognition of the hierarchy (Pearce and Fortune, 1995), information flow (Arbuthnot, 2008) and minimising confusion (Kirrage et al., 2007). Similarly to other researchers, Arbuthnot (2008) reports that the strength of the British system is its effective flow of information, that serves to monitor developments of an incident and provide the required coordination. In the 2003 outbreak of Legionnaires disease in the UK, communication played a vital role in the management of the situation from the beginning of the outbreak not only in the affected communities but also for the entire public. Hence, it is important that effective communication strategies should be in place to prevent confusion and facilitate the timely, reliable and effective internal and external conveyance of information during epidemics (Kirrage et al., 2007).

By contrast, the drivers identified in the US ICS system include enhanced organisation of chaos (Buck et al., 2006), coordinated actions (Taber et al., 2008), support for any type of emergency (Bigley and Roberts, 2001), better coordination (Jensen and Waugh, 2014), information sharing (Anderson et al., 2004), clarification of leadership and command issues, and an increase in the safety of responders (Anderson et al., 2004). Bigley and Roberts (2001) report that the ICS system is a highly bureaucratic organisation model that can attain tremendous outcomes in diverse working conditions, including those characterised by volatility and uncertainty. Therefore, this system can be useful in any form of emergency. Structure elaborating refers to the detailed and central processes of organisation creation. The ICS underscores techniques of system assemblage because ICS based organisations are usually constructed at the scene and should be able to manage up to several thousand people under severe conditions. Overall, the ICS structure elaboration progression is well developed because all initial constructions of the ICS start in similarly.

The ICS contains structures such as unified command, area command and multiagency synchronisation centres to address harmonisation problems at different levels of the government (Buck et al., 2006). The ICS enhances the importance of coordinating the efforts of agencies when they are working to save property and human lives (Moeller, 2006, Taber et al., 2008). Nowadays, the ICS principles can be used in a range of emergency situations, from small to major incidents, local or federal agencies, many government and private companies have used the structure successfully especially after the 9/11 disaster (Moynihan, 2009). It has been used in response to different types of emergencies and disasters, such as floods, earthquakes and industrial incidents (Lam et al., 2010). The structure provides management to incident response, and it is designed to manage effective incident management (Sharma et al., 2015). As a result, it has been possible to achieve numerous goals that the system sets out to accomplish. Role switching harmonises the structure elaboration activities. ICS roles are created based on the functional needs of a situation as determined by the incident commander (Bigley and Roberts, 2001). With ranks disabled when they outlive their purposes. The swapping of roles entails the reassignment of workers to other positions that are created within the organisation.

One example of the successful execution of the ICS is given by Anderson et al. (2004) when commentating on the Arlington County Fire Department, with strengths attributed to its use of common terminology, which eliminates confusion and promotes unity. The modular organisation of the ICS develops in a top-down manner according to the complexity of the issue and the hazardous environment. This approach permits the development of distinct functional elements to manage specific situations. The chain and unity of command are indicated by a well-ordered line of authority within the ranks of the incident management organisation. Hence, each individual reports to a specific supervisor, which simplifies reporting relationships and eradicates confusion caused by contradictory directives (Anderson et al., 2004). Also, there is a clear picture of the available resources, brought about by the resource management procedures, that entails the arrangement, posting, tracing and recovering of resources (Jensen and Waugh, 2014). Furthermore, all activities in response missions are also executed according to predetermined SOPs.

The ICS is considered to have the capacity to initiate an order from chaos and solve communication problems. The system also clarifies leadership issues, promotes the efficient utilisation of resources and ensures the wellbeing of responders. Therefore, the system has been used effectively in the command, management, communication and synchronisation of emergencies (Jensen and Waugh, 2014). Flexibility and adaptability are the ICS strengths, as the structure can be deployed in a modular fashion depending on the requirements of the emergency (Anderson et al., 2004). The structure of the ICS is flexible; it allows the emergency commander to expand and control according to a particular event. It can be used in small scale operations and can be quickly scaled up as an event increases in size and complexity (Jackson et al., 2004). Hence it is flexible to adapt to any scenario requiring an emergency response (Perry, 2003). The adaptability of ICS means that it can be used not only for various types of emergency, but also for several emergency sizes (Anderson et al., 2004). As mentioned earlier, the ICS can be scaled up as required and this has been demonstrated through its application across many different emergencies over the years, indicating that it has adaptability to incidents of any size, scope, and nature.

Within the context of an emergency, the command structure plays an essential role during the response phase, in which many activities need to be carried out in order to save lives and minimise damage to property. First responders tend to originate from local agencies, i.e., the police or fire brigade services (Haddow et al., 2014), and, as a result, a number of academic studies have described the importance of a command structure to deal with emergencies (Mishra et al., 2015). Thus, understanding the concept of an incident command system may lead to an increase in a commander's ability to make effective decisions during emergencies (Van Den Heuvel et al., 2012). It can also enhance a commander's preparation when planning for future events (Chlimintza, 2008), as many still lack such important competencies, particularly in developing countries (Madry, 2015).

The failure to attain some of these implementations and drivers in the UK's GSB system has led to the identification of the barriers in the British system. For example, the UK's system lacks unity of command due to a confusion of some of the terms used. Clarity of leadership and command also poses significant problems in the British system. However, both systems have comparable communication efficacy.

The incident command system forms an incident management structure capable of reducing the confusion of the operations required in the event of an emergency. As noted by Dhanhani (2010) there are currently only a limited number of academic studies focusing on the natural hazards identified in the UAE.

The ICS is based on administrative principles demonstrating its potential to improve the effectiveness and efficiency of various types of institutions, as it is perfectly applicable in its response to the adverse events of any dimension and complexity. The principles of the ICS allow the guarantee of swift, coordinated and effective deployment of the available resources, as well as minimisation to the alteration of the policies and operating procedures of each responding institution. Therefore, the ICS must be applied to any incident, event, or operation; so, it is useful for preparing various scenarios and mobilising necessary resources to meet an incident occurring, if expected. When an incident occurs, the ICS will start immediately from the first sign of its arrival. This ensures a better preparedness and well-organised response. The routine use of ICS would be excellent for professional training, with the staff being able to gain familiarity with the system and its procedures. Section 1.1 in chapter 1 highlights the lack of an existing contribution to this field, as the UAE (unlike other developed countries, which already have advanced strategies in place) is still considered to be a developing country in the field of emergency management (Alteneiji, 2015). This leads to a need to examine and evaluate the incident command structure, due to the lack of academic studies undertaken on the structure in relation to the UAE.

3.7.2 Organisational Factors

When it comes to organisational obstacles, an organisation is required to provide training programmes, accompanied by sufficient exercises, to ensure participants are capable of implementing the incident command systems. The literature emphasises the importance of training and the implementation of exercises to build the capacity of commanders during an emergency response. For instance, training programmes can decrease any confusion between command structures in the chain of command; however, the literature notes a lack of research into training programmes focussed on enhancing a commander's skill and knowledge in relation to the incident command system. In addition, exercises form a beneficial tool, enabling emergency commanders to develop the required technical skills when dealing with high-pressure situations.

This section attempts to give an overview of how these types of organisational factors are influencing command implementation by providing examples of evidence from the literature such as training, standard operation procedures, resource and logistics.

Three organisational factors were identified in the UK GSB system. They are coordination (McMaster and Baber, 2012), training and exercising (Crichton et al., 2005). Effective training helps to establish competent teams that are capable of managing emergencies effectively. While incident training aims at advancing command dexterities through detailed comprehension of training processes as well as full-sized reproduced emergency exercises, these activities mainly focus on the response phase as opposed to the subsequent recovery phase. Participants involved in a study by Crichton et al. (2005) reported that prior participation in incident management teams exercises empowered them to handle emergencies effectively. However, the training did not provide precise command skills such as making decisions under pressure. Therefore, there is a need for incident training to focus on specific command skills and aspects of the recovery phase of disaster management. Additionally, team leaders can undergo training using immersive computer-generated reproductions such as Hydra, which is employed by the Metropolitan police in the UK (Lamb et al., 2014). The quality of the response to emergency efforts is associated with the commander's knowledge, skills, and abilities to put them into practice in a range of emergency situations (Schaafstal et al., 2001). Thus, emergency training is intended to develop a commander's capacity to respond to demands during an emergency. For instance, a study was conducted in Malaysia in 2013 concluded that the emergency training faced problems, such as a lack of support and lack of awareness among members of the Malaysian community (Nazli et al., 2014).

An example of successful coordination is given by McMaster and Baber (2012), who use a case study flooding in Gloucestershire, South West of England to show that successful coordination in key emergencies requires a deep understanding of the situation and a high level of trust among the responding agencies. Even though the rescue operation was successful, several obstacles were encountered, which highlighted the need for enhanced coordination. For example, poor shared awareness and cooperation among the agencies involved were highlighted. These issues were partly linked to the inadequate experience of the workers and agencies, as well as the detection of command authority. Additionally, the prevailing communication system at the time was partly to blame for the obstacles outlined. Importantly, personnel should receive training to adjust to the need to work alongside new affiliated agencies at short notice, in addition to recognising and preparing for integration in extraordinary situations.

Organisational factors in the US include the importance of Standard Operation Procedures (SOPs) (Anderson et al., 2004, Moynihan, 2008a, Jensen and Waugh, 2014), when faced with insufficient coordination between organisations (Buck et al., 2006), resource and logistics (Arora et al., 2010), and training and exercising (Lutz and Lindell, 2008, Jensen and Waugh, 2014). Moynihan (2008a) reports that responders in the US depended on a coordinated strategy in the form of SOPs apart from the hierarchical structure of the ICS to achieve the objectives. Therefore, task forces should homogenise their operations. Thus, Jensen and Waugh (2014) indicate that the protocols used by the Fire Ground Command System and FIRESCOPE ICS were merged into a single system that could be applied by fire and rescue personnel from both systems. Consequently, the use of SOPs provides much needed organisation, transparency and knowledge.

It has been agreed that SOPs are vital elements to activate operations in response to emergencies and disasters (Steiner, 2015). A study by Moynihan (2008a) found that a primary challenge for the taskforce is to standardise its operations as SOPs provide structure, clarity, and knowledge that did not previously exist. According to Moynihan (2008a) response taskforce members reported that a lack of stability was a bigger problem than a lack of flexibility in the implementation of the structure. However, the uncertainty of emergency situations means that SOPs cannot cover every situation and an overdependence on SOPs might lead to more inflexibility (Moynihan, 2008b). Buck et al. (2006) assert that coordination is a precondition to an effective ICS system. While Jensen and Waugh (2014) also report that strict adherence to SOPs in situations that require flexibility lowers the efficiency of the ICS. Nonetheless, the bureaucracy observed in the ICS system hampers coordination. Furthermore, the importance of resource allocation in emergency management is significant (Arora et al., 2010). As through the provision of sufficient resources, it is easier to offer all the necessary emergency response required. The ability to offer rapid response is critical in reducing the impact of incidents. This means that failure to ensure that necessary resources are allocated on time could lead to the worsening of a situation (Arora et al., 2010). It could also result in an increase in the number of casualties. Some of the resources may include medical services, food, shelter, and clothing among others (Moeller, 2006). This requires all resources, logistics, and support of the action plans to be obtained, including medical aid and food as well as other important resources and materials such as fuel to sustain operations (Sutingco, 2006, Perry, 2003).

Significantly a new publication from the International Standard Organisation (ISO) for emergencies response has been published. According to Peter (2012) the ISO 22320 standard for emergency response covers all essential activities that an emergency commander should be aware of. This standard lays out the approach for emergency response and could be applied to private or public organisations. Having said that, the incident command process can be applicable to incident commanders’ actions at all levels of responsibilities. It includes the following important elements and activities in Figure 3.2 below (ISO, 2011):

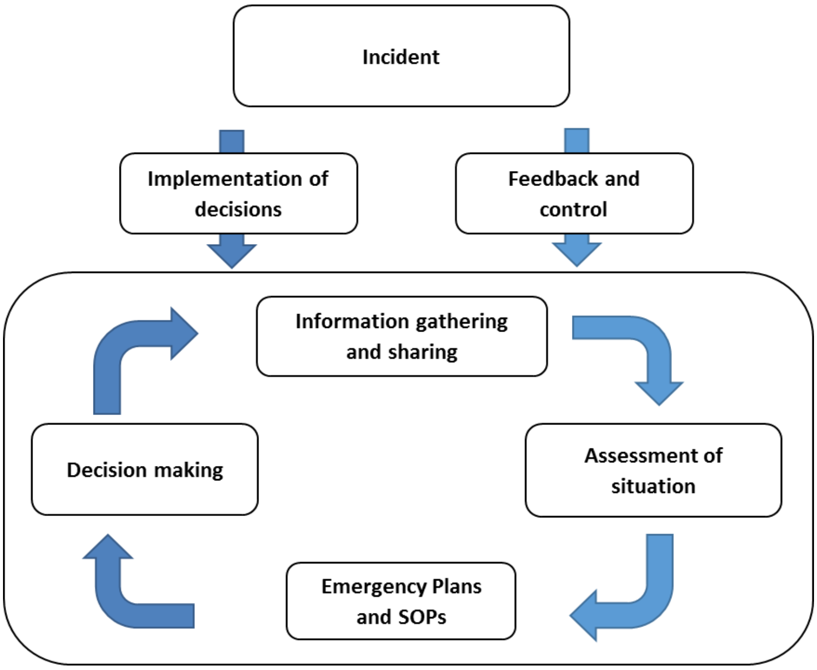


Figure 3.2: Incident command process source (ISO, 2011)

Figure 3.2 above illustrates the key elements of a commander's activities, which should be considered among all three levels in the GSB structure. This process has similar characteristics and principles compared to the UK elements in the Civil Contingencies Act 2004. Overall, examining what creates an effectively managed incident is useful.

From the researcher's perspective, however, the CDGC agency and the search and rescue teams should all have more extensive training in how to deal with emergencies. As minimising total losses is an essential goal, and saving people's lives during an emergency depends on the civil defence commanders' ability, knowledge, and skills. While, a lack of emergency response skills could result in causalities and property loss. Therefore, these agencies should have an opportunity to participate in programmes that offer detailed, modern training. To this end, emergency response organisations in different countries vary based on the types of threats and are strongly attached to the competencies and preparedness of each incident command systems.

3.7.3 Individual Factors

The literature significantly emphasises the impact resulting from individual factors. A subject for further investigation relates to a lack of effective commanders, particularly as they are required to remain calm under situations of intense pressure during the delegation of assigned tasks, and their ability to make an effective decision is vital. As decision making is dictated by the complexity of a situation, uncertainty, time pressure, and risks contribute to the making of a well-informed decision, while a lack of understanding of the concept of incident command system may lead to the presence of negative factors in response to an emergency. Consequently, several relevant factors were considered as a guide for the research. For instance, individual factors for emergency management were evident in the GSB system in the UK. They included; decision making (Brunacini, 2002, Crichton et al., 2005, Chlimintza, 2008, Mishra et al., 2015), situation awareness, training, cooperation, (Brunacini, 2002, Crichton et al., 2005) the level of qualifications and experience (Arbuthnot, 2008, Chlimintza, 2008). Whit Crichton et al. (2005) stressing the importance of a high level of decision-making and teamwork skills. Notably, all these attributes can be obtained through competent training and knowledge sharing.

The GSB structure can help commanders to make the right decision during an emergency. Chlimintza (2008) notes that the command structure has an impact on the process of decision making in the emergency and is based on the personality of commanders. For effective decision making during emergencies, commanders must be able to form an accurate assessment of the situation in its initial stages (Van Den Heuvel et al., 2012). Some of the scholars addressed the issue of decision making when managing emergencies at the individual level (Bigley and Roberts, 2001) with a focus on behaviour, whilst others focused on a group or team performance (Salas et al., 2001). In contrast, a study by Kapucu and Garayev (2011) indicated that more attention should be placed on individual decision making during emergencies. Moreover, Launder and Perry (2014) emphasise individual decision making, indicating that there is a need for emergency commanders to understand and interact with every level of government, so that they can be effective in linking the chain of command to facilitate the fulfillment of their tasks and coordinate with higher levels during the emergency (The´venaz and Resodihardjo, 2010). In addition, silver commanders may not analyse the situation before making a decision. This could be due to several reasons such as a lack of experience of the commander resulting in a quick decision, or a lack of sufficient time, or the disability to form a clear picture about the situation (Mishra et al., 2015).

Situational awareness is described as cognisance of the ongoing and the foresight of how a situation could unfold. It is a crucial step that precedes decision making because it facilitates the evaluation of a situation. A rule-based decision-making approach is employed in the tactical level of command where cooperation involves working together to achieve shared goals and is best exhibited as teamwork. Important aspects of teamwork include workload management, which ensures that tasks are apportioned appropriately among team members so that irregularities and gaps are recognised. Effective teams should coordinate their activities and support team members by distinguishing their tasks (Crichton et al., 2005).

With regards to training, Lamb et al. (2014) report that different command training courses are delivered in the UK Fire and Rescue Service. However, these courses vary from one station to another based on the specific needs of the centre. Four incident command levels are available. Additionally, the continuous application of knowledge following training is required to maintain a specific skill set (Lamb et al., 2014). A commander who is responsible for managing emergency incidents should receive different training in emergency command skills (Crichton et al., 2005, Crichton and Flin, 2002). Alexander (2004) argues that a test for a good emergency command is to solve problems, to prioritise the elements of a problem, how it can be achieved with each element in a small amount of time, authorise responsibilities, manage a number of tasks, communicate clearly and keep a level head. These skills could provide feedback on how training for the emergency command can be structured (Crichton and Flin, 2001, Arbuthnot, 2002).

Furthermore, exercises are essential tools because disasters are uncommon, making previous practice particularly vital elements in emergency management (Sinclair et al., 2012). While, emergency exercises allow commanders to promote their skill performance during response duties in an effective manner. Thus, experiences from drills and exercises are considered to be a vital method to promote skill performance in an effective manner (Lutz and Lindell, 2008, Crichton et al., 2005, Granillo et al., 2010). More importantly, McLennan et al. (2006) argue that there is nothing in the literature that implies all methods of training are not useful; however it does propose that a full range of practices and exercises to respond to real-world events are more likely to increase the individual experience.

Whilst insufficient training, exercises, and staff development can lead to many issues, for instance, Chlimintza (2008) reported personal conflict, disorganisation of the commanders and no adherence to SOPs. The SOPs of interventions require that military camps in an area faced with forest fires be notified along with the law enforcement agency, local forestry agencies and civil protection officials working in the affected area. The military is expected to provide help when asked by the fire brigade. However, disparities in the training knowledge between military officials and professional firefighters may disrupt large emergency responses. Such a disparity was witnessed in a 2007 forest fire in the UK, were there were delayed deployments of military forces (Chlimintza, 2008). Disorganisation was observed when the Gold authority of the emergency response failed to request additional fire fighting resources apart from those given by the British fire agency and other rescue services. Furthermore, the allotment of the received resources needed a team of employees. Instead, only one individual who was a junior employee was given this responsibility. This person was permitted to instruct senior officers regarding the management of the resources. However, power-related problems arose because a few senior officers were not willing to receive directions from a junior employee, hence leading to personal conflicts. The number of firefighters exceeded the number of forest fires, which also resulted in personal conflicts between incident commanders. These conflicts spilled over to the various organisations involved in the management of the fires, which endangered the overall outcomes.

The decision to disclose this information underlined an effort at transparency. This was made so as to ascribe accountability, specifically to the organisation responsible for the misconducts (Chlimintza, 2008). When reacting to a crucial event, three stages of decision-making stages of Gold, Silver, and Bronze are involved. This process implies that decisions are made on three different levels, which may lead to ill-timed operations. Mishra et al. (2015) assert that the decision making adopted in the GSB system is relatively complex and is linked to context and individual factors, particularly expertise. The issue of a lack of qualifications and experience arose when first-responders from other fire brigades stepped in to assist the oil fire. However, they did not have knowledge of the area as well as adequate knowledge of fighting practices (Chlimintza, 2008). The inability to identify the most suitable place for an individual or agency in the response structure during an incident can cause grave inefficiencies and conflict (Arbuthnot, 2008). Devitt and Borodzicz (2008) assert that previous experience plays a significant role in the effectiveness of a response team. However, other factors such as motivation, expertise, and personal values also play an important role.

Since emergency commanders are required to make accurate decisions in emergency situations, and train and develop their competencies in operational emergencies, the Office of Qualifications and Examination Regulations in the UK have approved four levels of command qualifications. The four levels are as follows: (Lamb et al., 2014).

- Level 1: Award in Initial Incident Command. Officers at this level have demonstrated the ability to command and control operations.
- Level 2: Award in Intermediate Incident Command. Tactical commanders at this level have demonstrated the ability to review emergency status.

- Level 3: Award in Advance Incident Command. Commanders at this level can act tactically and command the largest and serious situations.
- Level 4: Award in Strategic Incident Command. Strategic commanders at this level can control the emergency at a strategic command and cooperate with the Strategic Coordinating Group SCG.

An expert is a person who knows what needs to be done based on experiences and processes that experience for understanding (Rake and Njå, 2009). Some authors in the literature have indicated that ten year experience is sufficient to make someone an expert (Van Den Heuvel et al., 2012). Emergency management experts should be key staff members responsible for training development. Their knowledge and experience will increase the value of the training team by providing useful feedback to others to enhance the effectiveness of their training plans (Hosseini and Izadkhah, 2010). Experience is most probably found in emergency mission agencies such as the civil defence and police forces, because of their job duties and mission (Lutz and Lindell, 2008). One example of inexperience is a situation involving police operations in the UK when managing football crowd risks.

Conversely, other individual factors are identified in the US ICS. They include a lack of knowledge and understanding (Lutz and Lindell, 2008, Taber et al., 2008, Jensen and Waugh, 2014), lack of training and exercising (Jensen and Waugh, 2014), qualifications and experience (Buck et al., 2006, Taber et al., 2008, Jensen and Waugh, 2014), in addition to commander characteristics (Jensen and Waugh, 2014). The FEMA has established a national database for functional qualifications and training for all employees of the ICS to ensure adequate skills. However, there are inadequate efforts to educate and provide hands-on training to the first responder community, which need to be increased (Buck et al., 2006). However, Jensen and Waugh (2014) report that the ICS cannot guarantee that all members responding to hazardous situations have the pertinent knowledge associated with the kind of disaster they are addressing. Nevertheless, effective training is also possible if there is a short time between the acquisition of knowledge through training and the practical application of the knowledge through response efforts (Jensen and Waugh, 2014). In terms of individual characteristics, it is widely believed that an emergency commander should have the ability to manage and operate emergencies with flexibility and creativity. Jensen and Waugh (2014) argue that the individual characteristics of those who participate in emergency response are a vital factor for building a comprehensive understanding of how incident command structures can be used and how it can efficiently work.

In summary, many organisational and individual factors affect the implementation of the incident command system. A study was conducted to review the evolution of the incident command system in practice, along with the organisational and individual factors that affect the system implementation identified. Examples included the incident command system being accepted by the organisation, training requirements through the organisation, with pre-incident plans or SOPs classified as important, as well as performance evaluations after exercises and the availability of resource and logistics. In addition, individual factors that affect the system implementation were also identified. These included individual understanding of the concepts of the incident command system and how it should be used, training, exercising, command characteristics, situation awareness, communication, and leadership, as well as having access to resources (Jensen and Waugh, 2014). Notably, three similarities between the individual factors in the UK's GSB and USA's ICS systems have been identified. These are commander characteristics, training and exercising , and insufficient knowledge and experience.

3.7.4 Barrier Factors

Despite the advantages of the incident command structures, a number of general barriers and factors impact the overall incident command systems activated within an emergency response. General barriers were identified from the literature such as a lack of structure understanding, lack of roles and responsibilities, overlap in command and who is in charge, misuse of the SOPs, insufficient qualification, delay in structure setting, and lack of communication to mention a few.

One of the main barriers to the use of the GSB approach is difficulty when transferring the system from theory to practice (Pearce and Fortune, 1995, Kirby et al., 2014). Further barriers include inflexibility in command and control for specific emergencies (Pearce and Fortune, 1995), inadequate experience and insufficient qualifications (Stott et al., 2008), and a lack of knowledge and understanding (Lutz and Lindell, 2008, Jensen and Waugh, 2014). Bearing in mind the accessibility of performance information, it is anticipated that facts about the activity of the operations will be conveyed from Bronze to Silver as part of the management. However, no distinct performance monitoring system that reports back to Silver and Gold exists. Such a system would compare the anticipations of the decision-making subsystem and the execution of the Bronze functions. Additionally, the GSB system faces significant environmental turbulence, but there are inadequate initiatives to shape the surroundings from within the system. The wider system cannot devise the original design of the activities of the command system due to the mechanistic usage of the command structures. As a result, the structure may not always match specific operational procedures. This lack of structural understanding demonstrates another barrier factor. Tensions between the three stages can also be observed sometimes, because the formal structure of decision making may be responsible for an inappropriate response if the levels fail to coordinate effectively. With misunderstanding of the structure as a process between all participants, potentially leading to a failure in emergency response (Chlimintza, 2008). Significantly, this could cause problems, especially in newly implemented structures such as the UAE, where it is still relatively new.

Identifying and understanding roles and responsibilities are essential for all individual commanders and organisations to play an effective part in the response phase. The level of response to emergencies depends upon the scale of the emergency. The operational level will be activated on the scene of the incident and the bronze command is appointed for responding to small scale emergencies. However, in more severe emergencies which require more assistance, the silver command is appointed. In the case of an emergency which requires assistance from experts, or if there is more than one type of emergency on the scene, like cascading impacts across the city or region, then the strategic gold commander will command (Salmon et al., 2011).

Nonetheless, Kirby et al. (2014) highlight the inflexibility of the GSB system, with its lack of coordination and information sharing. The speed and mobility of certain emergency scenarios such as the Cumbrian spree killing revealed significant problems such as poor communication, which resulted in confusion. Additionally, the system is characterised by a rigid command protocol that cannot be applied effectively in such scenarios. This is because traditional approaches using ranked authority and control management tactics are usually slow and perfunctory, particularly when reacting to rare and volatile situations. The use of the GSB system in the UK was detrimentally affected by a lack of qualifications and experience. Most members of the response team had not had the training or first-hand experience with spree killings. Moreover, a significant proportion of the respondents admitted that they would not be able to handle similar incidents effectively in the future (Kirby et al., 2014). Communication has been identified as a crucial factor in emergency response (Kusumasari et al., 2010, Steigenberger, 2016). According to Flin et al. (2008) many incidents occur in high hazard industries particularly due to poor communication. Additionally, all the communication between the levels of the structure should be in clear and understandable language, so that there is clarity and it is acknowledged and understood the same way by all responders. In emergency events, technology is used to enhance commander communications such as Terrestrial Trunked Radio (TETRA) (Alexander, 2008). To achieve clarity in communication, common terminologies are used between commanders, for effective coordination no matter the complexity, scope, or location of the incident (FEMA, 2008b). Thus, to perform effectively in emergencies, it is important for commanders to have excellent communication skills. Briefing and debriefing are key factors of success in coordination and communication, and these are skills a commander must have to be effective (AIIMS, 2004).

Additional barriers exhibited in the GSB response system in the UK include insufficient clarity of command and who is in charge, as well as a lack of clear roles and responsibilities, are additional barriers exhibited in the GSB response system in the UK (Arbuthnot, 2008, Chlimintza, 2008). For instance, in the Buncefield emergency response in Hertfordshire in 2005, firefighters argued that the Silver command did not determine the required strategies, hence transferring the responsibility for strategic affairs to the Bronze command. Officers from the fire service in charge of the affected area claimed that their adjacent brigades went to the site before help was requested. On the other hand, the accused team denied self-deployment and argued that they were in standby mode ready to provide help. Arbuthnot (2008) reports that the terms ‘command’ and ‘control’ and similar words as well as the levels of command (strategic, operational and tactical) are ambiguous and can have various meanings in different settings, which may lead to confusion during emergency responses. Consequently, the terms Gold, Silver, and Bronze are used instead. Nevertheless, despite the use of these terms, simple questions such as who is in charge during an incident can still yield confusing answers. Another shortcoming is an overlap within the structures of the systems utilised by civil and military responders, which are meant for different roles. As a result, there is a poor understanding of the required SOPs (Arbuthnot, 2008).

A further barrier is a fact that risk changes, for instance, Stott et al. (2008) examined the possible effect of policing on crowd dynamics and chaos in England and Wales. It became apparent that the risk changed, according to the dynamics of the intergroup dealings and it can also arise from the intricacy and working of tactical paradigms and police organisational arrangements. Hence, the most successful way of dealing with such risk is guaranteeing that continuous threat evaluations are connected to information directed and fast tactical placements. Bronze commanders within the police organisational structure are in the best position to adjust the operational procedures and tactical schemes, which highlights the importance of Bronze level autonomy. Therefore, Bronze commanders should be empowered and trained with the required strategic aptitudes.

On the other hand, other barrier factors were identified in the US ICS system. They include difficulties transferring from theory to practice, delay in structure setting (Taber et al., 2008), and a lack of qualifications and lack of knowledge and understanding (Taber et al., 2008, Jensen and Waugh, 2014). With the transfer of command from the original responder to high-level employees often causing a loss of control over the incident (Buck et al., 2006). Some scholars have shown concern about the ICS structure development, arguing whether the structure is needed in the first place or even if it is as flexible as some claim. While Buck et al. (2006) maintain that the use of ICS as a principle of disaster and emergency management will probably not work as planned. Concerns from firefighters have been noted as to whether the structure would fit well for small fire incidents, as one structure manages all fires responding within the different types of fires occurrences. Also, using the structure might be inadequate for other agencies which have not used the structure before (Jensen and Waugh, 2014).

The experience of the ICS illustrates some negatives points with the structure adoption. After years of implementation of the ICS, there have been few studies into its effectiveness (Lutz and Lindell, 2008). According to Lutz and Lindell (2008) the ICS principles do not generalise well for all types of organisations when responding to different hazards. In addition, some authors state that the hierarchical structure of the structure does not consider the inherent complexity and uncertainty involved in large scale natural disasters like Katrina, where it was seen to have failed (Comfort, 2007). The structure failed at that time because, according to Wise (2006), the biggest problem during the response to Hurricane Katrina was the unsuccessful command at the highest level. The previous findings are consistent with a study by The´venaz and Resodihardjo (2010), where the authors found inadequate situational awareness at the highest levels resulting in ineffective communication between agencies in the disaster area. Due to this, response agencies were unable to establish a functioning ICS structure creating considerable confusion in the response phase to Katrina.

In summary, a literature review was conducted that summarises how scholars explored the ICS implementation internationally (Jensen and Thompson, 2016). Although Jensen and Waugh (2014) argue that after evaluation of the structure, all these debates do not mean that the ICS has not been used in practice. The initial principle of adjusting the ICS structure provides the first commander who arrives on the scene with critical information that can enhance the response process more efficiently.

Common barriers observed in both the UK and US systems include the lack of qualifications and experience, delays in structure setting and difficulties transferring from theory into practice. Both systems face challenges in implementing theoretical strategies in real-life scenarios. Consequently, it is observed that both the UK and the US have developed internationally recognised advanced emergency response structures that have been adopted widely by the other countries mentioned in this research. As mentioned previously, the main structure used in the UK is the GSB structure, while the USA utilises the ICS structure when responding and managing emergencies. The international recognition and acceptance of both these structures, has informed the decision of the UAE to implement the GSB structure as its emergency response command structure. Although this structure has many benefits, it does also face challenges and barriers, which have been identified by the literature review. Therefore, it is of the utmost necessity, that the GSB commanders have the knowledge and skills required to fulfill their roles of responsibility. It is also greatly important that the use of this emergency command structure by the CDGC agency in the UAE is reviewed critically, in order to provide essential information about the possible barriers and the way to eliminate or limit them successfully.

3.8 International Incident Command Systems

In this section, other international incident command structures are illustrated to identify key fundamental factors that affect the implementation of incident commands in different countries. Besides both the GSB and the ICS, a comprehensive literature review was conducted to identify what other factors are affecting the incident command. The rationale from selecting systems deployed in developed countries lies beyond the fact that the literature provides comprehensive resource about emergency response management in these countries. At the same time, the researcher has no attention to ignore other international reputable systems.

3.8.1 Japan

The Japanese disaster and emergency management system is a structure depends on a hierarchy structure, with the first level being the national level (Prime Minster) at the top, then the prefectural level (Governor), followed by local or municipal level (Mayors of cities), which are the primary agency who have responsibilities for managing disaster preparedness, response and recovery (Comfort et al., 2013, Britton, 2007). This structured was based on the use of a disaster management information system, to enhance information sharing between levels of an organisation’s hierarchical structure from the local to the national level (Okada and Ogura, 2014). Thus, a study was conducted of an evaluation of the command and information system, compared to the American ICS structure (Okada and Ogura, 2014). The authors identified significant major obstacles based on the Japanese agencies neglect coordination and information sharing, which is a strong influence of ICS effectiveness (Boersma et al., 2014).

3.8.2 Australia

In Australia, the ICS framework has been provided by the Australian Inter Service Incident Management System (AIIMS). The framework has been used by emergency services such as the Australian Fire Agencies for dealing with all sizes of incidents (Bearman et al., 2015, AIIMS, 2004). The Australian emergency services follow similar concepts that have been used in the US, as well as the Gold, Silver and Bronze command function which has been adopted in the UK. In Australia, the management of large scale incidents (such as the UK GSB) is achieved through three main levels: operational local (level 1), tactical regional (level 2) and strategic national (level 3) (Bosomworth et al., 2017). In the operational level 1, most incidents are managed by the first responders, using local resources. For the tactical Level 2, this includes local emergency services, and in more complex incidents, the teams who support the first responders. While, strategic Level 3 takes place when incidents need support from external emergency agencies, that provide additional resources (Bearman et al., 2015, Curnin et al., 2015, Bosomworth et al., 2017). Based on the previous articles, although the idea of the Australian incident command structure is similar to the UK command structure, the function of command in Australia is similar to the US ICS framework during response to incidents of all sizes and it is structured into four main functions: planning, public information, operations and logistics (Bearman et al., 2015, Curnin et al., 2015).

3.8.3 China

In China, the development of emergency management is still at exploration stage. Therefore, the Chinese government has adopted the US structure. After multiple cases of disasters, the Chinese government has made progress in incident command structures, although, several drawbacks in ICS implementation have occurred in the response process. Among these drawbacks are the absence of the roles and responsibilities of the first responders, the absence of emergency operation procedures, poor communication, and coordination in the response process. Consequently, the authors recommended that establishing ICS standardisation is a task of top priority (Zhang and She, 2014).

3.8.4 Taiwan

In Taiwan, the ICS has been implemented since the 1999 Chi-Chi earthquake and the structure has become an important structure for the Ministry of Interior. A lack of standard operation procedures was identified as the main source of communication failure of the disaster management (Lam et al., 2010).

3.8.5 Norway and Sweden

The concept of emergency response to incidents is quite similar internationally. In European countries such as Norway and Sweden, a similar structure to the US of the ICS has been adopted. However, some challenges appear in implementing the structure, with the first challenge being that in the initial response phase, a group of low ranking officers are commanding, whereas the selected incident commander arrives an hour later. Another challenge is the changes in the roles of the incident commander (Njå and Rake, 2008).

The Norwegian emergency response system is well suited to manage minor to large scales of emergency, and the overall incident commander is represented by the police (Rimstad et al., 2014), while in Sweden it is from the fire department (Rake and Njå, 2009). In Norway, the police command centre represents a strategic level, while the second level is called operational (in the UK it is called tactical) and it is represented by the chief of staff. The third level is the tactical level on the scene (in the UK it is called operational), and it is represented by the incident commander. More details of The Norwegian emergency response structure and roles of responsibilities for each level is illustrated by (Sommer et al., 2017).

Rimstad et al. (2014) explain that there are some common challenges with large scale incidents, such as information overload and a lack of information between emergency services. For instance, a recent study in Norway was conducted to examine how incident commanders from Norwegian police officers learn to manage emergency response operations. The study analysed the terrorist attacks on the Government Complex in Oslo and the Utøya Island shooting on the 22nd of July 2011, resulted in 77 deaths in total. Some important factors impacted the emergency response operations and it was concluded that, the command structure was ineffectively managed, there was a lack of situation awareness, a lack of information sharing, and the gathering of information was weak (Sommer et al., 2017).

3.8.6 Netherlands

In the Netherlands, the concept of emergency and disaster management is based on local responsibility. This concept depends on collaboration rather than on a command structure. Police, fire, and ambulance services are responsible for regular or small scale accidents rather than large scale disasters, which should be a part of their responsibilities as emergency services. In contrast to the UK command structure, the tactical level is not located near the operational events, but near the strategic level (Groenendaal et al., 2013). Therefore, in order to shape the collaboration structure, the local organisation structure for emergency and disaster management has been divided into three main multidisciplinary coordination levels (Scholtens, 2008, Scholtens et al., 2014):

1. The municipal policy team, the Mayor is in supreme command, and makes the strategic decisions. Having the role of giving orders to participants in the management of a disaster;
2. The regional tactical team, who translate the strategic decisions into tactics with the responsibility of observing operational coordination.
3. The local operational command team, who ensure the tactics are carried out. The responsibility of the team is to coordinate operational command with all emergency agencies at the site; however, the commander has no commanding power on other agencies rather than passing on the mayor's orders (Scholtens et al., 2014).

3.9 Development of the Conceptual Framework

This section outlines the development process of the conceptual framework for this research. Firstly, the conceptual framework was developed by identifying the main issues resulting from the literature review. Secondly, there was an identification of the relationship between key concepts, along with the boundaries, and scope, of the study. The development of the conceptual framework is demonstrated in Figure 3.3 below.

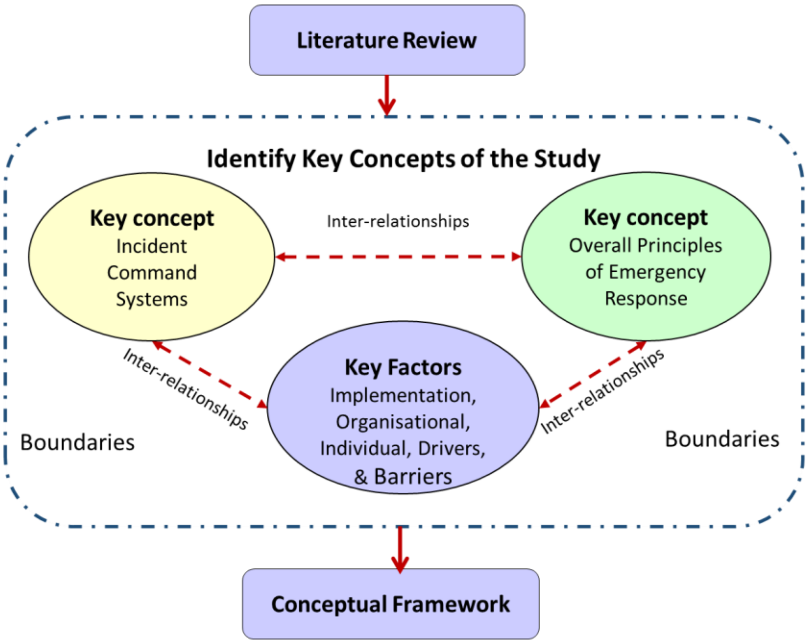


Figure 3.3: The development of the conceptual framework

The conceptual framework maintains its function and general purpose adequately. It details the theoretical models, concepts, arguments, and ideas that have been developed in relation to the research topic theme. This conceptual framework is devoted to the definitions of key concepts and factors of the study, to describe its characteristics. Such as incident command systems and the principles of emergency response, including implementation, organisational, individual, driver and barrier factors, to explain possible processes associated with them. In addition, it recognises and describes state-of-the-art functionality, that is, to indicate the main theoretical lines in relation to the problem of this thesis and propose a new theoretical perspective that is considered relevant in relation to the research objectives. The following main sections are those suggested by (Kulatunga, 2008), and demonstrate the key concepts involved in the development of the conceptual framework.

3.9.1 Main concepts

The process of developing the literature review enabled the main key concepts of incident command system during an emergency response to be identified. There are a number of phases involved in the development and conceptualising of the framework for the incident command system in the CDGC in the context of the UAE. The initial phase consists of formulating the research aim. As previously noted in section 1.4 in chapter 1, the aim of the current research is to develop a framework for the incident command system in the UAE’s CDGC.

Thus, based on this aim, the second stage of the process consisted of a comprehensive literature review. Meanwhile, undertaking such a detailed study emphasising improvements in command structure can provide effective implementation of the incident command system during the emergency response phase. Thus, the key concepts of the incident command system consist of: firstly, the implementation and drivers of the incident command system as a structure of emergency response; secondly, the organisational factors; thirdly, the individual factors impacting on incident command system and finally, the barrier factors impacting on incident command effectiveness.

3.9.2 Relationship between the key concepts

This section firstly, outlines the main concepts of the conceptual framework in the literature review, and secondly, establishes the relationship between these concepts. This conceptual framework highlights the importance of the emergency response phase to preserve both life and property.

Furthermore, the framework identifies the importance of the implementation of the incident command system of emergency response for the emergency services, i.e., the fire agencies. This is because it explains the roles and responsibilities between the Gold, Silver and Bronze commanders, thus decreasing confusion between these levels. At the same time, the framework also enhances a flexible exchange of information.

Thereafter, the framework outlines the organisational and individual factors and the general barriers influencing the incident command system, in particular in terms of individual and organisational factors in sections 3.7.2 and 3.7.3 in chapter 3. As further noted in section 1.3 in chapter 1, there is also a need for further investigation into the incident command system in the context of the UAE when dealing with an emergency. This indicates the existence of a limitation of knowledge concerning the incident command structure used in the CDGC, and precisely the potential obstacles, that can be identified when implementing the structure during the emergency response phase.

This research is focused primarily on an investigation of the incident command structure during an emergency response, having established from the literature that (despite incident command being implemented in CDGC in the UAE) a number of issues remain with the management of an emergency response, due to the confusion between commanders relating to their roles and responsibilities. This leads to a need to evaluate and examine incident command as a structure of emergency response, due to a lack of contribution to the knowledge, as the UAE is still a developing country in the field of emergency management. These key issues illustrate the relationships between the concepts.

3.10 Incident Command System Conceptual Framework

This section illustrates the explanations of the key components of the conceptual framework of this research and outlines the ways in which the various themes come together to explore and evaluate the incident command structure implemented in CDGC. It is essential to develop a conceptual framework with a clear understanding of how themes are joined together to evaluate the incident command system.

Figure 3.4 below represents the conceptual framework based on: (1) a consideration of the key concepts; (2) the relationship between the main concepts; and (3) a consideration of the boundaries of this research. The conceptual framework will be refined following the data collection and data analysis. The core function of the framework is to represent the unit of analysis of the study, i.e., the incident command system. Red arrows indicate the steps forward in the process in which the incident command system for emergency response begins, the implementation and driver factors of the incident command implementation, and the ways in which the incident command structure is influenced by several organisational and individual factors, and barriers identified from the literature. Blue arrows denote the reasons of the incident command implementations, the organisational and individual factors, and the barriers, all of which are categorised in the subthemes and the drivers which may lead to the effective implementation of an incident command system. The framework demonstrates the boundaries of the research, indicated by rectangular blue dashes, whereas the rectangular red dashes identify the scope of factors impacting on the effectiveness of the incident command system. The conceptual framework for this study is presented in Figure 3.4 below. The fourth objective of this study was achieved through developing a conceptual framework based on the main elements that contribute to the development of resilience-focused on the best practices of incident command systems in developed countries.

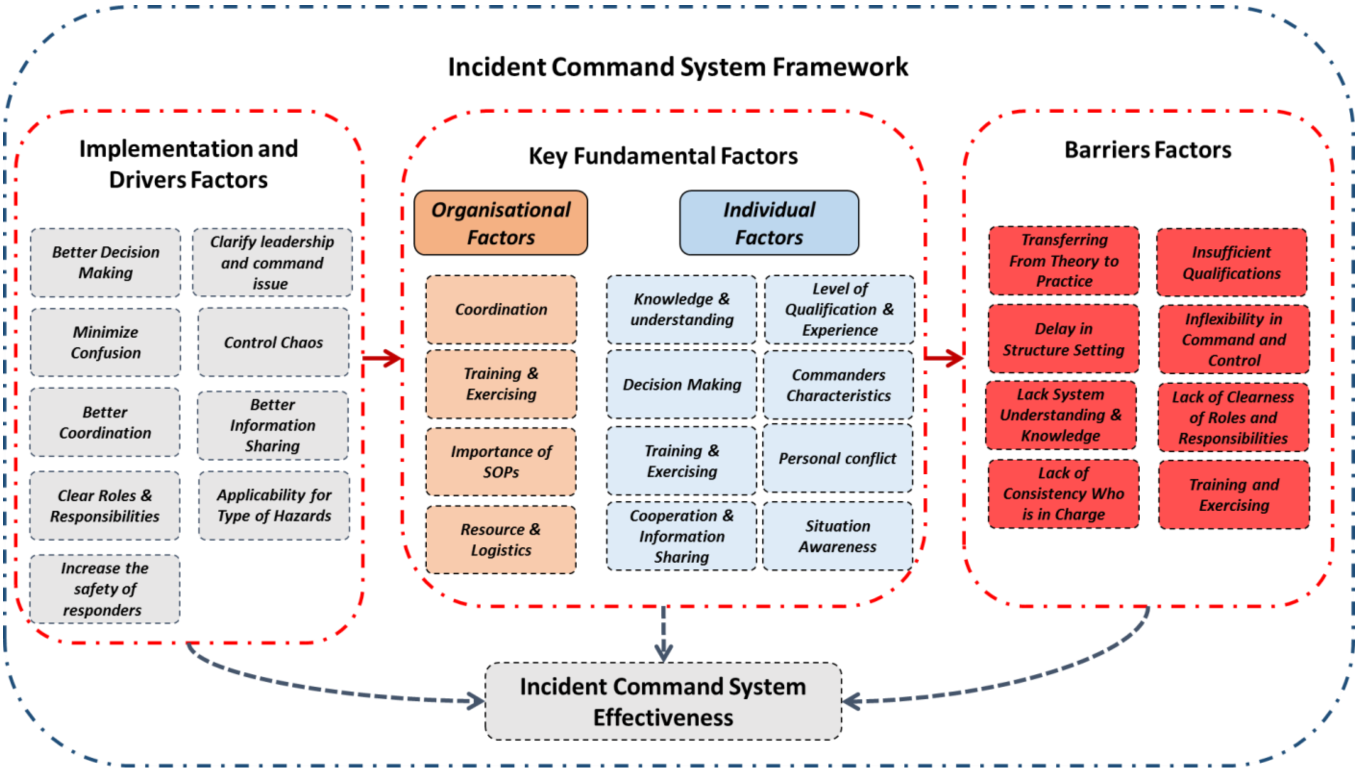


Figure 3.4: Research conceptual framework

The conceptual framework is based on the phases of the administration process and analysis of the problems and complications encountered during responses to incidents and event management. Accordingly, three major components were established as; implementation and drivers, key fundamental factors, and barriers. There are common links that identify them, so they are grouped into the following characteristics:

(i). Implementation and driver factors include: better decision making, minimised confusion, better coordination, clear roles, and responsibilities, an increase in the safety of the respondents, clarification of the leadership and command roles, controlled chaos, better information sharing, and application for the type of hazard.

(ii). Key fundamental factors both organisational and individual. The organisational factors include coordination, training and exercising, the importance of SOPs and resource and logistics, while the individual factors include: knowledge and understanding, decision making, training and exercising, cooperation and information sharing, level of qualifications and experience, commanders' characteristics, personal conflict, and situational awareness.

(iii). Barrier factors include: transferring from theory to practice, delays in structure setting, lack of system understanding and knowledge, lack of consistency of who is in charge, insufficient qualifications, inflexibility in command and control, unclear roles and responsibilities, and inadequate training and exercising.

It can be seen from the Figure 3.4 above; that the conceptual framework as a model promotes standardisation for the management of events or operational incidents, along with maintaining its implementation. Nevertheless, it is necessary to develop standards, plans, protocols, procedures, and agreements. The conceptual framework also allows foresight into the development of standardised operational structures, so that public institutions, non-governmental organisations and private companies could work together in a coordinated manner effectively. The flexibility of the conceptual framework could be used and adapted to any hazard situation, from local incidents or those where it is required.

3.11 Chapter Summary

The UK and the USA have developed advanced emergency response structures, which have gained international recognition and other countries have borrowed extensively from them. The main structure adopted by the US is the ICS structure while the UK utilises the GSB system in managing and responding to emergencies. The international acceptance of these structures informs the reason for the UAE's implementation of the GSB system as its system of emergency response structure. The incident command structure has numerous benefits but also has several challenges and barriers identified by the literature when implemented in emergency situations. Therefore, application of this emergency command approach by the UAE's CDG requires a critical review to establish potential barriers and how to solve them.

Both the UK and the US structures have similar architecture, but the main difference is that the US's ICS structure is centralised on functions, while the UK's system is based on behavioural features. Both systems have common advantages and countries can benefit from implementing either of the structures for emergency command. As several barriers have been identified within both systems, this implies that the adoption of the structure for the first time is likely to result in problems.

Chapter three looked at the elements that underlie the research study and explained the key factors of the main issues that are to be investigated. Based on what the essential elements required for a commander to effectively respond to emergencies are, with these elements considered as a foundation, on which this study attempts to address and build an investigation within the CDGC settings, for responding to emergencies and disasters.

Hence, these approaches can be used in benchmarking for other nations such as the UAE. As previously mentioned, the UAE's CDGC agency is responsible for protecting peoples' lives, properties and national and natural resources in case of emergencies. It has realised the need for improvement and is consequently developing a standard manual for emergency response procedures based on the GSB system of the UK. This is intended to increase professionalism using an emergency response framework for effective modern-day emergency management.

The study aims to investigate the current implementation factors of the framework for the incident command structure and identify emergency response factors that influence the command implementation in the UAE's CDGC. To help improve the civil defence commander's performance on key fundamental factors, that show the expected outcome that would be achieved by the MOI. Although some key factors were identified from the UK and the US command systems, there is still no literature related to the UAE context. Therefore these factors will be addressed and modified in this study after completion of the first stage of the data collection, which is semi-structured interviews with Gold and Silver command levels. This research will focus only on the response stage which associates with the emergency response from an individual perspective as an important feature.

This chapter has discussed the procedure for developing the conceptual framework of this study by identifying: (1) the main concepts; and (2) their inter relationships. The elements of the conceptual framework have been extracted from the literature review. This review indicates that the UAE ICS system bears numerous similarities with the GSB system in the UK. Both systems are characterised by three command levels of Gold, Silver and Bronze, which are also synonymous with the strategy, tactics and operational activities in the UK system. However, there is limited information concerning the implementation of the incident command system in the UAE, which identifies a knowledge gap in the application of this system in this country.

Following the development of the conceptual framework of the study, the following chapter outlines the methodology adopted for this research, using the single case study research approach, semi-structured interviews during the first stage, and the questionnaire survey during the second stage.

CHAPTER 4 RESEARCH METHODOLOGY

4.1 Introduction

This chapter outlines how research is carried out. It discusses the research assumptions behind the research methods and the relevant research techniques and approaches adopted in order to answer the research questions. A vital concept in this research is exploring the application of the incident command system within the UAEs' Civil Defence authority to address facilitate emergency responses. This study is conducted to better understand the existing structure of command and control elements in the incident command system hierarchy and to determine the critical drivers, barriers impacting individual performance at the Gold, Silver and Bronze levels. The research starts with a literature review on the subject. In this chapter, further details on the research methodology will be identified, followed by a rationale for why these methods were selected for this research.

4.2 Overview of Research Methodology

A research methodology is a systematic process for solving a research problem. It involves understanding how the researcher performs the objectives and answers the research questions to gain new knowledge. The methodology outlines the theoretical principles that guide a particular research approach (Saunders et al., 2016). According to Pathirage et al. (2005) developing a research methodology is an essential process for giving careful consideration to a research study and for choosing an appropriate approach and research method.

The systemic approach includes cooperation between a researcher and an organisation facing a specific problem that needs to be solved (Rist et al., 2006). It lays out suitable steps that can be adopted by a researcher to deduce a logical conclusion to a research problem (Kothari, 2004, Collis and Hussey, 2009). It is also a science of studying how research can be carried out, or the philosophy behind all research (Rajasekar et al., 2006, Adams et al., 2007). Accordingly, it is essential to use an appropriate method to process systematic research.

A number of studies found in the literature identify the existence of some confusion between mixed methods research, i.e., the terms 'method' and 'methodology'. Creswell and Plano Clark (2011) defined the term 'method' as referring to the practical process of the collection and analysis of data, emphasising the main characteristics of mixed methods research as being the collection and analysis of both qualitative and quantitative data. Moreover, Saunders et al.

(2016) defined the term 'methodology' as the philosophical assumption underpinning research, including the process by which a researcher designs the research questions and selects the methods employed , while pragmatism refers to the use of a range of methods (i.e., mixed, multiple qualitative or quantitative). This current study does not, however, employ the term 'methods' as referring to a research methodology, but as the tool employed for data collection and analysis.

According to Dainty (2008), a research methodology not only refers to the methods in a given research study; it also includes the philosophical assumptions that support the research. Methods are the tools for collecting and analysing research data that are used by a researcher to achieve the research objectives and to answer the research questions (Creswell, 2015). Therefore, a research methodology is a vital process that allows a researcher to follow the process of achieving the research objectives.

In order to articulate the research methodology for this research, the researcher will follow Saunders et al. (2016) research onion model. The research onion model outlines the research process, starting with the research philosophies and ending with the data collection methods. This model has been chosen due to its clear illustration of the structure and layout of the research design, from the philosophical approach to the data collection and analysis methods. Given the above discussion, the research onion model is considered as one of the most important research methodology frameworks, and it seems to cover the entire strategic framework of the present research study as shown in Figure 4.1.

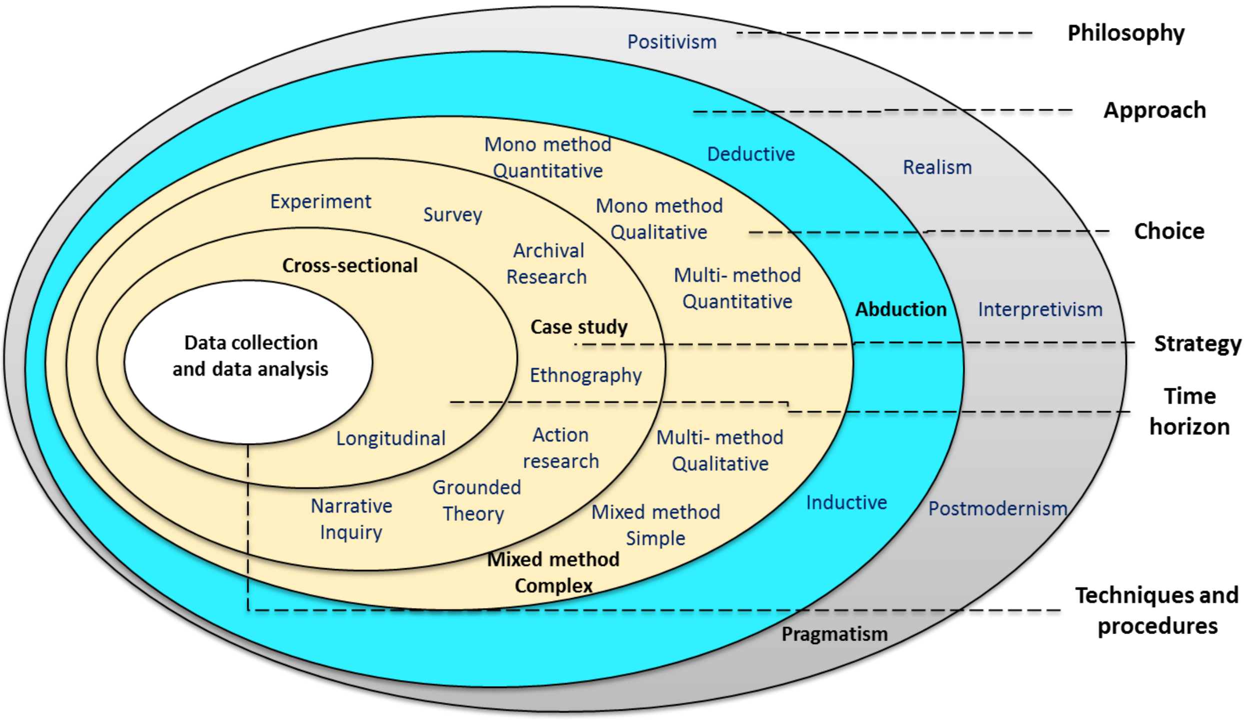


Figure 4.1: Research onion model source: (Saunders et al., 2016)

According to Saunders's research onion model, there are approximately six layers, which starts with main research philosophies types. The coming sections will explain the research design, beginning with the research philosophy first layer, and ending with the research data collection and research data analysis techniques as the last layer. In addition, the study describes the philosophies that are most applicable to this research project, as well as the ontological, epistemological and axiological considerations related to the aim of the study, which is to develop a framework for the command structure within the UAE's CDGC emergency services, to identify implementation factors, organisational and individual factors, as well as to identify barriers, drivers and provide vital recommendations for adoption by the CDGC to improve the emergency response structure.

4.3 Research Philosophies Assumptions

Scientific achievements have previously focussed on a single research philosophy. However, a range of sources had been successfully employed recently in both natural sciences and social sciences. The emergence of the social sciences can be viewed as enhancing the progress of the natural sciences (Collis and Hussey, 2009). Furthermore, many approaches are related to the identification of philosophy, i.e., research philosophy in management, including positivism and interpretivism, realism and pragmatism (Easterby-Smith et al., 2012, Easterby-Smith et al., 2015, Gray, 2014, Collis and Hussey, 2009). However, Easterby-Smith et al. (2012) viewed ontology, epistemology, and axiology as forming the core of research philosophy, while Saunders et al. (2016) considered that ontology, epistemology and axiology are located outside and around the research onion of research methodology. Collis and Hussey (2009) indicated that a researcher may find him/herself faced by a number of different terms describing different research philosophies, due to the terms employed in the literature being perceived as possessing different meaning and disciplines.

The research philosophy of this study has been formulated to follow Saunders et al. (2016) research onion model. A research philosophy is a set of beliefs, philosophies, and assumptions about the nature of knowledge and various aspects of the world as viewed by the researcher (Collins and Hussey, 2003). There are three main reasons for understanding the issues of research philosophy are useful. First, Easterby-Smith et al. (2004) highlighted that knowledge of philosophy could encourage a researcher to clarify his research designs. This means that the overall structure of the research includes the types of evidence collected, how they have been collected and from what perspective they will be interpreted. Second, knowledge of philosophy can assist a researcher in identifying or creating designs that may lie outside his past experience (Easterby-Smith et al., 2004). Therefore, the research philosophy includes important assumptions that support the research strategy and methods. Both the philosophical approach and the research approach strongly influence the reasoning behind the research and, subsequently, the data collection and analysis. Many experts in the area of methodology, such as (Saunders et al., 2016, Collis and Hussey, 2013), believed that there are major domains philosophies. In general, the majority of these debates among scientists have focused on assumptions related to the research philosophy, such as ontology, epistemology, and axiology. Many experts in the area of methodology, such as (Saunders et al., 2016, Collis and Hussey, 2013), believed that there are major domains philosophies. In general, the majority of these debates among scientists have focussed on the subject of assumptions related to the research philosophy, i.e., ontology, epistemology, and axiology. The next subsections explain and justify the philosophical stands for this research, starting with ontological, epistemological and axiological assumptions that are described in relation to the aim of this research.

4.3.1 Ontology

Ontological assumptions shape the way in which a researcher studies the research. These involve an understanding of objects, including organisations, individuals' lives and artefacts in management and business and, thus, influence the choice of what to research (Saunders et al., 2016). Researchers have studied the spectrum of ontology, which refers to *"The nature of reality"* (Creswell et al., 2007, Pathirage et al., 2008), leading to a considerable number of debates arising from differences between the natural and social sciences (Easterby-Smith et al., 2015). A traditional understanding of the ontology continuum states that the world is external and real, and thus research phenomena can only be observed through direct correspondence with the subject of research. The ontology describes our views on the nature of reality: whether there is an objective reality that really exists or whether reality is subjective and created in our minds. Therefore, understanding these positions is crucial for any research study.

Some authors have argued for the existence of two main ontological spectrums, with an identical meaning but formulated with different expressions, including: (1) Realism and Idealism and (2) Objectivism and Subjectivism. A number of further authors have also indicated that both terms focus on ontological aspects, i.e., Realism and Idealism (Easterby-Smith et al., 2015, Easterby-Smith et al., 2012), whereas (Saunders et al., 2016, Saunders et al., 2012), highlighted the main ontological assumptions as being Objectivism and Subjectivism.

Objectivism/Realism consists of that which the senses indicate as being the reality and the truth. It argues that objects are independent from social actors and holds a similar view as positivism in assuming a scientific approach to the development of knowledge, i.e., the existence of an external and independent reality capable of being measured (Gray, 2014, Easterby-Smith et al., 2015). While Subjectivism/Idealism considers the potential for a variety of social realities, which are created from the perceptions and consequent activities of social actors, leading to the researcher being required to collect multiple experiences, perceptions, and views (Easterby-Smith et al., 2015, Saunders et al., 2016). From the perspective of the researcher, both sets of terms are attached to the identical meaning of understanding of Objectivism/Realism and Subjectivism/Idealism. Table 4.1 below indicates the differences between these two terms.

Table 4.1: Comparison between objectivism/realism and subjectivism/idealism source (Easterby-Smith et al., 2012)

Ontology	Objectivism (Realism)	Subjectivism (Idealism)
Truth	Single truth	There are many truths
Facts	Facts exits and can be revealed	Facts depend on viewpoint of an observer

These aspects influence what a researcher seeks to investigate. Thus, understanding the principles of the research philosophies is a key factor in achieving any research project. Research studies conducted with an objectivist approach are more likely to explain events and test theories, whereas studies conducted with a subjectivist approach are more likely to attempt to understand differences among people, rather than objects; these studies explore differences among humans as social actors in order to gain an understanding of the world from different groups' viewpoints and to collect richer and new information about various phenomena.

4.3.2 Epistemology

Epistemology continuum describes how a researcher knows about various assumptions and the reality of gaining knowledge that should be accepted. Generally speaking, epistemology deals with the following questions: *"What is knowledge?" "What do people know?"* and *"What counts as knowledge?"* (Gray, 2014). The Epistemology continuum refers to the assumption that knowledge facilitates researchers to select the most effective approach towards enquiring into the social worlds (Easterby-Smith et al., 2015). A researcher can, over time, modify these philosophical positions and move to a new position. Therefore, the most popular examples of epistemology positions in the social sciences consist of positivism, interpretivism, and pragmatism (Collis and Hussey, 2013). The coming subsections will explain the differences between the three approaches.

4.3.2.1 Positivism

Positivism generally refers to the epistemological stance of natural science. It embraces realism, which focuses on a single truth of reality (Saunders et al., 2016, Gray, 2014). It is associated with the ontological assumptions related to objectivism/ realism (Easterby-Smith et al., 2004, Collis and Hussey, 2013).

Positivism uses existing theory to develop hypotheses that will be tested and confirmed, resulting in the future development of theory. Research studies that are conducted with an objectivist approach are more likely to explain events and test theories. The positivistic approach tends to identify and evaluate issues by providing explanations for it. These explanations may establish links among different subject variables and/or relate them to specific theories. Furthermore, positivism is associated with the epistemological assumption that the social world exists externally and that its properties can be ascertained by means of objective measures, i.e., in which the observer is independent from that being studied, and thus the aim of the researcher is to establish the theory explaining the reality (Easterby-Smith et al., 2012). This approach is used by scientists, who apply deductive logic through experiments and observation to discover theories that can be used in prediction. Therefore, Saunders et al. (2012) stated that a researcher who is adopting a positivist approach would be concerned with facts, rather than with undertaking the research in a value-free approach.

4.3.2.2 Interpretivism

Interpretivism involves conducting research with people, rather than objects, and it concerns the differences among humans as social actors (Saunders et al., 2012) . Saunders et al. (2016) emphasised that the purpose of interpretivist research is to collect richer and new information to understand and interpret social worlds. An interpretivist interacts with the phenomena being researched as a result of the difficulties in separating that which exists in the world from the view of the researcher (Collis and Hussey, 2013). To clarify the differences between these two main paradigms, their features are compared in Table 4.2 below.

Table 4.2: A comparison of positivism and interpretivism (Collis and Hussey, 2013)

Positivism (Quantitative) tends to:	**Interpretivism (Qualitative) tends to:**
Use large samples	Use small samples
Hypothesis testing	Generating theories
Objective, precise, quantitative data	Subjective, rich, qualitative data
Results with high reliability but low validity	Results with low reliability but high validity
Findings can be generalised from samples to populations	Findings can be generalised from one setting to other similar settings

4.3.2.3 Pragmatism

Pragmatism focuses on the adoption of both facts and values, and on objectivism and subjectivism. A researcher is employing pragmatism as his/her philosophical position commences his/her study with a practical problem, aiming to contribute a solution for future practice (Saunders et al., 2016). Teddlie and Tashakkori (2010) stated that this might refer to the use of a mixed method research design. Furthermore, combining different approaches and evidence creating different ways of looking at the world can enhance a researcher’s ability to understand a research problem from some different viewpoints (Hitchcock, 2017).

The above discussion establishes that, in to answer a specific research question, it is important to adopt a philosophy capable of employing both the qualitative and quantitative data collection methods. This philosophy assists a researcher to describe in detail some initial themes, in order to identify the theory, which is subsequently confirmed by the researcher using an additional phase of data collection (Creswell, 2015). Pragmatists, therefore, assert that, rather than focusing on a single position, a researcher should be open to the use of a variety of methods, according to their benefits in answering the research questions.

4.3.3 Axiology

The last philosophical stance is an axiological assumption, which is concerned with the role of values in the study (Collis and Hussey, 2013). Axiology continuum is a kind of philosophy branch that *"Studies judgments on value"* (Saunders et al., 2009). Values play an important role in all steps of the research process. However, according to Sekaran (2013) the axiology refers to the choice of the data collection and the data techniques are valued.

As it was indicated, axiology is concerned with the role of values. The main aspects of this philosophical approach can be classified based on whether the reality is value-free and value-laden (Collis and Hussey, 2009). In a value-free approach, the researcher is independently related to the data, and his/her stance is; therefore objective, while the selection of how and what to study depends on the criteria of the study objective. Therefore, Collis and Hussey (2013) noted that a researcher adopting a positivist assumption is detached and independent from the subject of the research.

On the other hand, in a value-laden situation, the research selection relies on human experience and beliefs (Easterby-Smith et al., 2004). According to Collis and Hussey (2013) interpretivists assume that social reality is subjective that there are multiple realities. Therefore, each researcher has his own reality Interpretivists assume that it is not possible for the researcher to be separate from what is being studied, leading to greater subjectivity. Table 4.3 below illustrates the differences between the three main research philosophies.

Table 4.3: Differences between three research philosophies (Saunders et al., 2012)

	Positivism	**Interpretivism**	**Pragmatism**
Ontology *What is the nature of reality*	Real, external, independent of social actors, objective	Complex, rich, socially constructed from experiences, subjective	Complex, rich, external, view chosen to best enable answering for research questions

Epistemology *What creates acceptable knowledge*	Objectivism, Scientific method, observable and measurable facts. Focus on causality and law-like generalisations, numbers	Subjectivism, focus on perceptions and interpretations. Focus on the details of situation, a reality behind these details	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on problems practices and relevance Problem-solving and informed future practice as contribution
Axiology *What is the role of values*	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance	Value-laden research Researcher is part of what is researched Researcher maintains subjective stance	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view Researcher reflexive
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

4.3.4 Research Philosophy and Justification

In this research, the adoption of the philosophical stance of pragmatism assumes a number of important benefits. This philosophical continuum provides initial reasons for the research, as outlined below (Creswell, 2014):

- Pragmatism is not dedicated to any philosophical stance, and can therefore be applied in mixed methods design, i.e., qualitative and quantitative, and it focuses on answering the ‘what’ and ‘how’ of research questions;
- Pragmatism allows freedom of choice, enabling researchers to answer the research questions through the selection of multiple methods and data collection techniques;
- No absolute unity exists within the philosophical continuum of pragmatism. Rather than maintaining a single approach, it accepts the use of many techniques for both data collection and analysis;
- Pragmatism therefore offers opportunities for researchers to employ a variety of methods and assumptions, as well as data collection techniques and analysis.

Based on the explanation provided, the current research focuses on firstly, developing a framework for the application of the incident command system in UAE's CDGC emergency services. Due to the research objectives, this study will adopt pragmatism philosophical stance. Firstly, understanding the key factors of incident command (including current implementation factors, organisational and individual factors, obstacles and drivers in the context of the UAE's CDGC) requires an investigation of the experiences of CDGC commanders, in particular at local level, in using the incident command structure in the field of emergency response, in order to provide key information for this research. Secondly, it is important to explore the drivers for the implementation of incident command, and thus key factors facing incident command, as well as barriers relating to the existing incident command structure. This ensures that important data from the literature review is collected and analysed, as well as that from the current emergency response structure. Thus, this study firstly focusses on interpreting the various perceptions of a number of experts concerning the strategic Gold level and the tactical Silver level, in order to understand their different perceptions of their emotions and to collect sufficient information concerning the command structure at the local level of CDGC. In addition, the researcher considers that there are a variety of social realities and truths, created from facts dependant on the perceptions and consequent activities of social actors, e.g., CDGC commanders.

Secondly, a comprehensive analysis of all the themes and factors involved in the study will lead to an accurate reflection of the opinions of the interviewees, and thus these themes will be quantified, in order to assess the incident command framework. The use of a large sample for the questionnaires enabled the Bronze commander and the experts to confirm, validate and refine the framework of the application of the incident command in the UAE's CDGC emergency services. The above discussion reveals the tendency for the philosophical stance of this research to be that of pragmatism. Figure 4.2 below summarises the complete research philosophy stance relating to this research, which can be positioned in the middle of types of philosophies. In addition, following the second layer of Saunder's onion, the following next section describes the research approach.

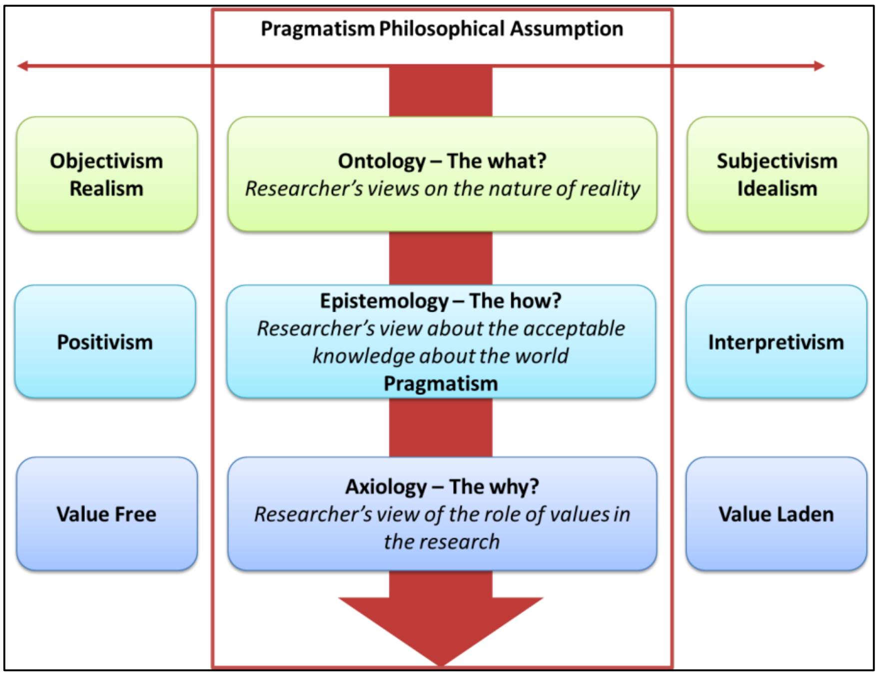


Figure 4.2: Research philosophy stance

4.4 Research Approach

The research approach centres on the rationale of the research, what information already exists and how the researcher compiles and gathers future data. As well as how clear the researcher is on the philosophy and the best approach to managing the research project. The initial concept was to critically analyse the incident command system currently used in the UAE. Even though the literature review revealed existing data relating to incident command systems in the UK and USA, there is still insufficient literature related to the UAE. Therefore, this discrepancy became a key issue when carrying out the investigation.

There are three general approaches in the literature: deduction, induction, and abduction. Firstly, this research deployed an abductive approach, which is based on a set of field observations, with the aim of providing a comprehensive explanation. It is based primarily on inductive reasoning to obtain information pertinent to incident command systems that could assist in developing theories and justify the need for an effective response to emergencies. Secondly, this research also deployed the deductive approach, which assumes the development of a conceptual framework based on identified factors that influence the implementation process of the incident command system in the UAE context. Therefore, the abduction approach is employed, in combination with inductive and deductive approaches. In summary, this research employs the abduction approach, as it has the capability to go back and forth and be more comprehensive than the other approaches.

4.4.1 Deduction

A deductive approach involves testing a theory and hypotheses. Then, a research strategy must be designed to test the hypotheses, which are ultimately confirmed, disproved or modified. Hypotheses are assertions about two or more variables and their relationship(s) (Thomas, 2006, Gray, 2014). The deductive approach involves the testing of a theory to establish a generalisation (Hyde, 2000). This approach relates to the philosophical assumption of positivism in relation to the undertaking of experiments to test (or confirm) a hypothesis. Generally, a researcher starts by reading the literature and subsequently designs a research strategy in order to test the theory. Therefore, for the deductive approach, studying a large sample might be more appropriate than studying a small one (Saunders et al., 2016).

4.4.2 Induction

On the other hand, the inductive approach involves collecting data in order to develop a theory based on data analysis (Thomas, 2006). According to Hyde (2000), the inductive approach uses theory building to establish generalisations concerning the topic under examination. Researchers using the inductive approach are more likely to be concerned with the contexts in which events take place. In any event, it is essential to select an appropriate methodology for the project. However, for a new topic on which there is scarce existing literature, the inductive approach may be more appropriate. The inductive approach is interchangeable with interpretivism, while the deductive approach is interchangeable with positivism (Saunders et al., 2016).

4.4.3 Abduction

A third research approach and aspect of theory development that is common in research is the abduction approach (Ketokivi and Mantere, 2010). If a researcher wants to combine the deductive and inductive approaches, an abduction approach may be a good choice (Suddaby, 2006). According to Saunders et al. (2016), abduction stems from a surprising finding rather than a basic assumption; thus, if a researcher wants to explore a phenomenon, identify themes or modify or generate an existing theory, then abduction is most suitable. Table 4.4 below compares the major differences among the deduction, induction, and abduction research approaches.

Table 4.4: Deduction, induction and abduction source: (Saunders et al., 2016)

Deduction	**Induction**	**Abduction**
When the premises are true, the conclusion must also be true	Known premises are used to generate untested conclusions	Known premises are used to generate testable conclusions
Generalising from the general to the specific	Generalising from the specific to the general	Generalising from the interactions between the specific and the general
Data collection is used to evaluate hypotheses for an existing theory	Data collection is used to explore a phenomenon, identify themes and create a conceptual framework	Data collection is used to explore a phenomenon, identify themes, locate these in a conceptual framework and test the results through subsequent data collection
Theory falsification or verification	Theory generation and building	Theory generation or modification, using existing theory where appropriate, to build a new or modify existing theory

This research is an exploratory study, in which the researcher seeks to explore the phenomena in a context in which little is known about the incident command structure implementation in the UAE particularly in the CDGC. Deciding on the best approach depends on the nature of the research topic and depends, in particular, on the research emphasis.

As mentioned earlier, and according to previous justification on adapting the pragmatism philosophy, very little is known about the application of the command structure within the CDGC in the UAE, and there are no academic literature providing substantial knowledge or information about the command structure in the UAE, and there is a lack of literature on the subject in the UAE. Instead, although the available literature addresses the command structure in the UK, summarising the main structures, elements, drivers, barriers and patterns, identifying those themes and elements will take place during the data collection stage especially in the UAE context.

As far as the researcher was able to determine, this study is a novel study, since it is the first study of its type conducted in the UAE. As was mentioned earlier, in cases involving scarce existing literature or in research attempting to create a framework and to draw recommendations for a phenomenon, furthermore, since this study exploratory in nature and due to the explanation of adapting sequential explanatory research design, therefore, an inductive approach is used, and this involved using semi-structured interviews with Gold and Silver commanders on the UAE command and control application in order to build a framework and to gain an understanding of the current implementation of the command structure and to identify the key elements determining the command's effects on the emergency response. Moreover, the second stage of the research in which basis and reasons for the incident command implementation, key factors affecting the incident command, barriers and drivers elements are identified by the researcher. Using a large sample size in questionnaires from the Bronze commander in order to confirm and refined the framework factors of the application of the incident command in the UAE's CDGC emergency services and to provide recommendations for adoption by the MOI to improve emergency service responses. Accordingly, at the second stage of the research, this research project used deductive approaches.

4.5 Research Choices

The research methodology choice is the third layer in Saunders' onion structure. The following section will examine the different types of techniques used to address the basic research objectives. This section explores the backgrounds of the qualitative, quantitative and mixed methods choices, as well as the choice among them. To this end, this research aimed to examine the existing knowledge gap that was disclosed by reviewing the relevant literature and during the initial process of data collection to decide what type of intervention practice is suitable for the incident command system (Creswell, 2015). At this phase, it was crucial to study the implementation of the incident command system and the effectiveness of emergency responses to emergencies. The attitudes of the commanders, which are pertinent to the emergency response, were captured through the semi-structured interview (qualitative method) and a survey (quantitative method) by using a mixed methods research design. Special emphasis was placed on an exploratory sequential mixed methods design, to assess how effective is the implementation of the incident command system from the perspectives of the commanders is. The deployment of mixed research techniques provides an in-depth understanding of the research problem and, in turn, provides a clear explanation about the implementation of incident command system. Therefore, a mixed research method improves understanding of the application of the incident command system in the UAE, from an academic aspect and verifies how the UAE incident command framework could be developed to manage emergencies better. In general, it is critical to choose an appropriate strategy for the main research aim and objectives. An optimal research strategy will encourage a researcher to investigate the nature of what is being studied. As set out in the aims of this study, research requires an in-depth, context-specific investigation of real-life, human cognitive and behavioural aspects in order to develop an incident command framework to increase the understanding of the command implementation structure in the CDGC. The design will depend on the primary study approach, as selected by the researcher: exploratory sequential mixed methods. Exploratory sequential mixed methods emerged in response to the limitations of the two primary traditions: quantitative and qualitative. It is considered an alternative to these two methods. This research used the mixed methods approach in general and on exploratory sequential design in particular as the most suitable research choice for this research project.

4.5.1 Justification of Using Exploratory Sequential Mixed Methods Design

Based on the main aim of this research which is to develop a framework for the emergency response standards and elements of the application of command structure, the exploratory sequential research design suites this research more as the qualitative data will aid in developing an instrument for the second phase as the purpose of exploratory sequential research design is to explore a phenomenon in depth. The information collected from purposive sampling during the qualitative stage will enrich the quantitative findings, including establishing any significant relationship between the incident command framework factors.

Creswell and Plano Clark (2007) suggested that there are no standards to judge the effectiveness or quality of mixed methods. Mixed methods research is defined as a combination of quantitative and qualitative methods designed to gain an understanding in both breadth and depth within single or across multiple studies (Johnson et al., 2007, Teddlie and Yu, 2007). The integration of both quantitative and qualitative data increases the strengths and decreases the weaknesses of each data type and vice versa (Creswell et al., 2011, Hitchcock, 2017). As a result, the mixed methods approach has several benefits, because it uses more than one method; researchers can collect more information on different aspects of the research topic being researched.

Some researchers argued that that mixed methods approach has the ability to bridge the gap between quantitative and qualitative approaches, with a combination of both approaches providing further pieces of evidence and certainty. Furthermore, mixed methods allow researchers to design research studies that may offer the best procedures for answering their research questions (Johnson and Onwuegbuzie, 2004, Creswell, 2015). Moreover, it allows researchers to answer research questions that cannot be answered by quantitative or qualitative methods alone by providing sufficient tools to achieve relevant aims and objectives (Creswell and Plano Clark, 2007).

However, there are some restrictions connected to the successful application of a mixed methods approach. Firstly, the researcher should be proficient and competent in dealing with both qualitative and quantitative approaches (Cameron, 2009). The second restriction is the analysis of a great amount of collected research data that needs multiple approaches to generate rational findings that could answer the research objectives and questions. Moreover, Creswell et al. (2011) indicate that the employment of mixed method research needs enough time and an abundance of resources, such as qualified support staff, statisticians and administrative support. Additionally, the number of words, illustrations, and data analysis presented would be a limitation regarding mixed method based manuscripts being published in relevant sites. Cameron (2009) argues that the tendency to use a mixed method approach in empirical studies is based on the nature of the research problem under consideration. Notably, Povee and Roberts (2014) state that the participants involved in a mixed method-based research study could be regarded as having an anticipated attitude. However, if the participants received limited training sessions, they could lose interest in the involvement of such research studies.

As the mixed method approach is time-consuming and expensive due to the data collection and transcribing of interview statements for a large sample of participants, these disadvantages may concern the researcher when considering selection of mixed methods. Also, Creswell et al. (2011) raise some related practical issues when performing data analysis and interpretation using specific designs of mixed methods. For instance, when the investigator merges the data during a coexisting design, the gained findings might produce conflict or contradictory results. Therefore, it is crucial to take the necessary action to resolve these differences adequately through the collection of additional data or by revisiting the investigative approach. As the research design incorporates a sequential approach, the key issues are close to the "point of interface", where the investigator needs to choose what results could be generated from the first phase as the focus of the attention for the continuation of data collection. Finally, an interpretation based on the integrated results could be another challenge because an unequal emphasis could be placed on each dataset by the investigator or the research team. Thus, the precision or validity of each dataset, and whether the research philosophies are related to either quantitative or qualitative research could or should be shared.

Mixed methods use both quantitative and qualitative data collection techniques and analysis procedures. However, this does not necessarily imply a combination of these procedures. In other words, quantitative data are analysed through quantitative procedures, and qualitative data are analysed through qualitative procedures. When quantitative and qualitative data collection techniques and analysis procedures are used at the same time simple (parallel) or even one after the other more complex forms (sequential) (Creswell, 2014) . A study is using a simple mixed-methods approach; however such a study does not combine forms within the research design. Instead, the research involves the use of quantitative and qualitative approaches in the same phase of research in order to make a comparison and how each data method support the other one. On the other hand, in cases involving a combination of quantitative and qualitative data collection techniques and analysis procedures, a study uses complex mixed methods research, which involves more than a single phase of data collection and analysis (Saunders et al., 2016).

Using the mixed methods may provide a greater diversity, and it could lead to better confidence in the research conclusion. Gray (2014) stated that qualitative and quantitative methods could be conducted separately, without any particular order; thus, a researcher may carry out the qualitative and quantitative portions either sequentially or concurrently. According to Creswell (2015), there are two main forms of sequential design (mixed methods), exploratory sequential research design and explanatory sequential research design (Creswell and Plano Clark, 2011, Onwuegbuzie and Johnson, 2006, Hitchcock, 2017). The former is when a researcher uses qualitative collection and analysis in the first phase, followed by quantitative collection and analysis at a second phase (QUAL → quan). The latter is when a researcher uses quantitative collection and analysis in the first phase, followed by qualitative collection and analysis at the second phase (QUAN → qual) (Creswell and Plano Clark, 2011, Creswell, 2015). The exploratory sequential design is beneficial when a researcher is exploring a new subject and refining or developing a framework (Creswell and Plano Clark, 2004, Onwuegbuzie and Johnson, 2006). Initial qualitative findings are employed to design quantitative questionnaires, and qualitative results are also used to develop themes.

It is significant to note that, from the perspective of the researcher, the research methods were employed in accordance with the previous studies focussing on emergency response. Reviewing these methods from the literature enhanced the researcher's ability to justify the choice of strategy and data collection methods for this current research from a number of different viewpoints. Understanding these approaches enabled the researcher to identify methodological gaps, with the aim of generating knowledge from the data analysis process. Unlike other studies that start from a certain understanding of reality and try to test it with data, this mixed method approach was preferable to develop an incident command system for the UAE to manage emergencies of different sizes. The types of data collection method and sources that were followed to achieve the research objectives are displayed in Table 4.5 below.

Table 4.5: Relationship between data sources and types of data collection method

Data Sources	Types of Data Collection Method
Secondary Data	1. The literature review of journals articles considering the best practices of the incident command system. 2. Literature review through case studies on incident command systems in developed countries (UK, USA, Europe, Asia, and Australia). 3. Review of technical reports about the incident command system for managing emergencies in the UAE's CDGC.
Primary Data	1. Qualitative semi-structured interviews one - to - one conducted in UAE 2. Quantitative questionnaires through an online survey in UAE

From the Table 4.5 above, it is possible to see this research leans towards an exploratory sequential mixed methods design. There are many reasons for choosing this type of mixed methods research design. Firstly, qualitative and quantitative data may emerge to help develop a complete understanding of the situation being examined. This approach could provide a comprehensive picture to compare, triangulate or validate results (Clark, 2010, Onwuegbuzie and Johnson, 2006, Hitchcock, 2017). This design is presumed to help the researcher gain a comprehensive understanding of how response to emergencies can be managed by the emergency services, by conducting semi-structured interviews with high level senior incident commanders. Having feedback from Gold and Silver command in the CDGC might be a better approach for the researcher to design the questionnaires for the quantitative stage to validate the factors of the incident command framework.

Secondly, the exploratory sequential design is useful and needed when the researcher needs to develop a set of instruments for the quantitative phase because the instruments are not available, and the elements of the study which have been examined are unknown in the UAE context. Thus, according to the literature, the UAE command structure factors are unknown and have not been identified yet since the structure has been adopted in 2012. Therefore the researcher uses a qualitative phase in order to get rich information from experts and to design instruments and a quantitative phase in order to confirm the framework outcomes. This design is most useful since the researcher is not sure what concepts and factors are important to the study. Thus the researcher does not know the important factors that affect the command implementation in the UAE. Gaining understanding from interviewing experts in the subject, is a good way for the researcher to rely on the quality of participants contributions to guide the subsequent stage of the study.

Thirdly, the exploratory sequential design approach is beneficial for increasing depth and breadth. In terms of depth, there is a complexity in the research study, enabling the researcher to gain an improved understanding of the incident command system, as well as additional information from interviewees' explanations, in order to establish the context and factors influencing the incident command structure. Regarding the breadth, as previously discussed, the researcher needs to generalise the findings. Thus, in the quantitative stage, the study is required to have an effective sample of the Bronze participants, in order to measure the incident command framework factors and enable the study findings to be generalised to the wider population. In sum, due to the strengths of the exploratory sequential research design, this research will follow this approach.

4.6 Research Strategy

The research strategy is the fourth layer in Saunders' onion model. A research strategy should be chosen as a function of a research situation. Each research strategy uses a specific method to collect and analyse data, and each method has specific advantages and disadvantages (Yin, 2014). Choosing the most useful strategy is one of the main goals of the research. There are many suitable strategies are associated with the qualitative approach, such as ethnographies, case studies, action research, grounded theory, archival research (Gray, 2014, Saunders et al., 2012). On the other hand, there are also many strategies associated with the quantitative approach, such as experiments and surveys (Creswell, 2003). However, it is evident that none of these strategies could achieve the unique purposes required for this research as they are not free from serious defects and or encountered limitations (Yin, 2014).

4.6.1 Case Study Strategy and Justification

This section provides an overview of the case study strategy design, including its benefits and drawbacks. This section examines the employment of the case study as a research strategy capable of enhancing the value of this research. As demonstrated in section 1.4 in chapter 1, the aim, objectives and research questions of this study, ensured that it required an exploration of the incident command concept within the emergency services. It aimed to identify the viewpoints of a number of different participants, along with their perceptions regarding the factors impacting on the implementation of the incident command. This requires that the study identified the perceptions of commanders, in order to facilitate the in-depth analysis of this research. This research attempts to address and collect richer and stronger research findings through the adoption of a single case design. Finally, it justified the choice of this strategy for use in this research.

A case study is a strategy for doing research that involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence (Robson, 2002). A researcher who is interested in a case study design as a strategic method is usually focused on exploring a specific phenomenon, which he hopes to understand in significant detail (Dooley, 2002, Creswell, 2015), due to this enhancing the means by which participants address a specific issue.

The case study can explore many subjects in more specific detail by focusing on an individual, an organisation, a role, a nation or a context. Furthermore, it can be used to explore a wide range of issues, such as programme and/or project implementation, a group, a team or a person; or a policy, a process or a system (Dooley, 2002, Petty et al., 2012, Gray, 2014). More importantly, regarding data collection, the case study approach does not require a particular type of evidence. Therefore, the benefits of using a case study as a method are that the researcher can implement a wide range of methodological approaches within the combination of data collection process such as qualitative interviews and quantitative questionnaires surveys to determine research validity.

Despite the fact that case studies have advantages, case studies can involve many challenges; for instance, case studies are time-consuming, require direct observation of actual situations and require multiple methods and tools with skilled interviewers (Meredith, 1998). Still, the findings of a case study may have a positive impact, since they may lead to new and creative visions for enhancing our understanding of the phenomenon (Voss et al., 2002). Thus, a researcher is able to choose from a wide range of methods, and the case under study and the research question will guide the researcher in this choice (Petty et al., 2012).

Although the challenges are described above, those challenges can be compensated by a number of robust principles. Therefore, Saunders et al. (2012) emphasised that a case study strategy can be a perfect method for enabling a researcher to challenge existing theory and for providing a source of new research questions. Furthermore, a case study looks in-depth at one or a small number of departments, events or individuals over a period of time; thus, case studies are flexible because they provide a researcher with a choice of either single or multiple cases (Easterby-Smith et al., 2004). Therefore, the case study strategy adopted for this research, helps the researcher gain a wider understanding of the context of the incident command system problem, it develops the researcher himself, since the researcher is personally a part of the process of conducting the study, particularly when working closely with management consultants in the CDGC.

According to Yin (2014), there are three main conditions for identifying a research strategy and distinguishing among experiments, surveys, archival analyses, histories, and case studies: the type of research question posed, the extent of control an investigator has over behavioural events and the degree of focus on contemporary historical events. The following Table 4.6 below illustrates the outcomes of the relationships among the most common research strategy criteria and the three conditions.

Table 4.6: Selection criteria for different research strategies source: (Yin, 2014)

Strategy	**Form of Research Question**	**Requires Control of Behavioural Events?**	**Focuses on Contemporary Events?**
Experiment	How, why?	Yes	Yes
Survey	Who, what, where, how many, how much?	No	Yes
Archival Analysis	Who, what, where, how many, how much?	No	Yes/ No
History	How, why?	No	No
Case Study	How, why?	No	Yes

The adopted case study method was proposed to determine the critical factors that might impact on the implementation of the incident command system in place. This research was aimed at developing an efficient incident command framework capable of dealing with current and unpredictable future emergencies and natural hazards in the UAE. Indeed, this strategy meets the aims of the research, but the risk lies with the inability to achieve the research objectives. To avoid this pitfall, the researcher considered some approaches, such as action research, archival analysis, history, and experiment. Thus, the case study technique was used for identifying, studying, and understanding previous experiences about emergency response. The research justification relied on gaining a better understanding of the best practices of an incident command system, such as organisational aspects, individual and barrier factors, and the drivers that might be associated with the incident command system.

The first condition for covering a research strategy emphasises the research questions, which are categorised as ‘Who’, ‘What’, ‘Where’, ‘How’ and ‘Why’ questions (Yin, 2014). The purpose of a research study can be categorised into three types of research principles as (1) exploratory, (2) descriptive, and (3) explanatory or evaluative (Saunders et al., 2016, Yin, 2014). However, according to Voss et al. (2002) different purposes can be employed in case study strategy, i.e., building theory; testing theory; refinement theory; and exploration.

Firstly, if the research questions focus on ‘What’ or ‘How’, which are forms of ‘how many’ and ‘how much’, this is exploratory research (Yin, 2014). According to Saunders et al. (2016), an exploratory study is useful when a researcher needs to gain an understanding of a problem or issue. A number of exploratory methods are available, such as searching the literature or interviewing experts in the subject. Accordingly, the present research is predominantly exploratory case study, since there is little knowledge about the phenomenon and no clear understanding of the subject being researched. Because this study is mainly exploratory case study, this research attempts to gain an understanding and to explore and identify standard elements of the incident command implementation structure during emergency response by answering the questions of ‘What’ or ‘How’ in a case study and involves a mixture of both types of ‘what’ question.

The second category is descriptive research depends on events, persons or situations. Thus, they are likely to manifest as ‘Who’, ‘What’, ‘Where’, or ‘How’ questions (Saunders et al., 2016). The third category is explanatory/evaluate research focus on establishing relationships between variables on a situation or a problem has been studied. Furthermore, explanatory studies seek to find out the best way for something to work. These types of studies are most likely to answer questions that seek an evaluative understanding will be likely to include ‘What’, ‘How’ and ‘Why’ questions and are more likely to favor the use of a case study (Gray, 2014).

The second condition emphasises the ability to control behavioural events. As was mentioned in the Table 4.6 above, the second condition best suits the experiment strategy. According to Yin (2014), experiments should be done when a researcher can manipulate behaviour directly and systematically. In addition, experimental research is often conducted in laboratory settings. This study does not intend to control behavioural events; thus, an experimental strategy is not appropriate.

The third condition attempts to focus on contemporary events and contexts that are not sufficiently evidenced (Dooley, 2002). Thus, this research concerns with the command implementation issues, since the structure has been adopted recently in 2012 and still relevant to present, therefore many gold and silver commanders are still available to provide feedback about the structure through interviews. Accordingly, it is appropriate for this research as it fits the first and third Yin's conditions for exploring the system implementation to provide recommendations for effective emergency response.

As it was mentioned, one major benefit of a case study strategy is its use of multiple techniques, which may include interviews and questionnaires, an exploratory case study rather than an archival method seems most appropriate to answer 'What' question. Hence, qualitative tools like interviews can be used when standardised questions are needed. In the first stage, a set of standardised questions may be appropriate for gaining a comprehensive understanding of the knowledge of Gold and Silver commanders with regard to the command structure, in the CDGC when responding to major incidents and emergencies, because much of the literature on emergency response management focuses on how the strategic Gold level manipulates the tactical Silver and operational Bronze levels of incident command during emergencies. Based on the above justification, the exploratory case study strategy was chosen as the most suitable strategy approach for this research.

4.6.2 Single Case Study vs. Multiple

Having determined that a case study is an appropriate strategy for this study, the next section discusses the type of case study design implemented by the researcher. According to Yin (2014)'s two-by-two matrix, four major types of case study designs are available: a single case, a multiple case, a holistic case, and an embedded case. To simplify the discussion of these types of case study design, each design is labelled as follows in Figure 4.3 below:

1. Type 1: Single case, holistic

2. Type 2: Single case, embedded
3. Type 3: Multiple case, holistic
4. Type 4: Multiple case, embedded

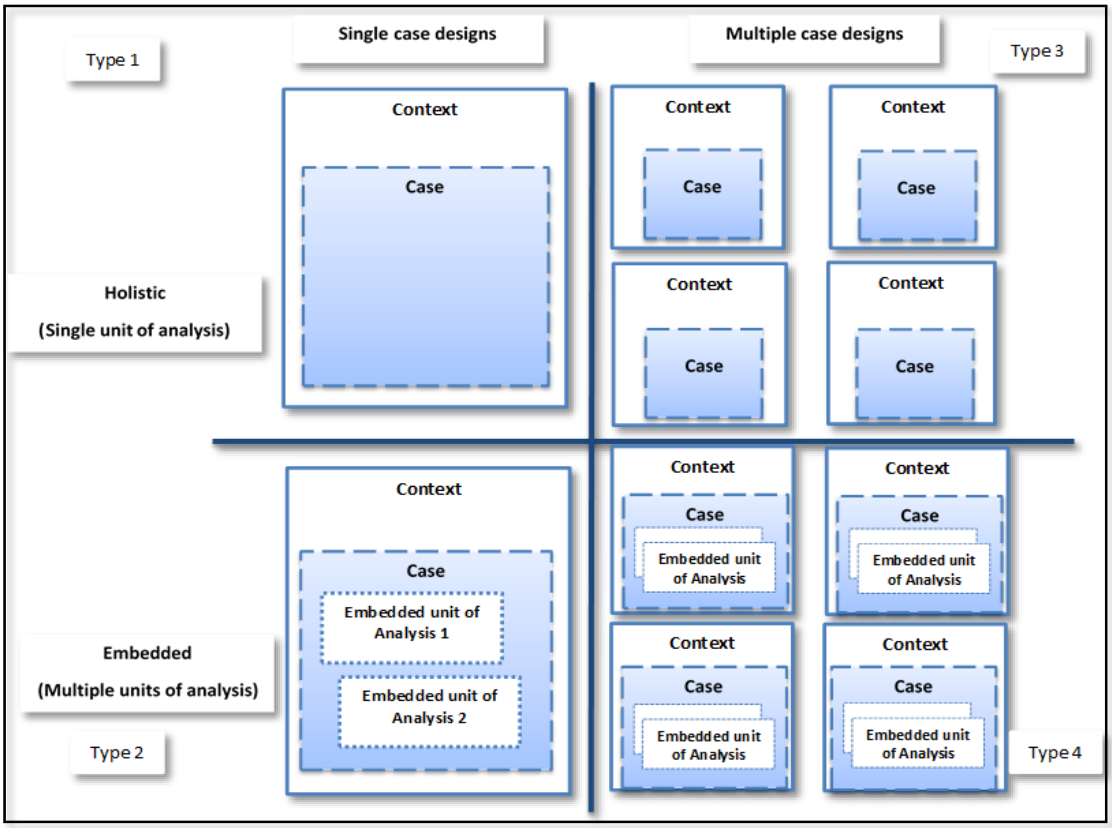


Figure 4.3: Basic types of case study designs source: (Yin, 2014)

4.6.3 The Rationale for Type 1: Single Case, Holistic

Case studies can also be either holistic or embedded. According to Saunders et al. (2012), holistic and embedded designs refer to the unit of analysis used. A holistic case study involves an organisation as a whole, whereas an embedded case study involves subunits within an organisation, such as departments or sections (Yin, 2014). A holistic single case is suitable for this research project on the basis of coming rationales: because an important rationale for a single case study is that it represents a critical, unique, common and longitudinal case.

When it comes to the rationale that the selection of a single case study is a critical matter for research, it can be argued that this current study is a unique case, as it seeks to develop a framework for the incident command system. The conceptual framework will be refined based on the participant's opinion using qualitative stage, and it will be confirmed based on the questionnaires survey. A single case study design provides the researcher with an opportunity to analyse the phenomenon in a way that few are able to do. Thus, this type of case study is most appropriate for researchers who are working within an organisation that is the subject of the study. From this perspective, the CDGC is the emergency service which uses the command structure in the field of emergency response. As a serving police officer in the MOI, the researcher has access to the CDGC, though personal and professional contacts and has insight into the practice and application of the incident command structure in the CDGC.

Secondly, in referring to the issue of a common case, this current case represents a common situation or project, and therefore focussing on one case can be seen as sufficient to understand other cases. As has also been described, there is a need to explore and investigate the existing command structure and the authority of each of the three main levels when dealing with emergencies and disasters. Hence, it is important to understand how emergency response teams are organised and how they can be better integrated with the event of emergencies. The selection of a single case study is that (despite multiple case studies increasing the breadth of a study) it provides an opportunity to explore phenomena in more depth and greater detail. It can thus be argued that if multiple case studies are not designed and conducted in an appropriate manner, a single case study employing an appropriate design can provide more effective understanding than multiple case studies. Thus, facilitating a better understanding of where the real problem is located. The incident command system framework would be developed to face the existing challenges; resulting in the commanders operating within this framework that likely to follow a common hierarchy, when multi-agencies are involved in emergency response actions. More importantly, the new framework would be operated under strict measures to increase readiness in the cases of emergency management.

Thirdly, In terms of the longitudinal case, the same single case study should be studied from two different points in time. This research sought to develop a framework for the application of the command system in the UAE's CDGC emergency services. As indicated previously, there is no existing literature on the incident command implementation in the CDGC; this provided the researcher an opportunity to analyse a phenomenon that few have been able to explore. As this study takes the form of research for a PhD, a longitudinal study was not possible due to time restrictions. Therefore, it is expected that further explanatory mixed method research will be undertaken to examine the command framework, in order to confirm or reject any findings.

A further rationale for the selection of a single case is that (despite multiple case studies increasing the breadth of a study) the single case study provides an opportunity to explore phenomena in more depth and greater detail (Yin, 2014). It can thus be argued that if multiple case studies are not designed and conducted in an appropriate manner, a single case study employing an appropriate design can provide more effective understanding than multiple case studies. This will facilitate a better understanding of where the real problem is located. In addition, since this research adopts the exploratory sequential mixed methods design, the quantitative stage will increase the breadth of the study. This research attempts to address and collect richer and stronger research findings through the adoption of a single case design. Furthermore, the single case study is more appropriate for use by a PhD student, and this is due to limitations of time.

The discussion of the rationale concerning the selection of the case study design reveals that a single case study design is the most suitable approach for this current research. Therefore, from the above discussions, the case examined in this study will be the CDGC as a whole organisation, explored as a single holistic case. The next section provides a brief description of the CDGC case study. Thus, this research will use a Type 1 approach (Holistic Single Case Design; see Figure 4.4 below).

4.6.4 Unit of Analysis

One of the most important elements of a research design is defining the unit of analysis, or selecting the most appropriate unit of analysis for each research question (Yin, 2014). The unit of analysis refers to what or who is being investigated, and it could be an individual, an organisation, a programme or another issue (Saunders et al., 2016). The CDGC is one of the most vital bodies in the MOI. It has the role of responding to emergencies. The CDGC was established in 1976 to protect lives, defend public and private properties, ensure environmental safety, rescue victims and establishments and protect projects and national wealth during wars and emergencies. The CDGC in the UAE is considered to be one of many sectors that fall under the responsibility of the MOI, which remains a vital department for providing police intervention in cases of emergency response.

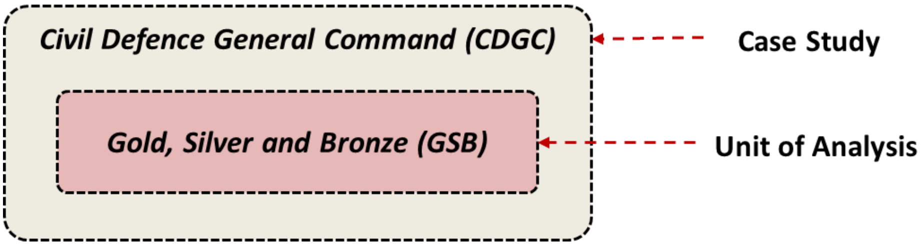


Figure 4.4: Unit of analysis for case study

This research study focuses on exploring and investigation the incident command system in the CDGC. Thus, the unit of analysis of this project is the incident command system as a whole. There are a few major reasons for adopting the chosen unit of analysis in this research. Firstly, the CDGC has responsibility for responding to emergencies in the UAE, with other agencies such as police. Secondly, the command concept is more likely to be implemented in the CDGC during an actual significant emergency. In other words, when the actual emergency response is almost real and/or in the field, the department has the opportunity to apply the command system. Hence, this researcher attempted to determine the current level of understanding of civil defence officers about the incident command structure, as well as to explore the driver factors, the barriers, and opportunities related to the existing incident command structure. Based on the above discussion, the investigation is limited geographically to the borders of the UAE.

4.7 Time Horizon

The time horizon is considered a vital component of Saunders' research onion. A time horizon is the time framework used by most research studies for undertaking the research project. According to Saunders et al. (2016), there are two main time horizons: cross-sectional and longitudinal. Cross-sectional time horizon studies are limited to specific time frames, which are used to complete the research project. By contrast, longitudinal studies examine changes and developments over time; while these provide a clearer picture of reality, they are more time consuming (Sekaran, 2013). This is one of the main reasons that a longitudinal study is beyond the scope of this research. This research is limited to a specific time period by the regulations for PhD study at the University of Salford, thus necessitating a time horizon. The study also does not seek to examine changes or developments of a particular phenomenon over time. Since it seeks to evaluate the command system at the present time, thus a cross-sectional time horizon is adopted.

4.8 Qualitative Data Collection Techniques

In this research, the primary data were collected through semi-structured interviews and questionnaires survey. Thus, the study used data triangulation, which involves collecting data from different sources in order to avoid participant and researcher bias and to improve research validity and reliability. Furthermore, the researcher chose this technique in order to explore the existing incident command system in emergency response, to guide the interview and to make sure that the participants are considering the themes in which the researcher is interested, as well as new information that may arise during the conversation. Through these steps, the researcher will be able to gain a full picture of the command functions, due to the exploratory sequential research design, in the first stage qualitative semi-structured, and in the second stage quantitative questionnaires survey. This section discusses the selection of the data collection techniques.

4.8.1 Justification of Using Semi-structured Interviews

The interview is one of the most important sources of evidence in a case study, since most case studies examine people's values or actions (Yin, 2014, Gray, 2014). There are three main categories of interviews: structured, semi-structured and unstructured (Saunders et al., 2009). For this research, semi-structured interviews were established as the most appropriate techniques for conducting data collecting. Semi-structured interviews (Face to face/One to one) are based on question guides, while open-ended interviews are the most popular for the other sections, due to permitting participants to express their experiences and knowledge (Turner III, 2010, Easterby-Smith et al., 2015). Semi-structured interviews allow responders to expand on their views and answers (Gray, 2014). Furthermore, semi-structured interviews allow the interviewer to build trust with the interviewees, thus encouraging truthful answers that will improve the validity of the research findings (Gray, 2014). It is more likely for managers to agree to a semi-structured interview, especially when the topic is considered interesting and relevant to their work. Semi-structured interviews can help to identify the questions that should be asked in the quantitative stage (Teddlie and Tashakkori, 2009, Onwuegbuzie and Johnson, 2006). Finally, semi-structured interviews allow the interviewer to build trust with the interviewees, thus encouraging truthful answers that will improve the validity of the research findings (Gray, 2014).

Nevertheless, there are a number of drawbacks related to this choice, including the facts that they can be time-consuming and expensive, especially when the researcher interviews a large number of participants (Yin, 2014). Furthermore, the reliability of interviews is still associated with the issue of bias; especially when the interviewer creates this bias through comments, verbal tone or non-verbal behaviours; notably, when the participant responds to questions specified by the interviewer. In addition, the participants respond considering the interviewer's belief and the frame of questions asked, so it is possible that the interviewer will interpret responses in a way that serves the research topic. In this context, and during interview time, it is hard to build trust with the participant. Thus, credibility is seen to be lacking, information may lose their value, and thus doubts about the validity and reliability of answers would constitute other limitations (Easterby-Smith et al., 2015). A further limitation is the generalisation of findings because qualitative research interviews usually lack the quality of data which depends mostly on the ability and size of the participants (Saunders et al., 2016). However, the sample size constituted concerns for this research, as the bronze sample is not clearly defined due to confidentiality concerns. The justifications for the selection of the semi-structured interview are explained in the next section. Figure 4.5 below illustrates the process of conducting semi-structured interviews/One to one/Face to face interviews.

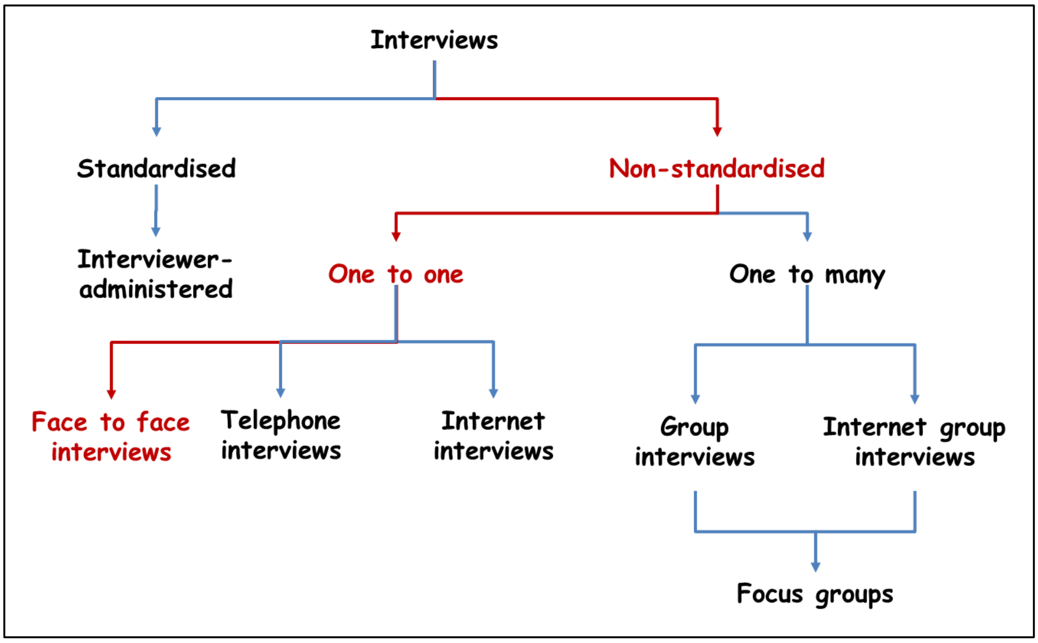


Figure 4.5: Forms of interview source (Saunders et al., 2016)

Given these options, the researcher adopted face-to-face semi-structured interviews as the main method of data collection. Figure 4.5 above shows that the semi-structured interviews are chosen as the research approach for this study for the following reasons as:

Semi-structured interviews in this study were applied by the researcher to interview several potential participants drawn from the ranks of senior civil defence officers in the CDGC. Those commanders were approached based on their positions, age, education, years of experiences and level of rank. As a serving police officer in the MOI, the researcher had access to the HR department of CDGC, and secured authorisation to access officers in both Gold and Silver command positions across the organisation.

The first stage of the data collection approach resulted from the primary aim of the research is to explore and refine the command structure framework within CDGC. Therefore, in order to fulfill the aim of the study, the semi-structured interviews focused on identifying the different views of commanders concerning the degree of importance of the incident command system, as well as on identifying the reasons, key factors, obstacles and barriers impacting its implementation. Based on the above discussions, the semi-structured interviews were deemed the most appropriate technique for the data collection. To accomplish this, the researcher used semi-structured, face-to-face interviews at the Gold and Silver levels and questionnaires at the Bronze level as the first and second methods of data collection, respectively.

4.8.2 Documentation

Documentation is one of the most important types of supporting evidence gathered from other sources. It is a research method that many qualitative researchers consider useful in the context of their research strategy (Bryman, 1994). Yin (2014) affirmed that documentation reviews are expected to be relevant to every case study topic and that they help to capture a more complete, holistic and contextual description of a case. He also suggested that documents can include letters, meeting minutes, and certain kinds of reports.

In this research, to obtain reliable data, documentary evidence was used as a supplementary technique to overcome the low reliability of the data produced from the semi-structured interviews and the questionnaires. This evidence also facilitated the triangulation of data. Important documents used in this research included CDGC SOPs unpublished files. All of these documented sources were studied and reviewed in detail in the case study and are analysed in the discussion chapter seven (CDGC, 2015a, CDGC, 2015b).

4.9 Quantitative Data Collection Techniques

The questionnaire aims to examine the current practices of the incident command system in the UAE to identify the differences between the framework factors and CDGC departments in terms of emergency response procedures, implementation, organisational, individual, barrier and driver factors.

The questionnaires are vital data collection methods that enable a researcher to identify the variability of a given phenomenon. Though it is possible to use questionnaires as the only data collection methods, it recommended to combine them with other methods in a mixed methods research design (Saunders et al., 2012). They are one of the most popular data collection techniques in the worlds of business and education (Gray, 2014). According to Gray (2014), the use of questionnaires has many advantages. First, they save both money and time, as they can be sent to many respondents at a low cost. Secondly, respondents' feedback and replies are returned within a short amount of time. Lastly, the respondents can complete questionnaires at times and places that are suitable for them. Conversely, there were some limitations concerned with the deployment of the questionnaire survey phase. Among these limitations were; the time required for the process of the data collection, the delivery of data, and the collection of questionnaires, which increased along with the increase of the sample. A further limitation is the choice of the questionnaire, which could be influenced by the available resources, namely, the financial resources at the stages of data entry and reproducing the questionnaire because they are costly. Thus, it was important to consider the costs of reproducing the questionnaire. Also, the stage of data collection is a onetime process as it is impossible to return to collect additional information (Saunders et al., 2016).

There are many types of techniques on how a questionnaire could be designed, distributed and collected that could be categorised into either self-completed or interviewer-completed. The former are usually answered by the respondents such as electronic questionnaires using the internet, and some companies offer online questionnaire sites such as Survey Monkey, or it could be postal questionnaires or hand delivered (Greener, 2008). The interviewer-completed questionnaire is recorded by the researcher by using telephone or face to face interviews (Saunders et al., 2012). Figure 4.6 below illustrates the selection of questionnaires types.

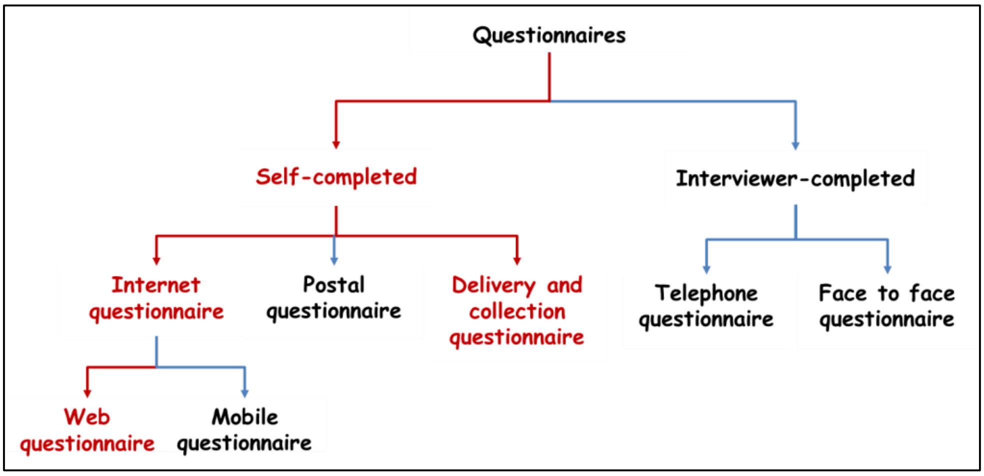


Figure 4.6: Questionnaires types source (Saunders et al., 2016)

4.9.1 Questionnaires Survey Design and Justification

The use of a questionnaire is appropriate to extend the initial findings from the qualitative phase during exploratory sequential mixed method research. Thus, questionnaires are tools employed within social science for establishing the characteristics, behaviour, attitudes, and beliefs of participants in the subject under investigation (Collis and Hussey, 2013).

Muijs (2011) postulated that firstly, questionnaires are highly flexible, permitting a researcher to study a wide range of research questions, and therefore enabling a researcher to study a relationship between factors and variables. Secondly, they can assist in the gathering of information from a large sample while requiring low levels of both cost and effort. However, a major limitation to the use of questionnaires is the difficulty in establishing a deep understanding of the study under investigation.

The web questionnaire used in this study was designed to measure the factors or indicators affecting the incident command system implementation in the CDGC. In addition, it was also designed to confirm the incident command framework from a large sample size. To measure the relevant variables and indicators, closed-ended scale questions are used. Specifically, the questionnaire used Likert-style rating scales. The Likert scale is a procedure for measuring attitudes and opinions (Boone and Boone, 2012). The Likert-style questions can be useful for gathering specific information or for seeking facts or opinions. Closed-ended scale questions use no more than a five-point scale ranging from strongly disagree to strongly agree.

In this study, the Likert-style rating scales are used to measure factors relating to the challenges and opportunities of the command system in the CDGC. Participants are given options ranging from strongly disagree to strongly agree. This type of scale helps the researcher understand participants' opinions. In this case, the use of Likert scales helped the researcher measure respondents' attitudes concerning the command system.

4.10 Triangulation

Combining sources of data analysis is called triangulation. Triangulation is the combination of different data collection techniques within a single study. Triangulation combines qualitative methods with quantitative methods, such that one group of people may be interviewed while another completes a questionnaire (Gray, 2014). Generally speaking, triangulation has many important characteristics, such as the ability to collect both quantitative and qualitative data and the ability to analyse both datasets separately (Creswell and Plano Clark, 2004). For instance, quantitative data collected using a questionnaire might be useful for triangulating qualitative data collected via a semi-structured interview. Data triangulation in a single case is considered important for strengthening validity in the absence of a comparison case (Collis and Hussey, 2013).

In practice, it is often best to use multiple data collection methods. First, such an approach could be used to address different research questions. Second, involving a combination of methods (e.g. interviews and surveys) will not only assist in data triangulation, but also balance out any weaknesses in the data collection methods. Thus, this research uses two methods of data collecting as a means to balance the weaknesses of each method with the strengths of the other. This traditional mixed methods approach is familiar to most researchers and can be used to develop significant findings.

Based on the above considerations, in this research, the researcher used semi-structured interviews as the main method for data collection. The interviews are supported by questionnaires, which served as the other source of evidence to confirm research data validity. Because it can be seen that the most important characteristic of triangulation is that it involves collecting more than one source of data literature review, qualitative and quantitative, analysing both sets of data separately to confirm the validity of the research data and it is accuracy.

4.11 Research Sampling Techniques

The population consists of the full set of the sample size. It is possible to collect data from the entire population. However, this would not necessarily provide more useful information than when employing a sample size representative of the entire population. In addition, collecting data from the entire population has implications in relation to cost, and is also time-consuming (Saunders et al., 2016). Therefore, the use of a sample saves time and is more achievable, due to the need for fewer participants to collect data. Teddlie and Tashakkori (2009) stated that sampling methods could be categorised as follows: (1) probability sampling and (2) non-probability sampling. See Figure 4.7 below.

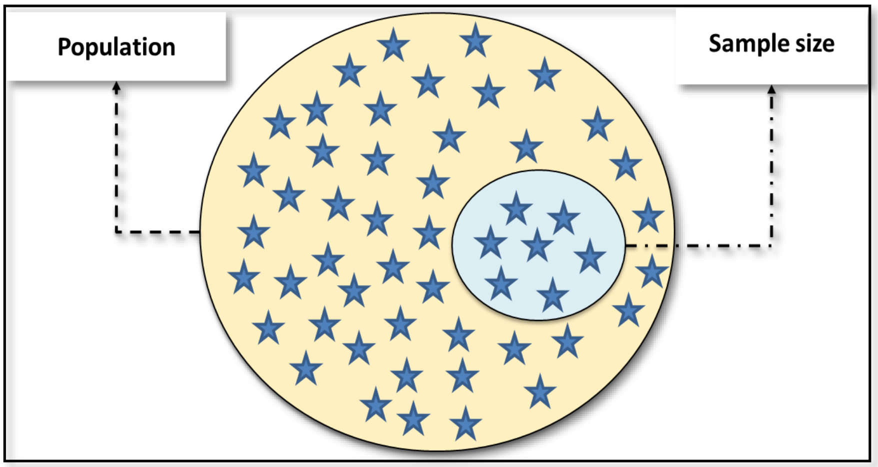


Figure 4.7: Population and sample size

4.11.1 Probability and Non-Probability Sampling

Sample size technique is categorised into two main approaches: probability and non-probability sampling techniques. Quantitative and qualitative sampling can be combined using mixed methods sampling techniques when the aim of a research study is to gain an in-depth understanding of a phenomenon (Teddlie and Yu, 2007). The probability sampling techniques are used in quantitative studies when the probability of each member being included is known (Teddlie and Yu, 2007). Probability sampling includes random sampling, stratified sampling, cluster sampling and systematic sampling (Saunders et al., 2012). On the other hand, when the probability of inclusion for each member of the whole population is not known, non-probability sampling is used; this occurs primarily in qualitative studies (Gray, 2014).

Saunders et al. (2012) indicated that if a researcher needs to meet a research objective and/or question, non-probability sampling may be the best choice, since non-probability sampling focuses on a small group of participants or a case study selected for a specific purpose. Purposive sampling is, thus, used when the participants being investigated are chosen because they can provide important knowledge that could not be gained from other sampling techniques. Additionally, snowball sampling suits a particular situation when a study may be sensitive and/or when it requires specific participant knowledge or experiences. This approach is also beneficial when there are complications in gaining access or when it is hard to locate the desired population.

4.11.2 Interviewees Purposive Sampling and Sample Size

An interview is a data collection technique in which selected participants are asked questions in order to realise and explore what they think or feel (Collis and Hussey, 2013). In terms of the sample size, Yin (2014) declared that there is no fixed number of interviews in qualitative research; instead, this number depends on finding out what you need to know. Likewise, Saunders et al. (2016) explained that, while sampling in quantitative research is based on the size of the research population, in qualitative research, the number of interviews is based on ‘replication logic’, rather than ‘sampling logic’. In other words, a qualitative researcher must keep interviewing until he achieves `replication' or the saturation point (i.e., hearing the same stories repeated again and again), at which no new information emerges during the interview. Most importantly, due to the nature of this study as it is exploratory sequential mixed method design, Creswell and Plano Clark (2011) pointed that the sampling technique in the first stage of qualitative should be a purposive sample. Therefore, this research targeted a group of civil defence commanders who are experts in the field of emergency response and the GSB command and control structure. Accordingly, the sampling method selected for this research is purposive sampling.

In terms of the interviews sample size, Gray (2014) indicated that there is no simple answer for deciding how much is enough. In a case study, the sample size is often very small; thus, purposive sampling is used for this research population. There is no given number necessary to conduct an interview, and therefore an effective approach is to aim for twelve interviews, each lasting approximately thirty minutes (Guest et al., 2006), or between six and eight interviews, each lasting approximately one hour (Rowley, 2012).

According to Saunders et al. (2012), the minimum sample size for a semi-structured interview is between 5 and 25 persons. However, Creswell and Plano Clark (2011) stated that in case studies a small number is used between 4-10 persons is likely to be sufficient, because it is considering a homogeneous population because the aim of this stage is to understand the Gold and Silver commander’s perception, belief and opinion about the GSB structure. Furthermore, the sample participants are similar and they share common experiences, which allows the researcher to explore the subject in greater depth. In addition, at this point, saturation of information can usually be achieved. This depends, of course, on the complexity of the subject matter.

Therefore, in this research, the population is considered to be purposive a total of 15 senior Gold (Director) and Silver (Deputy Director) civil defence commanders and Senior Fire Advisor are consulted, after achieving the saturation. Table 5.1 in chapter 5 presents the target interviewees of the research. For this research, the most reliable data were determined to come from people concerned about command issues within the CDGC. The interviewees included senior officers at the strategic gold level and the tactical silver level in the CDGC as illustrated in Figure 4.8 below. All of these levels are included in order to gain in-depth information and a clear perception of the different aspects of the command and control practices since the incident command is one of the duties of officers at all levels within the CDGC.

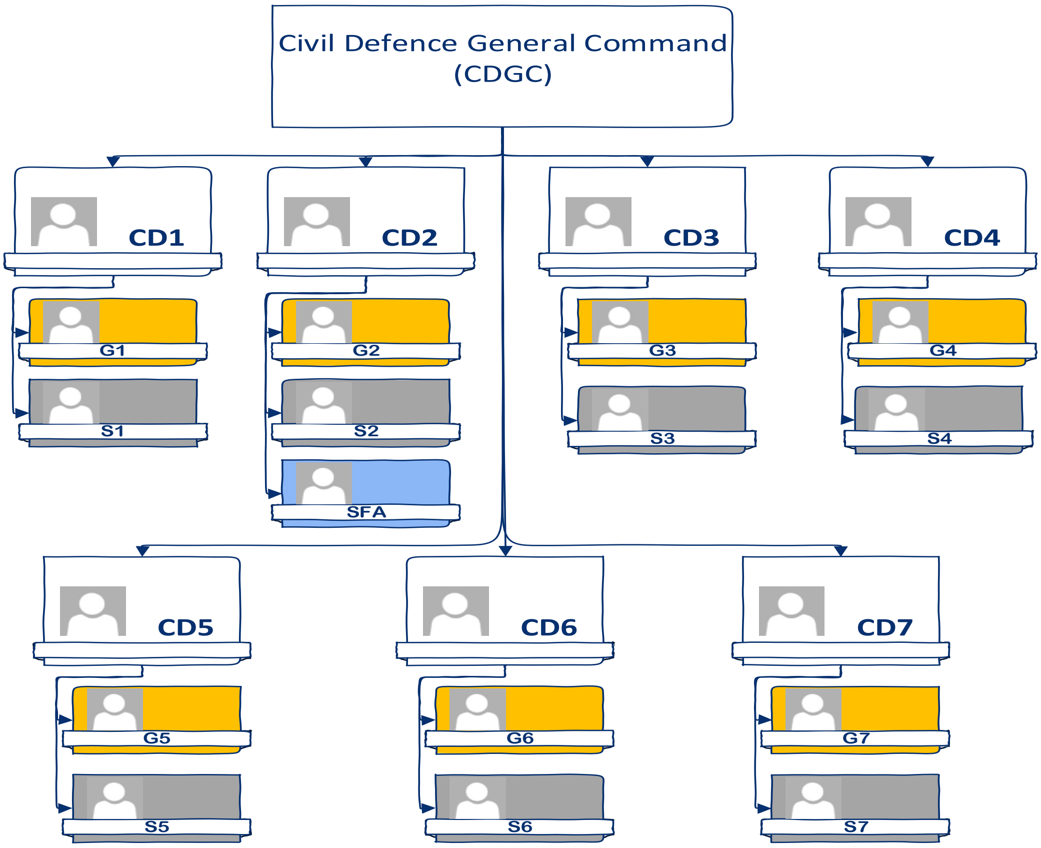


Figure 4.8: Target interviewees Gold and Silver commanders

Figure 4.8 above illustrates the CDGC organisational structure and the positions of the Gold and Silver commanders that were interviewed. A total of 15 Gold (Director) and Silver (Deputy Director/Head of a section) and Senior Fire Advisor (SFA) were interviewed, in this case, the researcher does achieve the saturation of information.

4.11.3 Questionnaires Random Sampling and Sample Size

Quantitative research requires large samples of participants. Larger sample sizes imply lower errors when generalising to the full population (Saunders et al., 2012). There are many types of sampling techniques: simple random, systematic, stratified and cluster. Simple random sampling allows a researcher to select a sample number without bias. It is best used when the researcher has an accurate sampling number that lists the whole population. Although this form of sampling is not typically appropriate for a large geographical area, simple random sampling could be adequate for a large geographical area if the researcher used an online data collection technique, such as emails or Survey Monkey.

Consequently, this study attempts to use simple random sampling, which was managed using a computer and an online random number generator and web questionnaire. The random numbers allow the researcher to select the size of participants without bias (Saunders et al., 2016). In the exploratory sequential mixed methods design the participants sample size will typically not be the same participants who answered the semi-structured questions in the qualitative stage, the reason behind this is that it can generalise the results based on a few participants in the first stage to different larger sample of participants that are used in the second quantitative follow-up stage (Creswell and Plano Clark, 2011, Creswell, 2015, Hitchcock, 2017). Thus, a simple random sample is an appropriate technique that enhances collecting the data in the second quantitative follow-up stage of the exploratory sequential mixed methods design.

There are a number of approaches for determining the sample size for a survey. An effective quantitative sampling strategy consists of random sampling, which falls into the category of probability sampling (Muijs, 2011). A number of strategic approaches can be used for determining the sample size of a study: firstly, the use of a published table to determine the size of the target population with different confidence levels and margins of error; and secondly, if the target population is unknown, a researcher can employ a formula to determine an appropriate sample size (Israel, 1992).

The first strategy was for the researcher to use a published table to identify the sample size of the population. This is illustrated in Table 4.7 and proved an acceptable sample size according to different levels of confidence and margins of error.

Table 4.7: Sample size for different sizes of target population at 95% confidence level source: (Saunders et al., 2016, p. 281)

	Margin of error			
Target population	**5%**	**3%**	**2%**	**1%**
50	44	48	49	50
100	79	91	96	99
150	108	132	141	148
200	132	168	185	196
250	151	203	226	244
300	168	234	267	291
400	196	291	343	384
500	217	340	414	475
750	254	440	571	696
1000	278	516	706	906

The second strategy for determining the sample size for the study was to use a formula to calculate the portion of participants. Hence, in order to determine a sample size, this study used a finite population correction formula by (Cochran, 1997). As noted by Gill and Johnson (2010), Israel (1992) and Bernard (2011) this study uses the following formula to formulate the new sample size: $n = n_o / (1 + (n_o - 1) / N)$

In explanation as why the sample size of the target population is unknown, this was because the number of Bronze commanders was restricted in the study. Although the researcher contacted the HR department to seek higher numbers of Bronze commanders from the seven CD locations in the UAE, this information was restricted, and it was not possible to have access to it. Thus this research employed an assumed population size of 400 to calculate the finite population. Hence, to illustrate the formula (n_o) the sample for the proportion of population should be formulated as follows:

$n_o = z^2pq/e^2$

Where z is the area under the normal curve that matches to confidence, and therefore the confidence level in this study is 95%, hence z = 1.96. Where the population is estimated and the researcher is unaware of the degree of variability, then the population proportion is **p** =0.5

and **q** is 1-p =0.5, where ***e*** refers to the margin of error and is determined to be ±5% precision so ***e*** = .05 (Israel, 1992, Bernard, 2011).

$$\boldsymbol{n_o = z^2pq/e^2}$$

$n_o = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2$

$n_o = 3.8416 \times 0.25 / 0.0025 = 385$

N = is assumed population size from which n_o is being drawn. Therefore, ***N*** = 400, and ***n*** is a new sample size

$$\boldsymbol{n = n_o / (1 + (n_o - 1) / N)}$$

n = 385 / (1 + (385 - 1) / 400)

n = 385 / (1 + 384 / 400)

n = 385 / (1 + 0.96)

n = 385 / 1.96

n = 196

Saunders's table and Cochrans' formula thus establishes the estimated population proportion as equal to 400, and therefore the sample size for this study is equal to 196. The information on the assumed population size is determined by researching and the total number of Bronze levels (Non-commissioned officer-Officer) is approximately 400. Similar results were achieved by using active websites called Survey Monkey and Fluid Survey to calculate the sample size, which is 196. There are no significant differences among these three results. The risk of this sample size, which is called the margin of error, is determined to be ±5%. The confidence level is 95%; this helped to reduce the error.

The questionnaire sample included a number of questions relating to demography (e.g., current rank, current position, age, education qualification, and years of experience). This research employs two main questionnaire designs of a self-completed type, due to being answered by the respondents through the delivery and collection of questionnaires, and through web questionnaires, with a number of companies offering online questionnaire sites, i.e. Survey Monkey). To achieve the sixth objective of the study, which is to evaluate a unified incident command and confirm the framework factors system for improving the UAE's incident command system, this research attempts to use a probability random sampling technique and a web questionnaire involving participants at the Bronze level of the CDGC as a quantitative data collection tool. In this research, the sample for the questionnaires is randomly distributed among members of the Bronze level (Non- commissioned officer - Officer) of the CDGC agency in order to make the sample as representative as possible. Participants are not forced to respond; that is, participation was voluntary.

4.12 Qualitative and Quantitative Pilot Study

Saunders et al. (2016) explained that a pilot study is a limited study to test a questionnaire, interview, checklist or direct observation in order to minimise the possibility of respondents having problems answering the questions. A pilot study also facilitates an assessment of the questions' validity and reliability and ensures that the questions are clear, unambiguous and sensible. The number of people participating in a pilot test differs from case to case. A pilot test can include friends and colleagues, who can provide feedback on whether the questions make sense.

For the purpose of this research, a pilot study of the interview questions was conducted. Copies of the research aims, objectives and questions, as well as the first draft of the interview questions, are given to the interviewees. The research aim and questions were used for guidance. Then, the primary draft of the questions is modified following a meeting with the research supervisor to enhance the validity of the interview questions. The pilot study was conducted in the UK, and it involved interviewing four PhD students at Salford University in areas related to the emergency response field. Following the completion of the pilot study, interviewee feedback was used to modify the interview questions. The comments of the interviewees were considered very helpful and were addressed.

In order to ensure that the questionnaires were understandable and easy to follow, they were designed and piloted with the assistance of the supervisor and CDGC senior managers. The pilot study was undertaken to test the survey reliability with ten Bronze commanders from the CDGC, with the pilot study therefore resulting in minor revisions to the original format of the questionnaire. Thereafter, the finalised questionnaire was translated into Arabic and drafted in two main languages, i.e., Arabic and English. This was necessary due to the majority of Bronze level commanders speaking Arabic, while only a small number were able to speak English. Thereafter, the questionnaire was administered in April 2017, using the online Survey Monkey website.

4.13 Ethical Approval

Ethical approval, according to Gray (2014), refers to an ideology of behaviour that guides honest choices about behaviours and relationships with others. The policy of the University of Salford is that researchers must apply for ethical approval before conducting pilot or empirical studies. This is done because researchers must ensure that participants' dignity and integrity are maintained. In this sense, and in order to ensure participants' satisfaction with the research, the interviews are conducted only once interviewee consent was obtained and once the interviewees are informed of the purpose of the study (interview consent form is presented in Appendix D). In addition, the interviews are held at convenient times, and the participants had the right to withdraw at any time. Finally, the confidentiality of the interviewees' personal data and answers are guaranteed in advance. See ethic application number ST 15-73 (Appendix E).

4.14 Semi-structured Interviews Design and Development

It is essential to follow a process (or a guide) concerning the criteria for conducting research studies. A researcher can find such criteria beneficial in enabling him/her to report important aspects of the study. Reporting the research should consist of the necessary components of research design, commencing with the personal characteristics of interviewees and ending in reporting and analysis and the final interpretation of the findings.

Gaining access to potential interviewees forms a vital step in ensuring their willingness and availability to participate in the study. Therefore, Rowley (2012) noted a number of initial steps to establish whether potential interviewees are willing to participate in a study. As a result, an important stage in preparing for the interviews consisted of the researcher contacting potential participants by means of email, or letters. Further details and a copy of the letter of invitation to the semi-structure interviews can be found in Appendix F.

Potential participants are contacted through email (provided by the HR department) with a consent form (Appendix D) and an information sheet explaining the research to ensure that all participants understand that participation in the study is voluntary and that their consent is secured prior to interviewing them. Semi-structured interviews were conducted with senior officers at the strategic Gold and tactical Silver levels. Since the semi-structure interview is considered to be a good approach for an exploratory study, thus the researcher will collect data from the CDGC agency in the field of emergency management, with the goal of exploring and investigating the study's aim and objectives. Because this approach would help the researcher understand the problems related to the adoption of the GSB structure for emergency response in the CDGC.

4.14.1 Targeting the Interviewees

Commencing an interview tends to be a sequential process, with the first step being to identify and contact all potential interviewees (Voss et al., 2002). The researcher, therefore, created a list of potential interviewees with experience of the GSB structure in the CDGC, identified with the assistance of the HR department of CDGC. A purposive sampling technique was used to obtain the contact numbers of participants. Once all the participants had been identified, their willingness to take part in this study was established by emailing copies of: (1) the participant information sheet; (2) the research consent form; and (3) the guidelines for the interview questions (semi-structured interview questions are presented in Appendix G). A confirmation email/phone call was returned by those interviewees wishing to take part in the research, followed by appointment made for the interview to take place (depending on the availability of the interviewee), along with confirmation of the exact location and date of the interview.

The researcher included all seven civil defence departments in this research study, making appointments according to the participants' availability. After confirmation of the planned interview dates, the researcher traveled approximately 1594 km to interview all the participants individually face to face between September and November 2016 at all seven civil defence departments across the country. The justification for the selection of the CDGC as a holistic single case study is that it provides the researcher with an opportunity to analyse phenomena in a way that would not otherwise be possible. This type of case study is most appropriate for researchers working within the organisation being studied. This research attempts to address and collect richer and stronger research data from all the civil defence departments across the UAE area, through the adoption of a single case study design.

4.14.2 Recording and Conducting the Semi-structure Interviews

The use of a digital recording is essential when undertaking interviews, as this enhances the interviewer's ability to concentrate on listening and re-focusing the interview. However, there are a number of issues when using digital recording, including the need to guarantee the interviewee the confidentiality of the recording, and their right to turn of the recorder at any time (Gray, 2014). There are a number of views concerning the use of voice recording during an interview, i.e., transcription is time-consuming, and it takes additional time to analyse the data. As noted by, Halcomb and Davidson (2006) the use of a recording device within an interview can lead to a number of disadvantages, i.e., the impact on the relationship between the interviewer and the interviewee, through the focus being on the audio recorder rather than concentrating on the questions, as well as the potential for technical issues. However, there are also a number of advantages: firstly, it is beneficial to transcribe and re-listen to recordings during data analysis; secondly, it can reduce interviewer bias, enabling the interviewer to listen to the conversation and ensure the accuracy of meanings; and finally, it can provide evidence that the interviewer actually conducted the interviews and that the reported data is accurate.

Thus, once their permission had been given, the interviewees in this study were recorded, with each interview session lasting for an average of approximately one hour. The interviewees were guaranteed confidentially, with the research papers written based on this study being structured so that no individual can be identified, and this study will not link the data provided to any interviewee identification. Thereafter, permission was given to maintain control over the material recorded, thus giving the interviewee the right to decide to stop being recorded at any time without any further explanation.

The semi-structured interviews were undertaken in Arabic and recorded in mp3 file format, and each file was subsequently transcribed into Arabic and placed in a separate word file document. During the following stage, each file was renamed to adjust to the responder's code, i.e., the code 'G04-CD4' is a Gold command number 4 (G04), undertaken at Civil Defence number 4 (CD4).

4.14.3 Transcription the Interview

The transcription of interviews is both time consuming and complex (Halcomb and Davidson, 2006), requiring between six and ten hours to transcribe each hour of recording. However, a researcher seeks to reduce the amount of time needed to transcribe the data, and thus the current researcher used a recording device with an ability to play, pause, and rewind to control the audio speed, as it suggested by Saunders et al. (2016). In this study, the actual range of Arabic transcription is that each one hour of audio recording would take six hours of transcription, and therefore the total actual recording (09:40) (nine hours and forty minutes) would be equivalent to (58 hours) fifty-eight hours of transcription.

4.14.4 Translation both Semi-structure Interviews and Questionnaire

A further essential aspect to be undertaken by the researcher when the instruments are unavailable in the language of the target respondent consists of the translation of semi-structure interviews and questionnaires. Translating is a process involving the translation of a source language into a target language. Therefore, the translation should not depend on word-to-word translation but should be undertaken in order to understand the local context and cultural meanings of the language of the interviewee (Harkness et al., 2004). It is important to note that both data collection methods of this study (i.e., the semi-structured interviews (qualitative) and the questionnaire survey (quantitative)) were designed in English during the initial stage and translated into Arabic during the second stage. Nevertheless, during the interview and survey distribution, both the Arabic and English versions of the questions were included and combined in each question design. During the third stage, both methods were again translated from Arabic into English. In order to reduce issues associated with translating questions into another language, the researcher sought a translation technique known as back-translation, i.e., the researcher contracted an independent translator working in legal translation company in the UAE to undertake this process, and thus ensuring the translator was a native speaker of the target language (Arabic). Both of the target questionnaires are presented in the Appendix H.

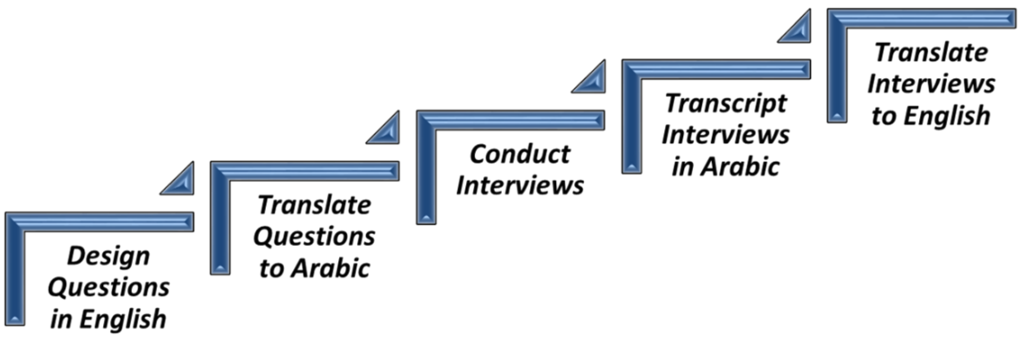


Figure 4.9: Interviews conducting process

The semi-structured interviews were conducted in the UAE at CDGC between October and November 2016, using the face-to-face method. The first interview was conducted on 13 October 2016 and the final interview on 2 November 2016. The preliminary research process assumed that fourteen participants would be interviewed, i.e., seven Gold and seven Silver commanders. However, the sample size was subsequently expanded to include one Senior Fire Advisor (SFA). This inclusion aimed at adding value and quality information to improve understanding of the implementation and function of the GSB structure. Accordingly, the researcher was advised by interviewee S02 to include the SFA, who had experience in the command and control structure in the CD2 general directorate. The researcher, therefore, added this expert to the overall number of interviewees. Therefore, fifteen interviews were conducted. These were limited to the role of the Gold (seven interviewees), Silver (seven interviewees) and SFA (one Interviewee). Furthermore, these commanders held high positions in their departments, with the Gold commander being a general director of the civil defence department at each of the seven departments, and the Silver commander held a head of an operation section at each of the seven civil defence departments. As a result, it was difficult to acknowledge how many interviews would be required to reach saturation. However, this was achieved by the information on the subject given by a total of thirteen interviewees. Guest et al. (2006) noted that data saturation during interviewing is more likely to occur following the first twelve interviews.

4.15 Questionnaire Design and Development

This study is exploratory in nature; the semi-structured interviews assisted the researcher in identifying the questions to be asked during the second stage of the exploratory design. Saunders et al. (2016) noted that data is collected from exploratory qualitative methods used to design the questionnaire, and therefore, according to Teddlie and Tashakkori (2009), the questionnaire survey can be employed as part of a sequential mixed method design to confirm the framework of the study.

Various types of questions can be used, including list, category, and ranking. The most common scales used in social research include an attitudinal rating scale, i.e., the Likert scale, which is employed to measure attitudes or behaviours, using a scale of between one to five, indicating from strongly agree to strongly disagree (Rattray and Jones, 2007, Brace, 2013). Therefore, the current research employed the Likert scales of closed-ended questions, for which participants choose a specific answer from the list provided by the researcher. This approach aimed to measure the Bronze commanders' attitudes concerning the framework questions, related to a number of different key factors of the framework implementation in the UAE. The design of the survey questionnaire is shown in Appendix I.

4.15.1 Questionnaires Distribution

The design of the questionnaire differs according to the means of delivery and returns from the respondents, and includes self-administered and interviewer administered. A Self-administered questionnaire is completed by the respondents and can be distributed through the internet, and delivery and collection, in particular when it comes to the use of Internet questionnaire techniques with its main advantages being firstly, that of cost, secondly, its ability to reach a large sample size, thirdly, being capable of being distributed over a large geographical area when a large sample size is required, and fourthly, confirming that the participants have responded (Wilson, 2013). However, it has a number of weaknesses, including a tendency to lack a high rate of response. Interviewer administered questionnaires, on the other hand, are frequently expensive to administer (De Vaus, 2014).

The above advantages and disadvantages of questionnaire collection methods have led this research to employ self-administered questionnaires by means of web/internet questionnaires, and delivery and collection technique. The non-probability technique was undertaken in order to select participants representing the assumed population of the Bronze command from the case study of interest. The delivery and collection technique demands assistance from others in distributing the survey to potential participants. Hence, the seven Silver commanders involved in this process distributed the link to the survey on behalf of the researcher. In this research, the questionnaire survey was undertaken during the second stage of data collection, in order to obtain a description of differences in the Bronze commanders' perceptions and views towards the implementation of the framework.

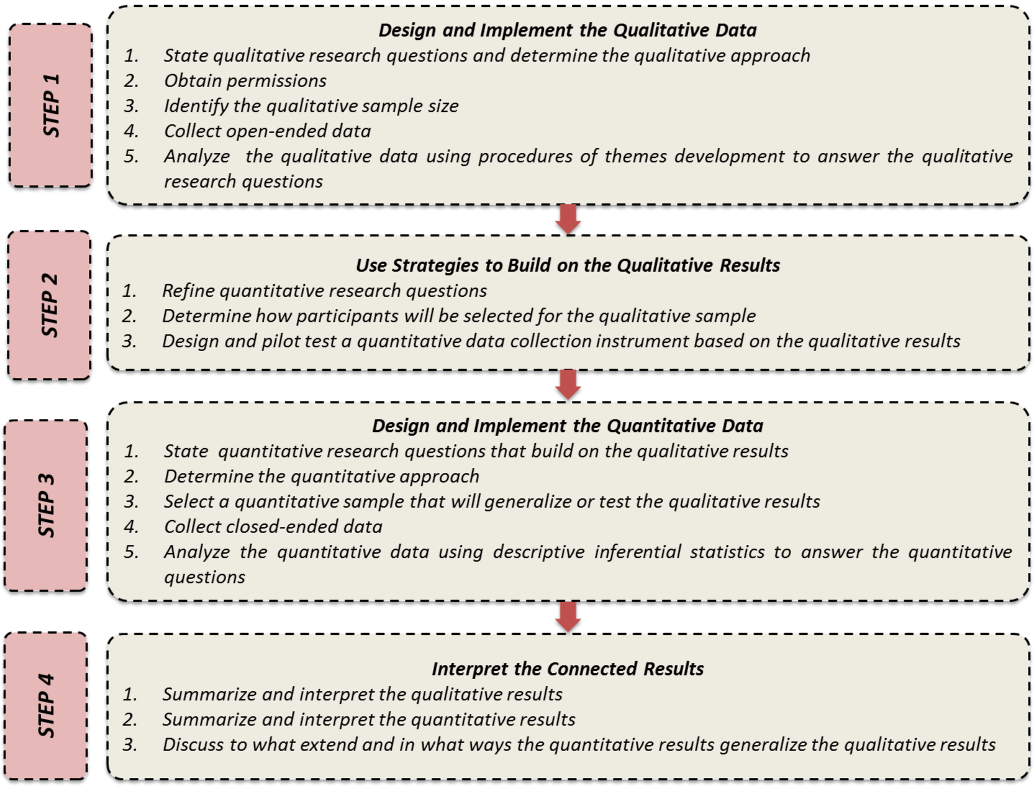


Figure 4.10: Flowchart of exploratory design (Creswell and Plano Clark, 2011)

The above Figure 4.10 above illustrates the four main steps for this exploratory sequential mixed methods design. The design commenced with an exploration of the GSB structure with the qualitative collection and analysis. The second step described a strategy to build on the qualitative findings, by developing a questionnaire instrument for testing the GSB factors. The third step consisted of the researcher implementing the quantitative approach, in order to determine the quantitative results from different and large samples, analysing the quantitative data using inferential statistics. The fourth step consisted of the interpretation process between both qualitative and quantitative results, undertaken by the researcher to generalise the results.

4.16 Qualitative Data Analysis Procedures

There is no standard method with which to analyse qualitative data, and the term ‘qualitative’ is frequently employed as a synonym for the term ‘interview’. The qualitative data typically refers to informational forms other than words, i.e., pictures or video clips (Saunders et al., 2016).

4.16.1 Content and Thematic Analysis

Content analysis is one of the most famous approaches for analysing qualitative data (Gray, 2014). According to Collis and Hussey (2013) content analysis is a technique used to analyse text data by understanding, interpreting and studying it by categorising themes defined by the research questions and data. This approach is used to examine the qualitative data by making a transcript of each semi-structured interview.

Content analysis was undertaken on data collected from the semi-structured interviews. This research, therefore, does not quantify the words in the transcripts, but rather uses content analysis to identify the themes from the interview transcript. There are a number of methods of content analysis, i.e., word count and thematic. The thematic analysis identifies patterns and themes capable of coding and classifying a set of data in more detail for further analysis (Easterby-Smith et al., 2015). Thus, the semi-structured interview questions can prove an effective basis for identifying themes, i.e. the main categories that form the basis of the research findings. In addition, each theme contains a number of sub-themes capable of being developed, while codes refer to the names of the themes.

Thus, thematic analysis forms a method of coding qualitative data used to design quantitative questionnaires. Therefore, both content and thematic analyses were used in this research for the semi-structured interviews. During the first stage of qualitative data analysis, the semi-structure data was analysed by being categorised into themes, in order to identify relations between these categories.

4.16.2 Qualitative Analysis with NVivo

A general term for computer software used to analyse and describe qualitative data is Computer Aided Qualitative Data Analysis Software (CAQDAS), and includes a number of computer software packages used to organise and capture quotes, e.g., ATLAS.ti and NVivo (Woods et al., 2016, Creswell, 2015, Lewins, 2015). It is acknowledged that computer software contains a number of advantages for qualitative data analysis. However, it also contains a number of limitations and drawbacks. A major advantage of CAQDAS is that it supports a wide range of qualitative and mixed methods research materials, i.e., audio; video; and text memo (Woods et al., 2016).

NVivo is a software package to assist researchers to handle, store and manage data in qualitative research. However, the software is only a tool and does not replace the researcher, as NVivo contains no ability to organise and store data, and thus the general process of the categorising or conceptualising of qualitative data remains the responsibility of the researcher (Easterby-Smith et al., 2015). Nevertheless, there are a number of advantages in using NVivo software: firstly, NVivo enables the importing of a word document directly to the software; secondly, this can then be coded in a straightforward fashion (Bazeley and Jackson, 2013); thirdly, it facilitates the making of notes, coding of interviews, editing, data linking and the writing of reports (Zamawe, 2015); and finally, NVivo enables a researcher to study the detailed data of specific topics, as the transcript resulting from the interviews is too large to manage manually, therefore the ability to code all information by means of a systematic process increases the validity and reliability of the research (Bazeley and Jackson, 2013, Zamawe, 2015).

Therefore, as discussed above, the current researcher employed the software package NVivo v11 to handle the thematic analysis for the process of data analysis. Experience of such software can promote the skills and knowledge of the researcher both during, and following, the research process. The researcher also selected to use the NVivo software v11 to analyse the data of this study and to use the thematic analysis feature provided, due to considerations of availability, and the fact that it supports qualitative research. Furthermore, the researcher has access to the software, which is provided by the University of Salford.

Hence, according to the above descriptions and discussion the use of NVivo v11 in this research enhances to achieve the fourth research objective. The researcher used the software in order to analyse the qualitative data where the data notes were transferred and coded using NVivo. The information resulted from the interviews is transcript into word files. Thereafter, this information is imported into the NVivo. These procedures are followed by developing themes and themes identification which codes and organise a set of data in more details for further analysis. Finally, data coding was used to help the researcher in identifying different interpretations of phenomena.

4.17 Quantitative Data Analysis Procedures

The use of quantitative data during the second stage of exploratory sequential design analysis is frequently conducted through descriptive statistics that indicate general trends in the data including: (1) central tendencies (e.g., mean, mode and median); (2) measures of dispersion (e.g., standard deviation, minimum and maximum); and (3) distribution measurement (e.g.

Kruskal Wallis test) (Creswell, 2002, Field, 2009, Wilson, 2013). Questionnaires can be used in both exploratory sequential mixed method design and explanatory sequential mixed method design research. Therefore, this study accords with the exploratory sequential design referred to as qualitative data is analysed by means of thematic analysis, while quantitative data is analysed by means of descriptive or inferential statistics (QUAL → quan).

4.17.1 Quantitative Analysis with IBM SPSS

Statistical Package for Social Science (SPSS) software is the most widely used package in social sciences, in particular within the educational sector (Peck et al., 2015, Pallant, 2013, Field, 2009). IBM SPSS has many statistical techniques that enable a researcher to test a particular need. However, this software requires statistical knowledge, and thus relies heavily on the skills of the individual researcher (Field, 2009). The software provides a wide range of statistical techniques, depending on the research study. IBM SPSS offers the opportunity to create descriptive statistics using graphs and an exploration of the data, or to establish relationships between variables using inferential statistics such as KWt (Pallant, 2013).

Due to the nature of this research, the questionnaire data was analysed using descriptive statistics and inferential statistics were employed as the main methods of quantitative data analysis. Firstly, by adopting a descriptive statistics, this approach is useful when the focus of the survey is to understand the opinions of commanders in different civil defence units, age groups, and levels of seniority, functions, and length of services. In particular, this study will use the quantitative data collection techniques, questionnaires to examine the opinions of the Bronze commanders.

Secondly, the size of the sample determines whether the researcher can use the inferential statistics, i.e., KWt is of good value when the sample size is large, and thus a more appropriate method would be the analytical survey. In this current research, therefore, the survey was distributed to the 196 participants of the Bronze commanders. Therefore, the KWt was used in order to identify relationships between the independent and dependent variables in the incident command framework that could potentially improve implementation during the emergency response in the CDGC. Based on the above discussion in this research, the questionnaire survey was analysed using IBM SPSS v23 software.

4.18 Reliability and Validity

The quality of the research depends on both its reliability and validity, the research choice selected in this current research focussed on increasing the reliability and validity of the data. Despite the differences in the process of increasing the reliability and validity between the qualitative and quantitative approaches, Morse et al. (2002) claimed that reliability and validity could be achieved through a number of different verification strategies. A large number of research studies have attempted to explain reliability and validity, which remains the subject of a continuous debate, with many scholars focussing on distinguishing between these two terms (Quinton and Smallbone, 2005, Yin, 2014, Muijs, 2011, Collis and Hussey, 2013, Field, 2009, Creswell, 2014, Wilson, 2013).

4.18.1 Qualitative Reliability

In management research, general explanation of both terms are given, as explained by Saunders et al. (2016), noted that the reliability of management research focuses on the replication of the findings. Reliability consists of the ability of an instrument to produce identical results under the same conditions (Field, 2009). Thus, a study proves reliable when a second researcher is able to replicate the research design, following the same procedures undertaken by the first researcher, and come to identical findings and conclusions (Yin, 2014).

In order to sustain reliability and quality in qualitative semi-structured interviews questions, a researcher should use a comprehensive and coherent approach to the research design (Saunders et al., 2016). Reliability in this research is achieved by outlining the reasons for the research strategy, along with the methods of data collection and data analysis. These procedures are explained in detail in the methodology chapter five of this research and should be used by subsequent researchers to understand the process employed by the current researcher, along with the research findings.

Saunders et al. (2016) provided a further method of increasing the reliability of semi-structured interviews is to provide information to participants or interviewees concerning the research project prior to an actual interview being conducted. Therefore, in order to increase the reliability of this current research, a list of themes based on the literature was drawn up and distributed between the Gold and Silver commanders (i.e. professional and experienced commanders in the field of emergency response in the CDGC) to inform them of the research information of interest to the researcher, and to provide opportunities for participants to prepare for the interviews.

Moreover, reliability is also achieved through the use of an approach to questioning capable of reducing bias during the semi-structured interviews. Saunders et al. (2016) stated the need to formulate different types of semi-structured questions, with the use of open and probing questions enhancing the exploration of the subject of the study by encouraging participants to provide extensive replies. Thus, this research employs a multi format of questions, i.e., the semi-structured interviews combined both open and probing questions, with the researcher seeking an explanation of issues related to the incident command structure used in the CDGC, refer to interview semi-structured questions in Appendix G.

4.18.2 Quantitative Reliability

Cronbach's alpha (α) was used to test the reliability of the survey. Cronbach's alpha is the most frequently used measure of reliability and consists of an alpha with a value between 1 (perfect reliability) to 0 (no reliability), with higher values indicating a greater degree of reliability (Pallant, 2013, Gray, 2014). A Cronbach's alpha of approximately 0.9 indicates excellent reliability; 0.8 and above indicates good reliability; and 0.7 and above is acceptable (George and Mallery, 2007).

As noted above, in this current research, the reliability of the questionnaires was established using Cronbach's alpha. Table 4.8 below demonstrates the data reliability analysed for each of the scales employed for measuring the different sections of incident command Implementation. Following the first step in undertaking the pilot study with PhD students, a second pilot study was conducted with ten Bronze participants from the CDGC agency with experience in emergency response. The sample size of ten Bronze commandeers was used as a pilot study for testing the reliability of the questionnaire, and the reliability was measured using Cronbach's alpha.

Table 4.8: Cronbach's alpha reliability from 10 Bronze commanders

Data Items	**Reliability Statistics**	
	Cronbach's alpha (α)	Number of Items
Implementation Factors	.929	8
Organisational Factors	.604	6

Individual Factors	.796	8
Barrier Factors	.926	11
Driver Factors	.909	9
Overall	**.939**	**42**

Thus, as noted above, a Cronbach's alpha of approximately 0.9 means excellent reliability, 0.8 and above means good reliability, 0.7 and above is acceptable, etc. The pilot study indicated an overall reliability of 0.939 for forty-two factors in the questionnaire, establishing that the questionnaire has very good reliability and thus the gathered data can be used for further analysis. The sections consist of: (1) implementation factors; (2) organisational factors; (3) individual factors; (4) barriers facing the system implementation; and (5) driver factors. Cronbach's alpha values were found to be higher than 0.9, which indicates that the items in all sections have excellent internal consistency and reliability. The data gathered here can thus be used for further analysis.

4.18.3 Qualitative Validity

The quality of research depends not only on reliability, but also on validity, and it is therefore insufficient to use a single approach (Collis and Hussey, 2009). Qualitative research establishes a high quality result by identifying the views of participants, presenting a comprehensive analysis of all the themes and factors involved in the study, which represent an accurate reflection of the opinions of the interviewee, thus leading to validity , i.e. the accuracy of the results of data analysis and findings capable of being generalised (Field, 2009). Some authors describe many aspects of validity, in order to ensure the quality of a research study, including: internal validity; external validity; and construct validity. Thus, this current research employs the terms proposed by Yin (2014): internal, external and construct validity.

1. Saunders et al. (2016) proposed the internal validity, which can be judged in two ways: (1) through the literature review and (2) through the use of an independent panel of experts.
2. External validity refers to potential generalisation from the findings of the research data (Quinton and Smallbone, 2005), and thus a researcher should take care when selecting a representative sample size of a population (Saunders et al., 2016). Thus, the participants in this current study from a representative sample, in order to achieve high

external validity, as they adequately represent the population of the study. Therefore, in the qualitative stage, the population sample consists of participants representing both senior and middle ranking commanders in the CDGC, who were selected due to being decision makers holding different ranks and positions within the seven emirates of the UAE.

3. Construct validity in a case study uses multiple sources of evidence to establish a chain of evidence (Yin, 2014, Dilanthi and David, 2001). To ensure construct validity in this research during the design of the questionnaire (both qualitative and quantitative), the following processes were followed, in order to ensure the questions were asked correctly. This current research implemented multiple sources of data collection methods, mixing qualitative and quantitative data in a mixed methods design. As previously indicated, construct validity in this research was achieved from research findings established from a number of different resources, including guidelines, articles and the literature review focussing on aspects of command and control during the emergency response phase, along with factors influencing the incident command system, in particular in relation to incident commanders and organisations. The design of both questionnaires in this current research was initially intended to increase validity by structuring the research questions so as to focus on the objectives of the research.

4.18.4 Quantitative Validity

Additional consideration needs to be undertaken to establish validity, i.e. the employment of an identical questionnaire found studies previously established as effective. However, in the absence of any existing questionnaires suitable for a new piece of research (as in the current case), the design and an evaluation of new questionnaires can prove beneficial (Jesús García de Yébenes Prous et al., 2009). No specific questionnaire was found in the literature appropriate to achieving the aim of this current research. Therefore, the current researcher designed a new set of questionnaires to measure the Bronze commanders' perceptions concerning the main qualitative results. Furthermore, construct validity is one of the most effective forms used to evaluate survey validity, i.e. how well the items of the questionnaires represent the conceptual structure. The KWt statistical techniques was used to determine construct validity in the questionnaire survey (Rattray and Jones, 2007, Muijs, 2011).

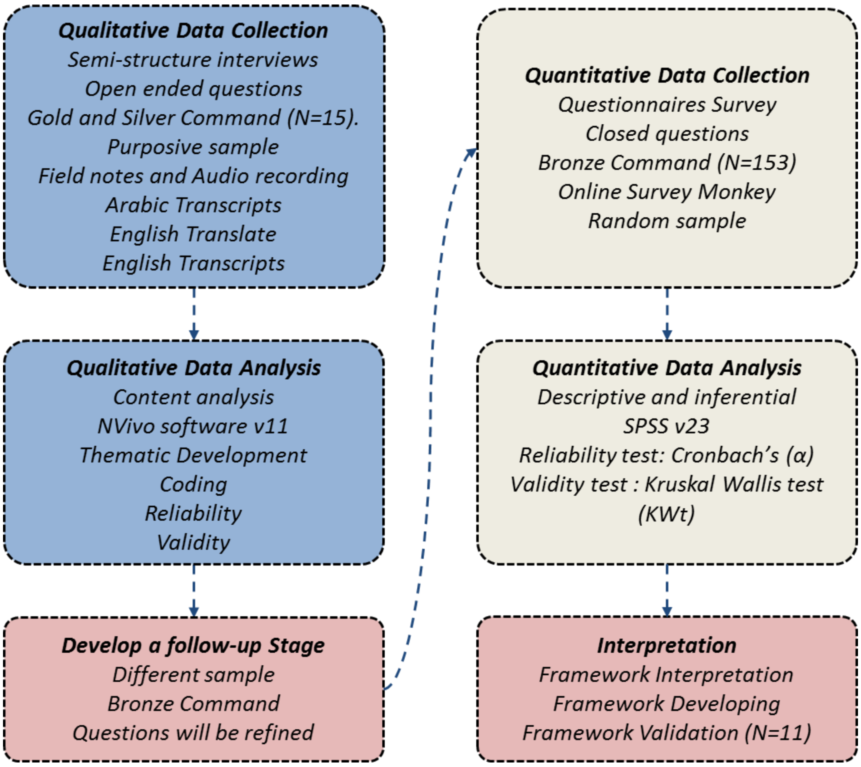


Figure 4.11: The Exploratory sequential flowchart of the study

The proposed research questions were asked to highlight an appreciable boundary between knowledge gap and ignorance. However, the challenge in developing the research questions lied in determining which uncertainties should be approached. Thus, the questions of this research rationalised the need to investigate the establishment of an appropriated incident command framework. The questions were also linked back to the research objectives. Table 4.9 below demonstrates the research objectives relating to the strategies and data collection techniques used to investigate and achieve the objectives.

Table 4.9: Achieving research objectivise based on data analysis and literature review

Research Objectives	**Method of investigation**		
	Literature review	Semi-structured interviews	Questionnaires
1. To identify and evaluate the current emergency management practice in the UAE's emergency agencies	x		
2. To investigate and analyse the critical factors and principles of practices, of effective and efficient incident command systems in developed countries.	x		

3. To develop a conceptual framework based on the main elements that contribute to the development of resilience focused on the best practices of incident command systems in developed countries.	x		
4. To critically analyse the identified factors of incident command system implementation within the emergency agencies, with respect to the CDGC in the UAE.	x	x	
5. To evaluate a unified incident command system for improving the UAE’s incident command system performance during emergency response		x	x
6. To develop and evaluate the proposed UAE incident command system that will facilitate the improvement of the management of emergencies			x

The study proposed six research objectives that focused on two broad targets, first the performance assessment of the current UAE incident command system from technical and operational aspects to identify the major drawbacks and malfunctions of the system. Second, the use of the incident command systems operating in advanced countries, to be used as a benchmark for improving the functionalities and mitigating the weaknesses and failures of the UAE based incident command system. The achievement of the two targets required a comprehensive review of relevant scholarly work to reach the right decisions regarding the selection of suitable research methodology and critical factors, to ultimately build a conceptual framework that demonstrated the core components of the suggested improvements.

The improvements as mentioned in Table 4.9 were a key consideration for the design of the research methodology chapter, with the aim being to accomplish the objectives of the research as detailed below:

The first research objective was to identify and evaluate the current emergency management practice adopted by emergency agencies in the UAE. Therefore, chapter two provided a descriptive background about the UAE and explained in-depth its demographics, potential hazards, and records. It also addressed the current emergency response practices and levels. In addition, it described in detail the CDGC incident command system and the definitions of emergency response in the UAE, with an emphasis on business continuity according to the National Response Framework (NRF) of NCEMA. This included: responsibility, comprehensiveness, participation, capability, communication, resilience and continuous improvement. To this end, chapter two identified and evaluated the current emergency management practice adopted by emergency agencies in the UAE by defining the structure and function of the SOPs manuals in the UAE.

The second research objective was to investigate and analyse the critical factors and principles of practices, relating to effective incident command systems in developed countries. Chapter three accomplished this by demonstrating the best practices of incident command systems in developed countries. The focus was mainly on the study of the UK's GSB and the USA's ICS systems. The UK's GSB was used as a reference for the study because the UAE has adopted this system as a basis for the UAE's GSB model. However, key fundamental factors, barriers, and drivers were identified in both frameworks and illustrated in this chapter.

The third research objective was to develop a conceptual framework based on the main elements that contribute to the development of resilience and was focused on the best practices of incident command systems in developed countries. The third objective was achieved in chapter three, as the conceptual framework was developed, through the identification of the main issues resulting from the literature review. In addition to the identification of the relationships between key concepts, along with the boundaries, and the scope of the study, this conceptual framework is devoted to the definition of key concepts and factors, with descriptions of its characteristics, such as the principles of emergency response, implementation, organisational, individual, driver and barrier factors that affect the implementation of the incident command systems, along with possible associated processes. In addition, it recognises and describes the state of the art functionality, that is to indicate the main theoretical lines in relation to the problem of this thesis. The GSB structure is adopted by the UAE's emergency CDGC agency; therefore the drivers of the framework are adopted by the study and are subject to analysis in the primary research methodology.

The fourth objective of the study intends to critically analyse the identified factors of the incident command system implementation within the emergency agencies, with respect to the CDGC in the UAE. The qualitative approach in chapter five describes how semi-structured interviews are conducted with senior commanders, at Gold and Silver command level. It also identifies the main key issues of: implementation, organisational, individual, barrier, and driver factors. These factors are detailed to synthesis the fourth objective and provide a strong foundation of the factors that affect the implementation of the incident command system in the UAE.

Objective five seeks to evaluate a unified incident command system to improve the UAE's incident command system performance during emergency response. The UAE's incident command system framework needs to be developed with a better structure and functioning. The findings of the quantitative research approach are intended to be used to complete the cycle of the sequential mixed method analytical procedures. In this phase, the KWt technique intends to investigate whether there is any significant level (p <0.05), in the relationship between the dependent incident command sectional factors across the seven independent group's variables of the CDGC.

Lastly, the sixth objective of this research aims to develop and validate the proposed UAE's incident command system that will facilitate the improvement of the management of emergencies. Chapter seven describes the UAE's improved incident command system framework along with details of the KWt technique which is deployed to determine whether there are any statistically significant differences between the independent and dependent variables. This framework is formed from a chain of inferences made from major sections and exported to be practically used by the CDGC agency in the UAE. For the robustness of the research, a questionnaire is distributed among CDGC experts to validate the proposed framework. The experts have line experience and deeper knowledge gained through intense experience and practice.

4.19 Chapter Summary

In summary Figure 4.11 above demonstrates how this study addressed the incident command structure implementation requirements for emergency response in the UAE's CDGC. The purpose of this exploratory sequential mixed method design was to explore with a small sample size and then to determine if the qualitative results generalised a large sample size. The first stage was a qualitative exploration of identified key factors for the application of the framework in the UAE's CDGC, as well as the identification of the barriers associated with the incident command implementation in the UAE's CDGC, to identify the driver factors of the current structure in which semi-structured interview data was collected from 15 Gold and Silver commanders. Because there are no existing factors to examine the incident command system, therefore these factors need to be identified based on the views of qualitative participants. In the second quantitative phase, questionnaires were collected to confirm the framework's key factors from 153 Bronze command at the CDGC. In addition, the KWt was conducted in this study because this type of quantitative test aims to give a robust analysis of the results by identifying and assessing the significant relationship between the dependent variables and independent variables.

CHAPTER 5 QUALITATIVE DATA ANALYSIS

5.1 Introduction

The aim of this chapter is to achieve the fourth objective of the study, which is to critically analyse the identified factors of incident command system implementation within the emergency agencies, with respect to the CDGC agency in the UAE. The semi-structured interviews were designed to collect the required research data and used with the focus groups (Gold and Silver) to answer the proposed research questions on the factors and challenges pertinent to the incident command system implementation and operational success in the UAE context. The qualitative analysis was concerned with the following research question, what are the current critical factors that affect the implementation of the incident command system within the CDGC in the UAE?

This chapter presents the qualitative findings of the study along with the perceptions, opinions, and experience of 15 senior commanders, which have been collected through semi-structured interviews, regarding the application of the command and control structure in the UAE's CDGC agency. These senior commanders comprised of both Gold and Silver, along with one of the CDGC's Senior Fire Advisor. An exploratory semi-structured interview provided the bases for the development of the conceptual framework, which was further explored in a quantitative survey of Bronze commanders in the CDGC. The information collected by the semi-structured interviews is presented thematically to illustrate the links between the collected data and objectives, for the specific purpose of the implementation of the command structure for emergency response activities. Furthermore, themes and sub-themes for the qualitative inquiry have been suggested and extracted from the data.

5.2 Background information of the interviewee

It has been mentioned earlier in section 4.11.2 in chapter 4 that purposive sampling techniques were adopted to select the Gold strategic and Silver tactical commanders from different civil defence departments of the CDGC agency across the UAE for the conduction of semi-structured interviews from sample participants. A total of (15) interviews were conducted, (7) from Gold commanders, (7) from Silver commanders and only (1) from Senior Fire Advisors. The Gold commanders were given the code "G", Silver commanders were coded as "S" while the Senior Fire Advisor was given the code of "SFA". Also, serial numbers were provided to each Gold and Silver commander for specification purposes. There are seven emirates in the

UAE namely Abu Dhabi, Dubai, Sharjah, Ajman, Um al-Qaiwain, Ras Al-Khimah, and Fujairah. The Gold and Silver participants were selected on the basis of one each from these seven emirates, and these selected commanders held high positions in the departments of the CDGC agency. For instance; the Gold commander is either a general director or a director at the civil defence department from each of the seven CDGC departments, while the Silver commander is either a deputy director or the head of an operation section at each of the seven departments. A summary of the basic characteristics of the participating commanders with reference to their commanding level is presented in Table 5.1 below.

Table 5.1: Interviewee's basic characteristics

Code	Position	Qualification	Experience
G01	General Director	Bachelor	1.5
G02	General Director	Diploma	13
G03	General Director	Bachelor	26
G04	General Director	Bachelor	16
G05	Director	Diploma	28
G06	Director	Bachelor	15
G07	Director	Bachelor	10
S01	Director	High School	20
S02	Director	Bachelor and Fire Science Diploma	20
S03	Director	Bachelor	13
S04	Director	Bachelor	27
S05	Head of a section	Diploma	29
S06	Head of a section	Bachelor	16
S07	Head of a section	High School	37
SFA	Advisor	Technical Degree	35

5.3 Semi-structured interviews analysis

Qualitative data from semi-structured interviews was initially coded and classified into five dimensions as follows: Implementation factors of the framework, Key organisational factors, individual factors, barriers faced in the successful implementation of the incident command system, and drivers for the success of the incident command system in the CDGC agency. Results and findings of the qualitative study are presented in these five sections. Within each dimension of the qualitative inquiry, themes were identified on the basis of research questions and interview transcripts. These themes are a reflection of the research questions and the main objectives of the study.

Further exploration of the participant's responses under each section and theme gave birth to the emerging sub-themes or emerging codes. The emerging sub-themes were the responses of participants and provided the vast scope of exploration. In the process of the coding of responses under their relevant pre-defined themes, all possible emerging sub-themes were identified and interpreted, so that all the relevant data is coded and utilised to answer the semi-structured questions. Once the process of coding was completed, all the coding references were iteratively read to reduce the resulting final codebook by identifying the possible relationships of codes with one another. In addition, NVivo v11 software was used to support this coding process of themes and sub-themes, with further thematic content analysis of the qualitative responses by the Gold and Silver commanders.

The analysis of the semi-structured interviews is linked with the development of a quantitative questionnaire survey for the next stage of the exploratory sequential mixed methods design. It has been mentioned earlier that the qualitative data from senior commanders (Gold and Silver) and its analysis findings are being used to design the quantitative questionnaire for Bronze operational commanders.

5.4 Section 1: Incident Command System Implementation

The first section of the qualitative analysis presents the views of both the Gold and Silver commanders on why and how the incident command structure was implemented in the CDGC. This included their understanding of how the system came to be chosen, as well as how it is currently implemented. Table 5.2 below presents the predefined themes and emerging sub-themes used for the initial coding of the data in this section.

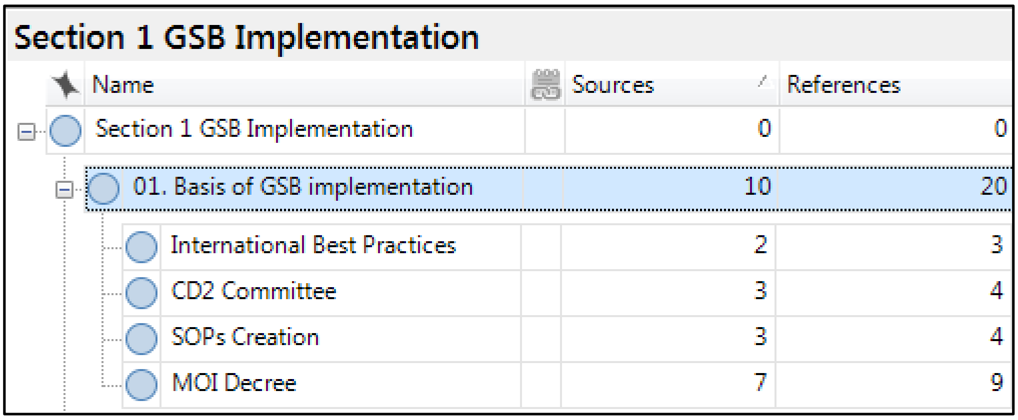
Table 5.2: Predefined themes and sub-themes

Themes	Sub themes
1. Basis of GSB implementation	• CD2 Committee • International Best Practice • MOI Decree • SOPs Creation
2. Implementation Factors	• Improve and Organise Response During Emergencies • Minimise Random Decision Making and Confusion • Avoid Unauthorised Intervention In Command • Organise Commanders Roles and Responsibilities • Improve Structural Organisation in Emergency • Better Coordination and Communication • Best Practices of SOPs • Minimise Negative Outcomes
3. Emergency Response levels	• Level 1 NCEMA National • Level 2 MOI Regional • Level 3 Emirate Local

4. Incidents Levels of Command	• GSB Levels and Location
	  ▪ Gold Strategic
	  ▪ Silver Tactical
	  ▪ Bronze Operation

5.4.1 Basis of GSB Implementation

While answering the questions of interview related to the basis of GSB implementation in the CDGC of UAE; four specific mechanisms were identified by participants namely: the Dubai General Directorate of Civil Defence committee (CD2), international best practices, the Ministry of Interior (MOI) decree, and the creation of Standard Operation Procedures (SOPs). The responses of the participants regarding the foundation of GSB implementation presented the following sub-themes as shown in NVivo Figure 5.1 below.



Section 1 GSB Implementation

Name	Sources	References
Section 1 GSB Implementation	0	0
01. Basis of GSB implementation	10	20
International Best Practices	2	3
CD2 Committee	3	4
SOPs Creation	3	4
MOI Decree	7	9

Figure 5.1: Coding structure for basis of GSB implementation

5.4.1.1 CD2 Committee

Most of the Gold level participants are identified in one or more mechanisms. For example, the mechanism of CD2 was identified by three Gold level commanders (n=3), while creation of the SOPs was highlighted as a basis of GSB implementation by two Gold level commanders (n=2) and the SFA. Moreover, the majority of the Gold level commanders (n=5) and two Silver commanders (n=2) identified the MOI decree as the basis of the GSB implementation in the CDGC agency of UAE. For instance, G05 provided the following details:

> *"The initiative of this structure dates back to 2012 when the General Director of Dubai Civil Defence formed the first emergency response system which consisted of different levels of commanders" (G05).*

5.4.1.2 International Best Practices

Some other participants G02, S01 and SFA pointed out that a committee from the CD2 was appointed to discover the international best practices in incident command and standard operation procedures. According to G02, three teams of officers were trained in three different foreign countries. After the completion of the training courses, the varied styles for combating the emergency incidents were unified to develop a GSB structure which was supposed to be adopted in the UAE to organise the operational incident. In G02's words:

> *"Three (3) teams of officers from the Dubai General Directorate of Civil Defence have trained in international schools in Canada, Singapore, and the UK. Later, the style of combating incidents was unified, and the best practices have been adopted" (G02).*

5.4.1.3 MOI Decree

According to the participants G01, G03, G04, G05, G06, S03, and S07 the GSB command structure was implemented in the UAE as per the decision of the MOI. Furthermore, details about the issuance of the decision by Undersecretary of the MOI in 2010 were explained by the participant G04:

> *"Later the decision to implement the GSB structure was issued by the Undersecretary of the Ministry of Interior by (….); thus, the command and control structure during disasters and incidents was generalised based on the administrative decree decision." (G04)*

5.4.1.4 SOPs Creation

After the analysing of international best practices and understanding the requirements of the UAE cultural context and environment, SOPs were designed and developed for the GSB structure adopted in the UAE. These SOPs are the guidelines for the conduction of emergency response processes in different types of incidents. Compliance with these standardised procedures is required to make the GSB structure successful and effective. As per SFA:

> *"The GSB structure was initiated based on the SOPs. We have clearly indicated in our SOPs, the level of command that would be required in the incident". (SFA)*

In summary, responses by the participants vary for the basis of GSB structure implementation in the UAE. Based on their recalling the process of GSB implementation, which can be divided into the following mechanisms: creation of a CD2 committee to discover the international best practices for incident command, creation of the SOPs in the light of international best practices, and finally the release of decree by MOI for implementation of the GSB command structure in the CDGC agency of the UAE. Figure 5.2 below illustrates the matrix coding query for the basis of the GSB implementation.

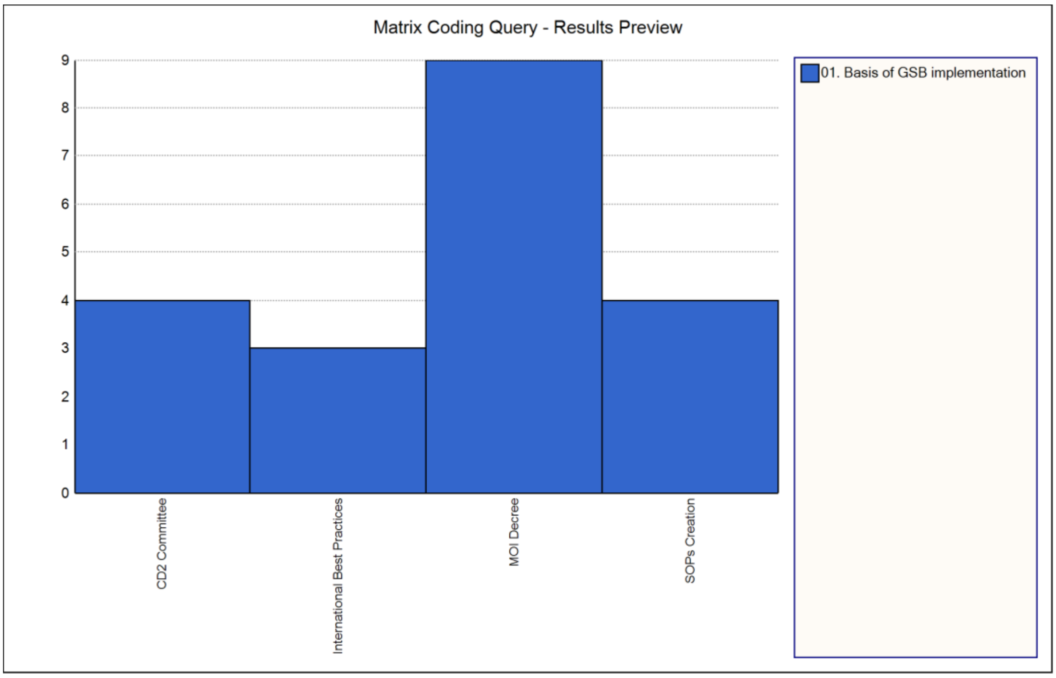


Figure 5.2: Matrix coding query for the basis of GSB implementation

5.4.2 Implementation Factors

The Gold and Silver commanders were asked about their perceptions regarding the reasons behind the implementation of the new GSB command structure. A variety of responses by the participants gave rise to the emerging sub-themes, in this respect, these emerging sub-themes were further classified by the participants under the umbrella theme of the improvement of responses during an emergency. Furthermore, the representation of the coding scheme and the participant's frequency for each emerging sub-themes are shown in Figure 5.3 below.

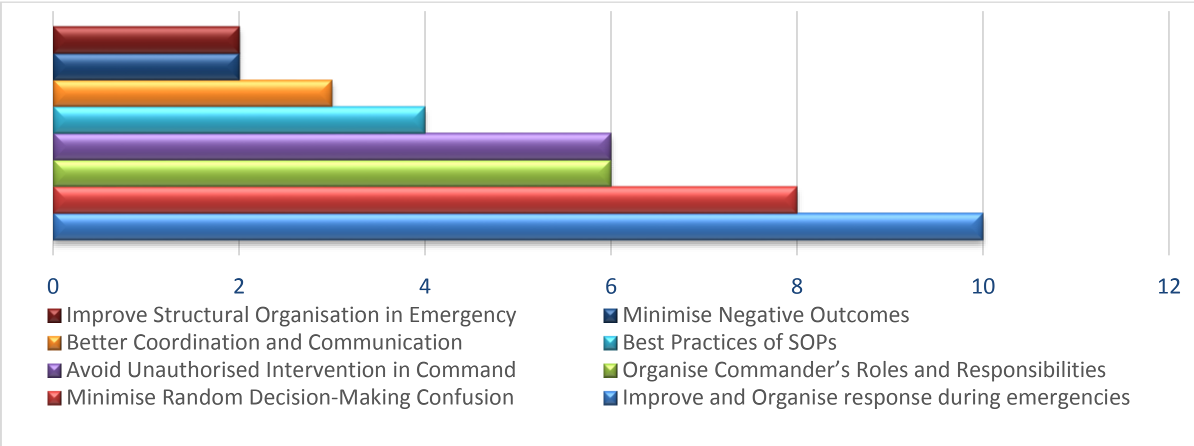


Figure 5.3: Emerging themes for GSB implementation factors

5.4.2.1 Improve and Organise Response during Emergencies

Majority of participants recognised that improving response during emergencies (n=10), in one way or another, was an underlying reason for the decision to implement the GSB command structure. Due to the need of an efficient structure that controls over different incidents, some of the factors which are mentioned by the participants for improved response included: avoiding current drawbacks such as lack of organisation in incident response, defining a clear decision-making structure based on specific types of hazards, and organising commanders' roles and responsibilities. The participant S04 raised this issue by referring to the improvement in the quality of the response for different types of incidents in these words:

> *"The GSB came to improve the quality management, command and control and responsiveness to different types of incidents in the UAE. The GSB, then, came to organise the incident command procedures and raise the quality of actions taken by the Civil Defence directorates in the UAE". (S04)*

In addition, the GSB structure was selected for its functional areas at the CDGC agency for the organisation of incident response operations. This command structure is installed at lower and higher levels across the structure for example from the bronze up to the gold level. The GSB structure helped in the development of incident management strategies along with the development taking place at the national level which is expressed by the interviewee G06 and G03:

"The GSB structure is a knowledge-based framework which enables all commanders to understand and acquire knowledge about incident management and the techniques used for management incidents successfully". (G06)

"The main reasons for the implementation of the GSB structure is the integration of all efforts to control over emergency response at the local, regional and the national levels". (G03)

5.4.2.2 Minimise Random Decision-Making and Confusion

Defining a clear decision-making structure was identified as an important aspect of the reason for the implementation of the GSB command structure (n=8). This is because the CDGC agency is facing problems due to disorganisation and confusion in the decision making process at the time of emergency response activity. According to participant SFA, the reason behind the unclear command structure is fragmentation in command and control procedures which result in chaos at the time of emergency response activities. As per the views of SFA, multiple officers were making their own decisions rather than following a joint process. For instance:

"There was not much command and control, it was very fragmented, where you have a lot of officers that they would be coming and making their own tactics and procedures, and so it was not joined up and the incident did not run as safely or its operations carried out as they should be done". (SFA)

Moreover, most interviewees emphasised the importance of clarity in decision-making to reduce random decisions at the time of emergency. G01, G04, G05, S01, S04, and S06 were all of the views that clear decisions and organised command orders were lacking in the past and were merely given randomly. As it was reported by G05:

"The GSB structure organises the roles and defines the locations of the commanders during the response to incidents, in contrary; these definitions were randomly taken during previous practices as efforts were randomly distributed and roles were randomly given". (G05)

5.4.2.3 Avoid Unauthorised Intervention in Command

Mainly the Silver commanders were of the view that the importance of avoidance in unauthorised intervention in command is also an important factor for the implementation of the GSB structure in the CDGC agency (n=6). As per the words of S02, intervention in command can be defined as "orders given by those commanders who are not directly involved in the incident response process".

> *"In the race to combat hazards, we have faced the challenge of random incident response. It means that commanders, even those, who are not involved in the incident response process, want to play a vital role in the process, so they give orders to participate in the joint efforts". (S02)*

Similarly, S04 elaborated the intervention in command as the attitude of gold commanders who enter the hot zone and make decisions on their own. According to S04, this is a risky thing and narrated:

> *"However, in some incidents, the gold commander may like to see the incident response procedures from the hot zone. Accordingly, this might cause a barrier to the incident response. Furthermore, this might expose them to risk, which might cause chaos and a negative effect on the incident response". (S04)*

Accordingly, it can be said that there were confusions and overlapping during emergency responses before the GSB implementation.

5.4.2.4 Organise Commanders' Roles and Responsibilities

Gold and Silver commanders of the study were of the view that there is a need for better organisation of the roles and responsibilities of the commanders' (n=6), to make and support improved, efficient and correct decisions at the time of emergency response activities. For instance, G04 mentioned that the organisation and identification of the commander's roles and responsibilities was one of the major factors for the implementation of the GSB structure. G04 reported that:

> *"It is also established to organise and define the roles and responsibilities of commanders during hazards and incidents". (G04)*

In a similar vein, participant G05 highlighted that the SOPs are being useful in helping commanders to understand their roles and responsibilities. Thus, resulting in the organisation of the emergency response process and incident management. A similar advantage in terms of incident management is expressed by G05:

> *"The Standard Operation Procedures (SOPs) have helped commanders to understand their roles and responsibilities, and to organize the emergency response process, and organize incident management. Now, commanders are titled with responsibilities and locations during incidents. The GSB structure organises the roles and defines the locations of commanders during their response to incidents". (G05)*

5.4.2.5 Best Practices of SOPs

Some of the qualitative participants mentioned that the identification and implementation of best practices for the incident response activities were also important factors in the adoption of the GSB. Four of the participants (n=4) highlighted the importance of learning and the adaptation of international best practices in the UAE context.

With the formulation of SOPs helping to increase the awareness of commanders about incident responsiveness, the framework is based on international best practices to achieve the improved level of incident response at the local level. This topic was addressed by G05:

> *"The GSB structure was implemented to improve incident response based on international best practices. At present, the practices are developing the tactics of the Civil Defence teams". (G05)*

The formulated SOPs framework was adopted as a code that is internationally benchmarked and one of the factors for the GSB structure implementation is the adoption of international standards and benchmarks in the UAE. According to SFA:

> *"[The SOP] is the reason why the GSB is implemented. We worked with a code of practice and this code is being benchmarked internationally across the world, and we felt that the SOPs is being written fit beautifully and can easily be used as best practice for our operations". (SFA)*

5.4.2.6 Better Coordination and Communication

Three of the Gold commanders (n=3) identified the improvement in the coordination and communication process as a factor for implementing the GSB structure. G03 perceived that a lack of coordination could lead to negative consequences in control over incidents:

“The lack of coordination between the major players will bring up with negative consequences and will weaken control over incidents”. (G03)

Coordination is required within a single agency and it facilitates the flow of information during the decision making process. For instance, as G07 explained:

“The GSB structure was adopted to facilitate the flow of information on which decision making is based to manage an incident effectively”. (G07)

The Gold and Silver participants of the study highlighted the use of the TETRA wireless system as the form of communication during an incident, whereas wired alternate communication modes were also identified by eight participants n=8 (four from each level). The only participant who did not mention the TETRA wireless system was the SFA, who provided a unique mode of communication associated with visual clues such as coloured T-Shirts. Direct communication between the commanders was also identified as a strong communication mode, whereas the other forms of communication were office meetings (mentioned by one Gold and one Silver commander) and video conferences mentioned by only one Silver commander. The SFA highlighted the unique mode of communication in these words:

“The incident commanders (Silver or Bronze) in practically any scene are identified by T-shirts and are a point of contact for all agencies to find that commander and discuss whatever level of command is required. Furthermore, we do have mobile operation vehicles, also we have a small, and we call it a silver command vehicle, where you can set plans, have discussions and communicate with other emergency agencies. Moreover, we have a larger vehicle equipped with an office and has been set up with computers and big screens, for when we need a great degree of command. Communication is always channeled through the commander or the commander’s support officer at the scene”. (SFA)

In summary, all commanders indicated that the improvement of incident response during emergencies was one of the most important factors for the implementation of the GSB structure in the CDGC agency. The majority of the participants highlighted the TETRA wireless system as a mode of communication during emergency incidents but wired, and face to face communication modes also exist significantly.

5.4.2.7 Improve Structural Organisation in an Emergency

Two of the participants, one Gold commander and one Silver commanders (n=2) provided the view that the improvement in response was directly related to the improvement in structural organisation in incidents. This enhanced structural organisation has provided a guideline for the change in structure when resistance is faced from within the organisation. S02 indicated that some resistance was witnessed against the structure due to a lack of trust and acceptance to change management. However, the structure has attempted to bring reforms in the structure of system by introducing changes at different levels. S02 highlighted:

> *"Despite the resistance against the structure was due to the fact that the commanders, who were qualified for the structure, were not trusted by the majority, and they did not accept change management. Changing the structure has been proposed as an attempt to reform the system structure due to changes taking place at different levels". (S02)*

5.4.2.8 Minimise Negative Outcomes

Finally, two of the participants (n=2) identified an important factor for the implementation of the GSB, which was, the minimisation of negative outcomes, and a reduction in the losses of lives and property at the time of an emergency. As per S02, the negative outcomes are minimised because of quick response time provided by organised response activities within the GSB structure. For instance:

> *"The reduction of losses of lives and properties has been the most significant outcomes of the previous and recent incident management systems. Before incident response efforts were randomly taken, the losses were huge and the command and control efforts were rather slow, thus, undertaking new procedures have become a necessity". (S02)*

Moreover, G02 was of the view that the major concern in incident response is the reduction of deaths and accidents to minimize any kind of loss.

> *"Deaths and accidents have been the major reasons to implement this structure". (G02)*

In summary, it is evident from the responses of the gold and silver participants of the qualitative study, that there is a number of factors which instigated the implementation and adoption of the GSB structure in the CDGC agency. Some of the factors highlighted by the participants were improved organisation of responses during emergency incidents, by enhancements such as clarifying decision making, defining the roles and responsibilities of commanders, identifying and deploying best practices and improved decisions for the minimisation of losses in any type of emergency incidents.

5.4.3 UAE Emergency Response Levels

Emergency response operations can be only local in nature in an Emirate or can extend to other regions or other emirates at the national level. All the qualitative participants were questioned about the main activation levels of the GSB structure at the CDGC agency. Almost all of the participants identified three activation levels namely: level 1 national (NCEMA), level 2 regional (MOI) and level 3 local (Emirate) as can be seen in Figure 5.4 below.

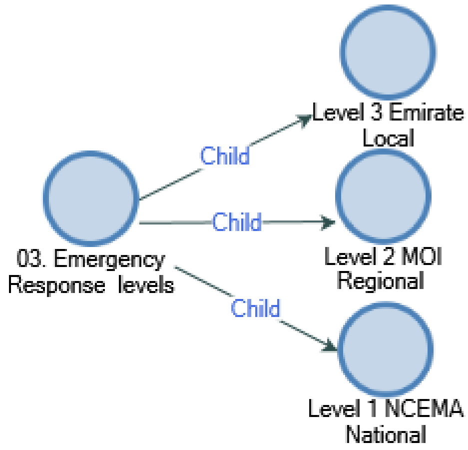


Figure 5.4: Emergency response levels

At the national level 1, most participants mentioned the National Emergency Crisis and Disasters Management Authority (NCEMA); at the regional level 2, the Ministry of Interior (MOI); and at the local level 3 the Civil Defence General Command (CDGC). In further explanation are the words of S01:

> *"The emergency response framework has three levels, namely, the Supreme Council for National Security with National Emergency Crisis and Disasters Management Authority (NCEMA). The Ministry of Interior (MOI). And the local Civil Defence General Command (CDGC)". (S01)*

5.4.3.1 Level 3 Emirate Local

The level 3 of the CDGC at the local level is applied inside a single state of an Emirate; where simple and moderate incidents are treated by the provision of emergency response activities, with response to type and size of the incident. According to G05, the level of response is based upon the categorisation of the incident and the possible consequences associated with that incident.

"The development of the level of the incident is raised based on its possible consequences. To shift from a simple incident to a disaster, during this, the incident alters from the local state to the national state, from the responsibility of the directorate to the responsibility of the NCEMA. In a disastrous incident, the responsibility might involve higher state positions such as the minister of Interior or even the deputy of the president of the UAE where support is expected from national stakeholders at all levels". (G05)

At the local level 1, the command structure consists of a Gold, Silver and Bronze commander. S07 reported that:

"The commanding structure in this level consists of a gold commander (the general manager), a silver commander (head of an operation section) and a bronze commander (chief of a shift)". (S07)

5.4.3.2 Level 2 MOI Regional

The level 2 MOI is at the regional level and is applied according to the development of the level of incident raised based on its possible consequences. In the transition from a simple incident to a disaster, the incident is altered from the local state to the regional state, where the responsibilities are shifted to the directorate of the MOI. G05 explained the procedure of transferring the command by saying:

"In a disastrous incident, the responsibility might involve higher state positions such as the minister of Interior or even the deputy of the president of the UAE, where support is expected from regional and national stakeholders at all levels". (G05)

5.4.3.3 Level 1 NCEMA National

The level 1 NCEMA is for the national level incidents and is applied in the case of complex incidents, which need to be treated at the state and national level with assistance from the NCEMA. The CDGC coordinates with the NCEMA to respond to the incident. Hence, the national level response activities require the intervention of the NCEMA. G05 expressed:

"In case of control over the incident is lost, the CDGC coordinates with the NCEMA to analyse the incident, evaluate solutions and discuss possible solutions on different types

of incidents such as earthquakes, floods, and tornados. Meetings to discuss all these issues should be held with the NCEMA office in the state". (G05)

Thus, the NCEMA was created to organise the efforts of the stakeholders involved in the GSB structure around pre-defined plans. Incidents within the GSB structure are distributed to the different commanding directorates operating under the leadership of the MOI. For instance, the directorate of police is supposed to respond towards risks relating to riots, whereas the CDGC is supposed to respond to risks relating to fire, flood, and earthquake hazards. In summary, it can be concluded that three activation levels were identified by the qualitative participants: the local, regional and national level and each of these levels is represented by their specific agencies namely the CDGC, MOI, and NCEMA respectively.

5.4.4 Levels of Command

All of the qualitative participants (n=15) identified the three levels of command in the CDGC as a single agency namely: Gold (strategic), Silver (tactical) and Bronze (operational). While in terms of communication, the TETRA wireless system was identified by the majority of the participants with some additional nodes such as wired and face to face communications. Sub themes related to the levels of command are represented in Figure 5.5 below.

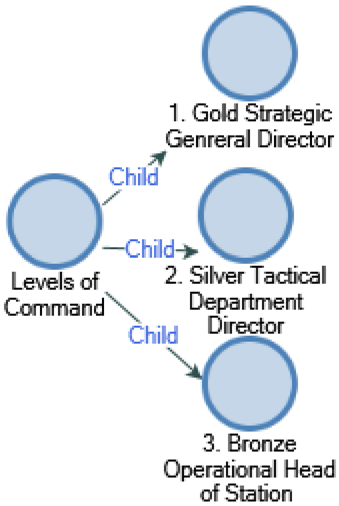


Figure 5.5: Coding structure for levels of command

All of the participants were able to identify the three levels of command as Gold (strategic), Silver (tactical) and Bronze (operational). The main distinction across these three levels is referred to as the role, which is played by the commanders during an incident. The identification of the three levels and their broad roles are also combined with the identification of their location during an emergency, as Gold in the cold zone, Silver in the warm zone, and

Bronze in the hot zone. Gold participant G04 explained that the location of the Gold commanders is in the operational room of the directorate, the Silver commanders are in the mobile operational rooms and the Bronze commanders are located in the operational field. G04 reported that:

> *"The positioning of commanders depends on the type of incident where the Silver commander is outside the operational area or the combined mobile operational room, while the Gold commander is based in the directorate operational room. Whereas, the Bronze commander exists in the field". (G04).*

Table 5.3 below presents a summary of the roles and responsibilities, the overall location and the rank or job position of the three levels of command.

Table 5.3: Roles and responsibilities, location and rank of the three levels of command

Gold	**Silver**	**Bronze**
	Related Job Positions and Rank	
General Director Department Director Colonel and above	Deputy Director Head of a section Major to Lieutenant Colonel	Head of a station Heads of a shift Warrant Officer to Captain
	Location	
Cold zone Central operation room	Warm zone Mobile operational room	Hot zone Incident zone/Field
	Roles and Responsibilities	
• Strategic commander • Evacuation orders • Raising emergency level • Call for support • Facilitate cooperation with stakeholders • Talk to the media Coordinating • Strategic planning • Putting plans according to objectives • Communicate with silver commander	• Tactical commander • Communicate and link gold and bronze commanders • Determine needs for gold and bronze by type of incident • Call for support of stakeholders • Receive updates / notifications form stakeholders on tasks • Distribute logistics support • Maintain required resources from stakeholders	• Operational commander • Evaluate severity and associated risks • Determine level of the incident • Lead operations team at incident • Execute plans • Transmit overall picture of the incident, provide feedback • Sole manager of minor incidents

5.4.4.1 Gold Strategic Level

Gold commanders are identified by the participants as the ones who make strategic decisions and have an overall vision of the incident, as well as the ones who are in charge of the coordination between national agencies and stakeholders. As G01 explained, some of the specific tasks are associated with higher-level decision-making, such as determination of the extent of an emergency or decisions for evacuation.

> *"The gold commanders have absolute power, and they are end-decision makers. They determine the level of emergency with the higher authorities. They take the decision of whether to evacuate or not and also decide about raising the emergency degree in the entire sector or just in the administration involved". (G01)*

In terms of identifying roles and responsibilities, the Gold commander draws a plan and organises the activities of the incident management. They oversee the incident from the cold zone to gain a holistic view and react accordingly, as the closer to the incident zone, the shorter the tunnel vision will be and vice versa. Gold commanders should perform from the cold zone to isolate themselves from any potential risk, and hence, perform their roles successfully. In addition, they determine whether the incident should be classified as minor or extended towards the regional or national level. As expressed by S06:

> *"The Gold commander is the strategic leader, setting the plans and regulations, organising the activities, and giving instructions concerning incident management. Leading the crews from the 'Cold Zone', they usually exist in the 'central command and control room', giving instructions to the Silver commander". (S06)*

Gold commanders are the strategic planners and are always present at civil defence headquarters. The SFA expanded on how the Gold commander plays an important role in leading the incident. According to the SFA:

> *"The massive fire in Dubai on the 31st of December 2015, had a national impact on the country. Whereby, global media agencies were asking questions, it was such a high-profile event; therefore, the level of command was very quickly raised to the gold level. In fact, the Deputy Prime Minister and the Minister of Interior came and took charge of that event". (SFA)*

5.4.4.2 Silver Tactical Level

Silver commanders are associated with tactical roles and responsibilities and are basically a link between the Gold and Bronze commanders, which increases the effective communication of responsibilities. They are associated more with the events, rather than the strategies; as explained by S01:

> *"The Silver commanders deal with the events rather than the strategies. They carry the role of communication and the delivery of orders and instructions from the Gold commander to the Bronze commander, and vice versa, and function as a link between the two levels of command". (S01)*

Moreover, Silver level commanders are responsible for the coordination and cooperation related to logistics support and decision making between the Gold, Silver and Bronze commanders. According to S06:

> *"The coordination process is usually conducted by the Silver commander, who conveys information within the cycle from the Bronze to the Gold commander. Also providing support and supervising the distribution of it at the site". (S06)*

In terms of taking command in an incident, the Silver commander has to announce both rank and name to the team members that he/she will be in charge of. This was explained by S02 in these words:

> *"Once the Silver commander takes the lead of an incident, by announcing name and rank, all team members should be informed by the communication panel and the Silver commander should give a briefing about the incident type, the decisions taken and the type of support needed. The newly assigned commander should also declare command of the incident and responsibility for the consequences of the actions". (S02)*

5.4.4.3 Bronze Operational Level

Finally, Bronze commanders are the ones who *"usually manage incidents"*. In the case of a minor incident, a Bronze commander can be in sole charge. They are responsible for the supervision of the tactics which are employed at the incident and these tactics are associated with the saving of lives, and the minimisation of losses. As S02 expressed, the Bronze commander at the scene is in charge of making decisions at this stage:

"The Bronze commander is the first to reach the site. He/she is, then, responsible for making decisions, while no one can intervene with these decisions". (S02)

G04 provided an insight into the relationship between Silver commanders, and the operations carried out by the Bronze commanders in these words:

"The Bronze commander has an operational role. They operate within the possibilities and resources provided for each incident. Distribute individuals on their assignments and organize their tasks based on pre-identified responsibilities; afterward, a Silver commander follows up the whole work at the site". (G04)

Similarly, S04 provided a detailed description of the role of a Bronze commander as:

"The Bronze commander is the first commander to arrive at the incident site. To evaluate the severity and risks associated with the incident and decide about the level of the incident, and whether it needs intervention from the Silver or Gold commander. They completely manage minor incidents, distribute roles to the teams, and convey information to the Silver commander, who coordinates with the Gold commander for further help or further decisions". (S04)

In summary, Gold commanders provide vision and general perception. With the major responsibilities being to give strategic vision, maintain support, organise and provide resources and remain in the cold zone. If the Silver commander calls for support, the Gold commander communicates it with the higher authorities and ministries.

The Silver commander applies the needs and requirements and communicates this between the Bronze and Gold commanders. The Silver commanders remain in the warm zone and prepare the plans for incident management, communication, and coordination between the higher and lower level. Furthermore, they coordinate and deliver orders and instructions from the Gold commander to the Bronze commander.

The Bronze commanders implement the incident management plans; allocate the roles to the teams in accordance with the pre-determined plans and provide frequent feedback about the situation to the higher authorities. As bronze commanders are located in the hot zone and are the first responders, they are liable to make decisions to save the lives of people as per the analysis of their situational awareness, knowledge, experience, and training.

Figure 5.6: Commands levels word query

In summary, the responses of the participants provided three levels of command for the incident response process, which are: Gold, Silver and Bronze. Each level has a certain set of assigned roles and responsibilities, for example; strategic, tactical, and operational for the Gold, Silver and Bronze levels respectively. Natural space for each level is also highlighted by the participants, for instance; Bronze commanders are located in the field in the hot zone, Silver in the warm zone, whereas Gold are in the cold zone.

5.5 GSB Key Fundamental Factors

The second section of the qualitative study presents the understanding and views of the Gold and Silver commanders about key fundamental factors, which can influence the successful implementation of the GSB structure. These fundamental factors are classified into two groups, namely; organisational and individual factors. Table 5.4 below presents the identified themes and emerging sub-themes under the coding structure for this section.

Table 5.4: GSB key fundamental factors

Themes	Sub-themes
1. Organisational Factors	• Training and Exercising • Commanders' Nomination Standard • Logistics and Financial Support • Experts • Rigorous Regulations • Commander's Grading
2. Individual Factors	• Knowledge and Experience • Training and Exercising • Individual Characteristics

	• Coordination and Information Sharing • Decision Making • Commitment to Apply GSB Structure • Situational Awareness • Cooperation

5.6 Section 2: Organisational Factors

A variety of key organisational factors were identified by the Gold and Silver commanders, which were considered as important for the successful implementation of the GSB command structure. Overall, six organisational factors were identified by the participants which are the emerging sub-themes under the predefined theme of organisational factors. The presentation of themes and emerging sub-themes is supported by the NVivo Figure 5.7 below.

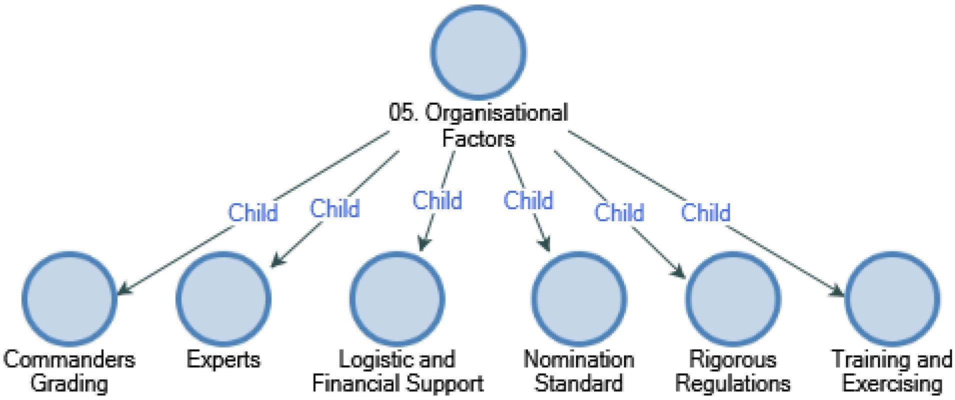


Figure 5.7: Organisational factors emerging themes

5.6.1 Training and Exercising

Gold and Silver commanders agreed upon the fact that training and exercise is an essential element for the successful and efficient application of GSB structure. This factor was the most important and discussed factor by all of the participants (n=14) except one Silver commander.

Some of the participants emphasised training sessions and exercises as necessary or basic requirements for the implementation of the GSB structure. G03 illustrated this approach as:

> *"Some requirements needed are as follows: Training and development at different levels, commanders need to meet at training sessions, workshops, share information and knowledge and know about the new matters related to the structure".* (G03)

For the participant SFA, training is essential for the development of skills within commanders so that they can understand their roles and responsibilities during an incident.

> *"In my opinion always look at 'up skilling' and training commanders to make sure that they are fully aware of the different roles and responsibilities". (SFA)*

Some participants (G01, G02, G06, S05, and S07) have also identified a lack of training programmes and inefficiency in knowledge transfer. According to G06:

> *"One other factor influencing the functional continuity of the system is the inefficiency to transfer knowledge by the organisation through training". (G06)*

From their interview responses, participating commanders seem to agree about the key importance of training and exercises for the success of the GSB structure. According to them, it is through training that commanders can gain the knowledge and skills they will need during incident response. However, most participants also see that this is an area in which the organisation could do better, and perceive it as a barrier to a fully successful implementation.

5.6.2 Commanders' Nomination Standards

Gold and Silver commanders provided their understanding about the nomination standards which are being observed for the categorisation of Gold, Silver, and Bronze levels (n=13). Nomination standards were based on the a) job position b) rank c) experience or length of service.

5.6.2.1 Job position

Most of the participants were of the view that the nomination of a commander depends upon the job position within the GBS and recommendations from the MOI are made in accordance with the job description and designation. Gold commanders are selected through this process, who in turn select their team of Silver and Bronze commanders. According to S07:

> *"The distribution of a commander's nomination is specifically determined by the Ministry of Interior without complying with measurements. However, nominations are determined by ministerial decisions to Gold commanders, who select their teams (Silver and Bronze). Most importantly, commanders are nominated based on their job descriptions". (S07)*

Hence it can be said that the nomination of commanders is based on their job position rather than any other criteria.

5.6.2.2 Ranks

Some of the participants also highlighted the factor of rank for the basis of the nomination of commanders within a GSB structure. In the same vein, S06 stated that the ranking benchmark is a role in nomination; for example the participant stated that:

> *"Silver command positions have been identified by the ranks from major and above and Bronze commanders are identified by the ranks from captain to lower, while the Gold manager is the manager of the directorate". (S06)*

However, in contradiction with this assertion, G02 was the only participant, who explicitly mentioned that the nomination standard is not linked to rank:

> *"The structure is always operated by a leading commander. The commander is not specifically defined by rank. Higher levels of commanders do not necessarily exist during the incident. The incident commander may be a captain, a lieutenant colonel, or a major. However, incident response is not linked to a specific rank and commanding chain is divided into different levels of commands, each of which carries different tasks". (G02)*

5.6.2.3 Experience and length of service

Five of the participants (2 Gold and 3 Silver) (n=5) out of the fifteen interviewed also referred to the experience or length of service as a nomination standard for commanders at each level of the GSB structure. Experience of the commanders is directly related to the length of their service and is one of the basis for a nomination as per G02:

> *"Commanders in the GSB structure are nominated based on their experiences and job positions and efficient practices. Since we work in a police unit, commanders are called (jokers) because they can fit in many positions. The higher the commander, the more experience they will gain". (G02)*

In some cases, participants were not of the view that there is no connection to job position with experience or length of service to be considered as the base for the nomination. As in the case of S05, the nomination depends upon the knowledge and field experience:

> *"Roles are primarily distributed in accordance with experience, and the Silver and Bronze commanders should acquire adequate field experience". (S05)*

In summary, most of the participants considered the job position as a key factor for the determination of the nomination of commander at a commanding position by the MOI. The job position is also related to the experience and length of service; however, some participants were also of the view that more importance should be given to experience and length of service rather than job position and rank.

5.6.3 Logistic and Financial Support

Five of the commanders (n=5) identified logistics and financial support as key organisational factors. According to S03, logistic support is the provision of human resources. While, in the view of G03, logistics support refers to vehicles and machinery.

> *"Furthermore, logistics and financial support, vehicles and machines are also significant for improving a commanders' experience and gaining new knowledge". (G03)*

Similarly, S04 mentioned the necessity of having certain materials, equipment and machines as an important organisational factor for logistics.

> *"The key requirements and organisational factors to achieve the best application of the GSB structure are support and the provision of all the requirements such as equipment and machines. Scarcity or a lack of equipment is sometimes a major problem for the GSB continuity process". (S04)*

Two of the Silver commanders (S06 and S07) highlighted the issues with communication systems as an influential organisational factor for the successful implementation of the GSB structure. It has been mentioned by S06 that difficulties are faced in the mountainous areas, for the achievement of best results from wireless communication.

> *"The TETRA communication system and Mobile station. The TETRA system covers 90% of CD6, but we face difficulties in TETRA communications in mountainous areas". (S06)*

In summary, there is a room for improvement in the communication systems and efforts should be made to have an efficient and reliable communication system for any kind of incidents.

5.6.4 Having Structure Experts

Three of the participants (n=3) also mentioned the importance of having structure experts in the organisation as an important requirement for the GSB success. In all three cases, it was observed that the provision of experts at present is limited and needs to be improved for the achievement of the best results. For instance, G07 mentioned that:

"In our department, we don't have structure training experts". (G07)

Similarly, S01 stated that:

"To achieve the best applications of the GSB structure, the department should provide experts for structure application". (S01)

In addition, G03 explained in detail the scenario that resignations or the retirement of experts are creating a threat to the sustainability of the structure to some extent. In the words of G03:

"GSB structure reinforcement is strongly needed for the sustainability of the structure because the expertise selected for the implementation of the structure are limited. We may lose this expertise due to resignations, retirements or reasons such as transfer. Indeed, new commanders need training, which is a long process. The adoption of the structure, whether local or international, requires sending commanders for training purposes". (G03)

5.6.5 Rigorous Regulations

Two of the Silver commanders (S02 and S03) were of the view that the successful implementation of the GSB structure depends upon regulations and the rigorous application of rules. According to S02, these regulations are applied in CD2, and it could even be important to enforce the structure through penalties when necessary.

"It lies in the development of rigorous regulations, in case the structure has not been properly applied. Penalties should be enforced in time. These regulations are properly applied in Dubai; penalties are applied by the Dubai Control and Governance Directorate in cases when the GSB structure command framework is not followed. Commanders who work beyond the procedures of the GSB structure are warned, and their orders are broken". (S02)

In addition, as per participant S03, the activation of the structure needs to be evaluated in real life incidents, although enforceability measures were not mentioned.

"The activation and application of the three-commanding structure with an evaluation of the activation of the structure in real life incidents is needed". (S03)

In short, these participants perceived that at the organisational level it is important to have consistent and regular evaluation. This would ensure more enforcement of the GSB structure.

5.6.6 Systematic Commanders Grading

The final influential factor which affects the successful implementation of the GSB structure in an organisation is the grading of commanders (n=1). At each level of the GSB structure, commanders should be systematically graded, and this systematic grading ensures a better understanding of the roles and responsibilities. As a result, there is efficient functioning of roles and the achievement of maximum benefits at each level. As S01 has suggested that:

> *"The imbalance in the structure is obvious, but it is hard to reveal it because it negatively affects the continuity of its function and its outputs. Commanders at the different levels were not trained effectively on the structure, besides not being systematically graded in their position, which means that commanders were not fully knowledgeable about the structure's specifications. To get sufficient experience on the structure, commanders should be graded accordingly (Bronze, Silver, and then Gold). However, Gold commanders have to be fully aware of the functional roles of the Bronze and Silver commanders". (S01)*

In conclusion, the main organisational factors analysed from the responses of the Gold and Silver commanders are; a lack of training and exercises, variations in nomination standards, inadequate logistics, and financial support, a lack of experts within organisations, application of rigorous regulations and the evaluation of commander grading.

5.7 Section 3: Individual Factors

Gold and Silver participants of the study also identified the key individual factors considered as necessary for the successful implementation of the GSB structure. These individual factors are the perceived views and opinions of Gold and Silver commanders as per their personal experiences and observations. Presentation of the themes and emerging sub-themes is presented in Figure 5.8 below. An explanation of each theme is discussed below.

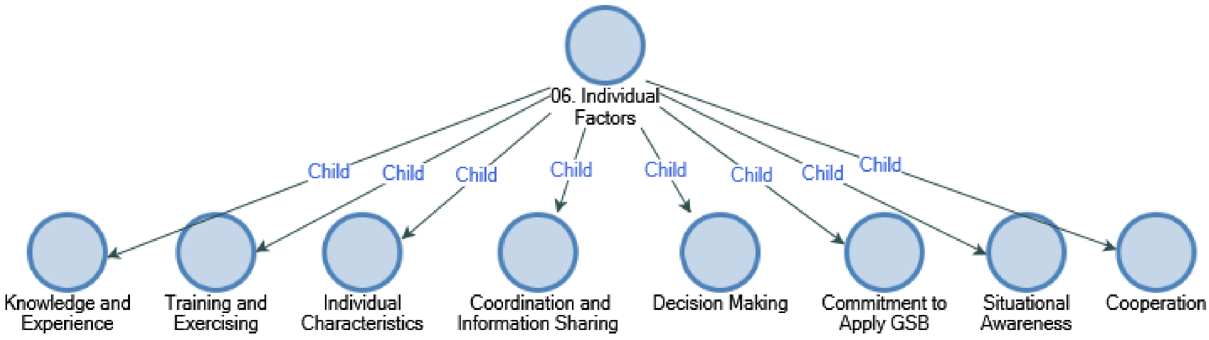


Figure 5.8: Individual factors emerging themes

5.7.1 Knowledge and Experience

All of the participants (n=15) agreed that knowledge and experience is a key individual factor that influenced the GSB structure implementation. An increase in knowledge is an important individual factor required to achieve the desired goals. Knowledge about the GSB structure, its different components, and requirements are important aspects. According to G01:

> *"In my opinion, all commanders should understand the GSB appropriately. Every level commander has to increase their knowledge about the GSB structure, and how to act in different situations". (G01)*

Participants of the study provided different views regarding the adequacy and quality of knowledge currently prevailing in the organisation. As G04, S02, S03, S04 and S06 had the strong conviction that commanders have sufficient knowledge about the GSB structure. As per S04:

> *"I believe commanders are well knowledgeable about the structure because our Gold commanders conducted training programmes for 3 weeks in the UK. Commanders know how to distribute roles, organise incident procedures and deal with different types of incidents". (S04)*

However, some of the commanders highlighted the issue of insufficient and inadequate knowledge of the commanders regarding the GSB command structure, which is affecting its continuity and sustainability. For instance, according to G06:

> *"Ignorance of authorities and a lack of understanding of the roles entitled for each level are the basic factors that influence the continuity of the GSB structure". (G06)*

Similarly, G05, G06, S01 and S05 were of the view that commanders do not have adequate knowledge regarding the GSB structure, its implementation, mechanisms, and the specific roles. The significance of this skill is particularly important at the Gold level. As S01 stressed:

> *"I do not think that higher commanders have the full knowledge about implementing the structure, simply because they have not been involved in training programmes yet, and they have a lack of knowledge about the roles of each level in the cycle". (S01)*

Furthermore, half of the participants had the perception that experience is an important skill that should be possessed by each commander at each level of the GSB structure. According to G03, self-awareness and a sense of security can be enhanced due to experience and more length of service.

> *"Commanders are more effective in incidents. With self-awareness, a sense of security and the ability to work under pressure". (G03)*

However, it is to be noted that another Gold commander who was of the view of inadequate knowledge also had the perception that the organisation is falling short in experience, which is affecting the sustainable and smooth operation of the GSB structure.

> *"Here in our department, we don't have any experts, who have experience in the command structure such as the Dubai Civil Defense directorate. These experts from Dubai were used for a limited time only, to increase our commanders' knowledge of the subject. We lack experience in the GSB command structure and we also need continuous training from those experts at the local and state levels". (G05)*

In short, there was a generalised agreement about the importance of knowledge and experience as an essential and influential individual factor for the successful implementation of the GSB structure.

5.7.2 Training and Exercising

The majority of the interviewees (n=9) indicated that training is also an important individual factor along with skills and knowledge. Training or education equips the commanders with skills and knowledge, or command and control characteristics. According to S03:

"These skills can be attained only through training, learning, and coaching. Commanders of the three levels should be trained to manage incidents, make decisions, evaluate emergency response processes, sett plans and know about possible local hazards". (S03)

SFA gave much importance to training and was of the perception that training should start early, after the appointment of commanders in all three levels.

"You develop skill through education. It is very important and critical that you identify early on with your commanders and that can be from Bronze to Silver level, that they have the ability to build skill and increase their knowledge of decision making. It might not be guided or driven by the emergency service, perhaps you have to develop a skill in decision making in another way, but it just allows you to increase your capability to be able to make decisive decisions in stressful situations, so skill development is an important key". (SFA)

Some of the participants highlighted the need for additional training courses and specialisations at the national and international level to enhance the skills and capabilities of commanders. According to G03:

"External courses to improve mental capabilities, intelligence and professional training courses are also necessary. There are specialised training courses at the Ministerial level, but they are still insufficient. We need further concentration on specialisations". (G03)

Few of the participants compared their training experience within different departments of the GSB structure as in the case of G05, and the comparison was made between training experiences at CD5 with that of CD2 in these words.

"Further training processes and time are needed in this part. Here in our department, we don't have any experts, who have experience in the command structure, like the Dubai Civil Defence directorate". (G05)

A Gold participant G07 was also of the view that comparison of training programmes should be made at the international level and benchmarks are needed in the UAE.

"Benchmarking with other experiences in western countries is still not adequate. What is important, now, is to communicate with foreign experts, and to gain new knowledge through training to cope with different levels that are increasingly developed". (G07)

Receiving appropriate training was identified as an important individual factor by participants. They view it as the path to gain knowledge and skills. External training may be particularly relevant.

5.7.3 Individual Characteristics

A significant number of participants (n=8), particularly from the Gold commanders (n=6), were of the view that some of the individual characteristics of commanders are directly related to the GSB structure. These individual characteristics are seen as a reflection of the commander's capabilities and capacities for the management of different mechanisms of the command and control processes. Command and control characteristics identified by the participants are:

- Self-confidence which is emphasised by G01, G02, G03, S02, S07;
- Leadership personalities highlighted by G05, G07, S02;
- Being *"brave enough to tackle the incident"* mentioned by G05, or in other words *"not being afraid of the responsibility"* expressed by S02;
- Ability to work under pressure indicated by G03;
- Discipline and desire to work stressed by G04.

Some of the details relating to the leadership characteristics of personality are highlighted by the Gold commander G07 who determines if the commander has the leading traits to influence the incident response process directly. G07 stated that:

> *"The continuity of the GSB structure is strongly associated with the style of the commander's personal characteristics exercised in the Civil Defense directorate. Thus, the lack of one effective leadership characteristic will weaken the incident response process". (G07)*

5.7.4 Coordination and Information Sharing

An important individual skill related to information sharing and communication is highlighted by one third of the participants (n=5, mostly Silver commanders). As per the words of S04, this skill is referred to as *"the collection of information to analyse it for decision making". (S04)*

While S03 highlighted that poor coordination or a delay in information transfer is causing continuity problems in the GSB structure:

"The continuity of the function of the GSB structure occurs when commanding mistakes arise between commanders due to failure to make decisions, poor communication, a delay in information transfer, or a delay in the order of executions and confusion". (S03)

One of the most vocal participants regarding the importance of this individual skill was the SFA. In the views of the SFA:

"To have an open mind and the ability to share information and ideas with other commanders from other agencies and stakeholders is the key to success. Rather than just having a decision based on my particular feeling, I would share my feelings and assess and arrive at the collective right decision to go forward and for me, that would be a result". (SFA)

In short, the ability of the commanders regarding proper coordination and the sharing of information is fundamental and influential for the proper functioning of the GSB structure.

5.7.5 Decision-Making

One third of the participants (n=5) also identified the key individual factor of decision making as an influential and impactful aspect. According to S03:

"Commanders of the three levels should be trained to manage incidents, make decisions, evaluate the emergency response process, set plans and be aware of possible local hazards". (S03)

In the words of S07, the importance of this factor lies more in rapid decision making.

"Leadership, speed in decision making and situational awareness are all influential". (S07)

The factor of decision making is associated with other individual influences such as knowledge and experience. As G03 stated:

"Knowledge and experience help in decision making and facilitate the problem-solving processes". (G03)

In short, for some participants, being able to use their knowledge and experience to develop appropriate and expedite decisions; is a key individual factor.

5.7.6 Commitment to Apply the GSB Structure

A few of the participants (n=4) were also of the view that a commander's commitment to apply the GSB in practise also affects the success of the GSB structure. As in the words of G02:

> *"The commitment of commanders and employees added to the timely process help the GSB structure to achieve its success". (G02)*

Application of the GSB structure is transmitted from a top down level, hence commitment from Gold commanders is required the most. Participants emphasised that there is a lack of commitment at the higher level, which can affect the success and efficiency. In the words of G04:

> *"The commitment to structure interdependencies and SPOs is also of great significance. More significantly, structure applications should start accordingly from top to bottom so that the leading commanders encourage the lower level commanders' commitment to implement the structure effectively". (G04)*

In short, what these participants reported was a sense that, particularly at the higher level, there could be issues with the lack of commitment to apply the GSB structure. This is perceived as a key individual factor for the structure's success.

5.7.7 Situational Awareness

Three of the participants (one Gold and two Silver) identified situational awareness as an important individual factor related to the ability of commanders in case of an emergency. Commanders of all command level are required to have the understanding and skills of situational awareness so that they can analyse the situation and ground realities for the quick and appropriate response to minimise the losses or negative outcomes. The three participants (n=3) who have mentioned the situational awareness skill as an important individual capability linked this factor with some other factors especially decision making. As in the case of G01:

> *"Effective decisions stem from good situational awareness and the decision makers personality". (G01)*

According to S01, the decision-making process and the situational awareness skills of commanders are linked together.

"Commanders at the three levels should be aware and conversant in the emergency response plans, the decision-making process, and situational awareness skills". (S01)

5.7.8 Cooperation between Commanders

Finally, two commanders (one Gold and one Silver) mentioned cooperation as a key individual level factor. This cooperation is important because the process depends on a sequence to be followed undisturbed. As per G06:

"According to this structure, orders are made in sequence. If emergency response at one level is disturbed, the whole sequence will be turbulent". (G06)

In the same vein, according to S07:

"Cooperation needs to exist between commanders as well as between teams". (S07)

In summary, the most prominent individual factors that can be influential and impactful on the successful implementation of the GSB structure are knowledge and experience, and both these skills can be enhanced through training and exercise. Some other important individual factors highlighted in the responses of the Gold and Silver commanders were individual characteristics, the ability of decision making, commitment to apply the GSB structure, effective situational awareness of commanders, and finally cooperation capabilities. As illustrated in the Figure 5.9 below.

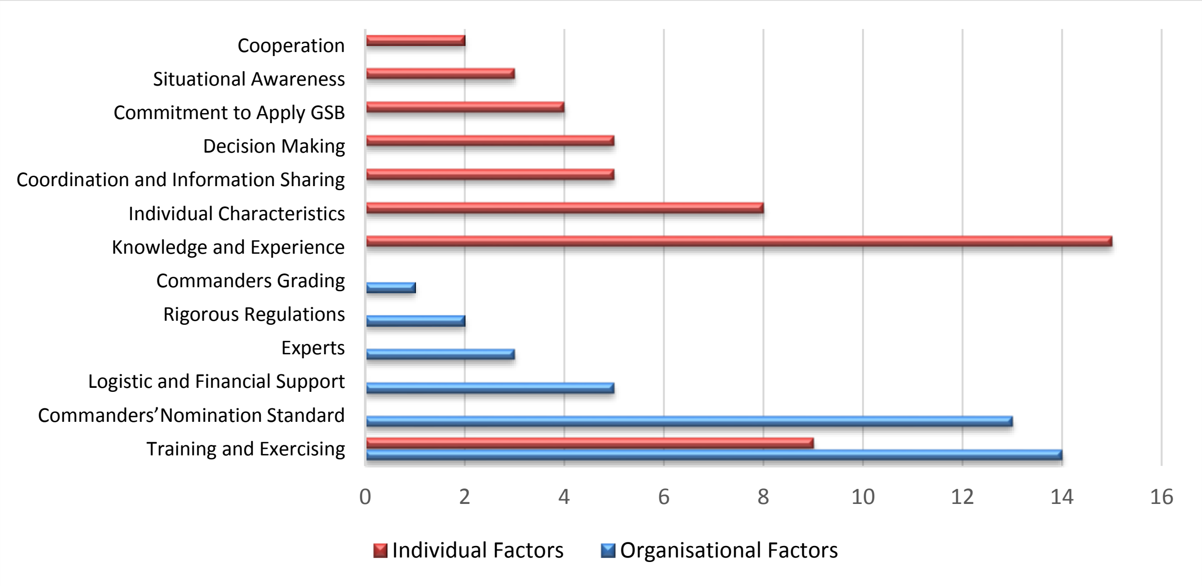


Figure 5.9: Both key fundamental factors

5.8 Section 4: GSB Barrier Factors

The third section of the study is focused on the barriers and obstacles, which are faced by the implementing organisation during the process of the GSB structure adoption. Participants of the qualitative study identified some of the possible reasons, which can be associated with the failure of the structure in the UAE context. In addition to the main challenges which are still being faced by the CDGC agency with regards to the successful implementation of the GSB structure. The responses from both the Gold and Silver commanders provided the basic theme of reasons for failure and obstacles faced during the GSB structure implementation. The sub-themes for this section are presented in Figure 5.10 below.

Section 4 GSB Barriers and Obstacles

Name	Sources	References
Section 4 GSB Barriers and Obstacles	15	81
Lack of Commanders' Qualifications	9	14
Lack of Knowledge	10	13
Lack of Training Exercising	9	13
Overlaps and Conflicts in Command	6	10
Lack of Acceptance and Desire	3	7
Lack of Coordination and Information Sharing	5	5
Lack and losing Expertise	4	5
Gold Attendance at Scene	4	4
Lack of Evaluation	3	4
No Nomination Standard	3	3
GSB is New	3	3

Figure 5.10: Reasons for failures and barriers emerging themes

Both the Gold and Silver commanders of the qualitative study were of the view that the GSB command structure is not being implemented successfully in the UAE. Participants identified some important barriers and reasons for this failure as per their knowledge and practical experience. These obstacles can also be termed as the shortcomings or deficiencies, which are limiting the extent of the GSB structure success and effectiveness.

5.8.1 Lack of Knowledge

The majority of the participants (n=10) identified another reason which can be considered as a reason for the failure of the GSB implementation. It is a lack of knowledge by the commanders about the overall understanding, knowledge of different components and role assignments. The commander’s lack of knowledge about their roles and responsibilities within the GSB structure is the most alarming issue. As per the words of S01:

“We have suffered the failure of the structure sometimes because some commanders do not have the knowledge to operate the structure”. (S01)

Some of the participants highlighted the specific area, where a lack of knowledge about the role and responsibilities can damage the GSB structure. G06, S03, S05, and G01 highlighted this issue by stating that it is a limitation for structure continuity. According to S03:

“The weak points specifically relate to the roles and responsibilities of the Gold, Silver, and Bronze commanders within the SOPs. Some commanders may lack the knowledge about their roles and responsibilities within the GSB structure”. (S03)

One of the participants emphasised the need to understand the SOPs and for them to be followed during an incident by every commander for an effective response process. Any lack of knowledge about the SOPs can impact on the GSB implementation and sustainability. As per S07:

“The major reason behind the failure of the structure is the lack of knowledge about the SOPs standard procedures used in the incident process”. (S07)

5.8.2 Lack of Commander’s Qualification

Nine of the Gold and Silver commanders (n=9) identified the issue of a lack of qualifications as an important reason for the failure of the GSB structure. A lack of commander’s qualifications also affects the commander’s abilities regarding their understanding of the roles and responsibilities and limits their extent in reference to the training and exercises. As per the words of S01, the CDGC agency should make sure that all the commanders have the required academic qualifications for the job.

“Employees in the CDGC should be trained on the GSB structure so it can be effectively implemented and applied. So, academic qualifications are necessary for all employees. The CDGC academy should take the lead to educate staff on operations through specialized courses”. (S01)

Eight of the commanders were of the view that there is a lack of experience due to the limitations in terms of the commander’s qualifications and this lack of experience also affects the decision-making abilities. Sometimes, commanders are unable to make the right decisions or they make the wrong ones at some incidents. As per S03:

"They may be lacking knowledge or experience or even lacking decision-making abilities". (S03)

In summary, it was observed that commanders have some concerns regarding vocational qualifications, which is affecting their experience and decision-making skills. There were also some concerns regarding the amount of time and commitment which is required to raise and enhance the qualification standards of the commander.

5.8.3 Lack of Training and Exercising

Along with the commander's qualifications and knowledge, another important concern for the success of the GSB structure was a lack of training and exercising. Nine of the participants (n=9) highlighted that a lack of training makes the GSB weak and ineffective. As it was reported by G07:

"One major change to face the adopting and implementing of the GSB structure is a lack of training. I believe the structure was built on the wrong foundations". (G07)

It was also observed from the response of the participants that, there is a significant lack of training at the CD department at the local level, which is highlighted by G01, G02, S06, and S07. And this lack of training is affecting the sustainability of the GSB structure. For instance, as per G03:

"GSB structure reinforcement is strongly needed for the sustainability of the structure because the expertise selected for the implementation of the structure is limited. Indeed, new commanders need training, which is a long process". (G03)

The participants highlighted the need for continuous and regular training for updated awareness about the GSB structure. S05 reported that:

"The weaknesses of the GSB structure are represented by a lack of training. Training should be established on a scheduled basis so as to increase the commanders' awareness of the structure". (S05)

Hence it can be interpreted from the analysis that the training is weak and inadequate for the successful implementation of the GSB structure and this should be improved by the MOI by offering regular training to the commanders at all levels of the GSB structure.

5.8.4 Overlaps and Conflicts in Command

According to the responses of six participants (n=6), there is sometimes conflict and confusion that arises at the time of an incident due to multiple orders and the overlapping of command. Issues of intervention in command have already been mentioned in previous sections, which can be referred to as a challenge for the effective and successful implementation of the GSB structure, as well as channelled procedures for the command instructions.

Furthermore, random decisions taken by the commanders, who take over the command without proper assignment of roles and responsibilities, affect the management of incidents and creates confusion of command and orders among the commanders at lower level specifically at the Bronze level. This fact was stressed by S04 in these words:

> *"The major action that negatively affects the performance of the system is 'random support' represented by the rush of commanders to lend a hand". (S04)*

Similarly, the SFA also narrated this fact by providing an example, where senior officers take over the command and give the orders on the basis of their rank, rather than the roles assigned through the GSB structure. In summary, it was evident from the responses of the participants that, overlaps and conflicts in the command process lead towards random decision making and confusion. This limits the effectiveness of the GSB command structure and hence, this conflict in command can be categorised as a challenge or obstacle for the successful implementation and effective functioning of the GSB structure.

5.8.5 Lack of Coordination and Information Sharing

Coordination and information sharing plays an important role within the three levels of the command, and any mismanagement of information at any level can lead towards disastrous consequences. Five participants (n=5) indicated the issues regarding effective communication and data transfer at three levels of command. As per the words of G01:

> *"The absence of effective coordination between the three levels is also one of the major causes of the failure of the GSB structure". (G01)*

Also, the lack of coordination with the commanders of a higher level is highlighted by the participant S07:

> *"The lack of coordination with higher commanders and a lack of fruitful discussions between commanders are important shortfalls". (S07)*

Likewise, the SFA pointed out the importance of information sharing across agencies and other emergency services and how this information sharing affects the coordination line for effective decision making.

> *"Let's say our agency which is civil defence, are operating the GSB structure and we have another agency operating their own structure in a fragmented way, and then it would not work. Because you need a single coordinated line of decision making through one coordinating control center". (SFA)*

5.8.6 Lack and Loss of Expertise

Four participants (n=4) indicated that experts are needed for the sustainability and functioning of any system and any loss of such experts can cause a negative impact on the continuity and smooth running of the system. There have been some issues related to the retirement, resignation, and transfer of such experts in the GSB structure, which are mentioned by S01, S02, S03, S05, and S07. In the words of G03:

> *"There are no GSB structure professional experts in our General Directorate of Civil Defense. Instead, the experience is gained in field activities". (G03)*

The lack of experts within the GSB structure affects the promotion process of commanders from one level to the next, as some important and specific skills are required from commanders at each level. Any sudden loss of experts creates a gap or hole within the level of the GSB structure. G01 reported that:

> *"Challenges include transferring from one department to another, retirements, or vacations, since training a commander to meet certain qualifications is a hard task. For example, it is hard to escalate commanders to the silver level since escalation is a complex process. Silver commanders are characterised by the ability to make decisions; they are tactical and good communicators; thus, certain issues such as the death or the resignation of a Silver commander is considered a major problem". (G01)*

Overall, losing the expertise built into some commanders due to retirement or transfer can be a major challenge. Along the same lines, having to deal with unprepared replacements for those commanders is problematic.

5.8.7 Gold Attendance at Scene

An interesting challenge expressed by a few of the participants (n=4) was the presence of the Gold commanders at the scene of the emergency, which affects the roles and performance of the Silver commanders. It was mentioned by S07, that the presence of Gold commanders creates confusion of roles and command for all the commanders present at the site, which subsequently affects the decision-making process at the time of an emergency.

> *"The Gold commanders should not attend the site because their presence eliminates the role of the Silver and Bronze commanders and creates chaos, as it affects the team and forces them to listen to their orders and avoid and neglect the orders of the Bronze commander". (S07)*

It was also expressed by a few participants, that some Gold commanders do not have full knowledge and understanding about the structure, as well as the incident command. As previously mentioned, their presence at the site creates conflict between the command of the Silver and Bronze commanders, which affects the emergency response activities negatively. S01 reported that:

> *"There are many practices that affect the success of implementing the structure: one might think when the Gold commander attends unexpectedly at the site, the incident commander will be confused. Also, when the Gold commander attends, it means that they do not have the minimum knowledge about the incident command". (S01)*

5.8.8 Lack of Acceptance and Desire

In the case of GSB implementation, it was witnessed in the responses of the Gold and Silver commanders that the end users of the GSB structure are showing a lack of acceptance and desire for the compliance or enforcement of the GSB structure. According to the views of three participants (n=3), the GSB structure is still new and the commanders are still not willing to adopt this structure at its fullest. Therefore, there is a need for the elimination of resistance by commanders and full acceptance for the better application of the structure. As per the words of G04, the commander's commitment affects the proper functioning of the structure:

"There are profound challenges for each new structure, but in the case of the GSB structure, commanders should commit to the betterment of structure implementation, application, continuous corrections, and successful functioning. There is also a lack of desire to apply the structure". (G04)

It can be said that any new system needs acceptance by its users to make it successfully implemented and effectively operational. Any signs of resistance for the adoption of such change can lead towards the ineffectiveness or less functionality of a newly adopted system.

5.8.9 Lack of Follow up and Evaluation

Three of the qualitative participants (n=3) provided feedback about the lack of evaluation and follow up, as a potential challenge being faced during the implementation of the GSB structure. As for the participant S02, a lack of follow up is more like a theoretical possibility:

"We have not been involved in a failure experience, but, failure may occur due to lack of planning, follow-up and execution". (S02)

Another participant related the issue of non-follow up to the inefficiency of the MOI, who is responsible for the evaluation and effective application of the GSB structure but have failed in the evaluation of the structure itself and the performance of commanders. According to G06:

"The GSB structure was implemented but not effectively applied, and this is due to a lack of follow up. The structure has specified the positions and declared the names, but failed in its operational dimension because procedures are not applied professionally. Commanders at each level are not following systematic procedures. No structure analysis or evaluations are conducted to evaluate performance and effectiveness. The Ministry of Interior is not doing well at its part including follow up and training. Also, they have not identified its weaknesses and strength and have disclaimed the responsibilities of the GSB structure applications". (G06)

In short, it can be said that, whether in theory or in actual experience, the lack of follow-up and evaluation is considered a limitation to the successful implementation of the GSB structure.

5.8.10 No Nomination Standard

Another challenge discussed by three of the Silver commanders (n=3) was the lack of nomination standards in the GSB structure, to appoint a commander for any specific level or promote a commander from one level to another. It has already been mentioned in previous sections that, the nomination of the commander is based upon three standards; which are job position, rank, and experience or length of service. However, S01 stressed that there had been no specific nomination standards for the appointment, promotion or transfer of commanders within the three levels of the GSB structure. S01 reported that:

> *"From my perspective, it is possible to say that there were no state standards for the nomination of commanders. The GSB was implemented by the Ministry of the Interior and enforced on the civil defense department, and the concept of the GSB structure has not been gradually implemented, as it is supposed to be included". (S01)*

This absence of nomination standards is affecting the successful and effective implementation of the GSB structure, as well as the understanding of the commanders about their roles and responsibilities at specified levels.

5.8.11 GSB is New

It has already been discussed that any new system requires some time for its acceptance and adoption by users. The GSB structure is considered a new structure by the commanders and this fact is creating some challenges, such as its acceptance and full implementation of the structure. Three commanders (n=3) identified the GSB structure's newness as a factor that explains a number of the challenges being faced in the implementation and continuity. According to G02:

> *"There are some challenges with the structure application due to it still being new". (G02)*

One of the Gold participants was of the view that at least five years is required to fully adopt the GSB structure and achieve its objectives. According to S06:

> *"The GSB structure needs 5-10 years to achieve its desired objectives". (G06)*

In summary, the responses of the participants revealed that there are various barriers, which are being faced by the organisation and commanders during the implementation of the GSB structure. Some of these barriers are related to the individual capabilities and expertise of the commanders, whereas some of the issues are of organisational level. Some of the important barriers and obstacles highlighted by both the Gold and Silver commanders include the lack of commander qualifications, knowledge, and training and exercising. As well as the issues and conflicts that arise during the command process, the lack of coordination procedures, and inadequate experts for the functioning of the GSB structure. In addition, the issues of resistance to the adoption of the GSB structure were highlighted such as the lack of evaluation, follow up procedures and understanding of the structure. Finally, the non-provision of nomination standards for appointments, transfers, or the promotion of commanders in different levels of the GSB structure constitutes a structural problem.

5.9 Section 5: GSB Driver Factors

The Gold and Silver participants of the study were asked about their understanding and perceptions regarding the importance, drivers and usefulness of the GSB structure in the UAE context. This section has been divided into two parts. In the first part, interviewees identified the main factors of drivers and benefits of the GSB structure. While, in the second part, types of hazards prevailing in the UAE are touched upon with regards to the participant’s responses. For the purpose of analysis, themes and emerging sub-themes are coded in accordance with their coding references, which are presented through NVivo v11 cluster analysis (See Figure 5.11 below).

Section 5 GSB Driveers and Benefits

Name	Sources	References
Section 5 GSB Drivers and Benefits	15	139
08.GSB Drivers Factors	15	84
GSB Achieved It's Goals and Benefits	15	15
Successful	13	13
Partial or No Success	2	2
Clear Roles and Responsibilities	13	21
Coordination and Information Sharing	8	10
Improve Outcomes and Performance	7	8
Clarity in Command Structure	7	7
Incident Management and Categorisation	6	8
Better Decision Making	5	5
Assure safety and Avoid committing errors	5	5
Evaluation	4	5
09. UAE Types of Natural Hazards	13	55
Earthquakes	13	16
Floods	12	13
Tsunamis	9	11
Climate Change	7	7

Figure 5.11: GSB Driver factors emerging themes

Responses of the Gold and Silver participants gave rise to the emerging sub-themes for the main theme of the GSB drivers and benefits. These emerging sub-themes were the representation and reflection of the participant's personal experiences and opinions regarding the usefulness of the GSB structure in the context of the UAE.

5.9.1 Clear Roles and Responsibilities

One of the advantages identified by the participants of the qualitative study was the clear definition of roles and responsibilities of all commanders. Thirteen of the participants (n=13) out of a total of fifteen mentioned this advantage and were confident that this benefit is helpful in managing the response activities. G01 highlighted this factor:

> *"The GSB structure is successfully and effectively implemented through assignments, roles, and legal responsibilities". (G01)*

It was also observed from the responses that it has also been helpful in defining the roles and responsibilities of the stakeholders, along with the commanders and formation of the SOPs which has facilitated this process in a very effective and positive manner. According to G05:

> *"The GSB structure has changed the way commanders treat incidents, whether minor or major and where every commander understands his defined roles and responsibilities. SOPs have facilitated control over incidents and defined the commanding levels". (G05)*

The formation of SOPs clarified the confusions in the minds of the commanders about the command orders and the sequence of response activities or operations. SOPs are formed in accordance with the international best practices and hence are more trustworthy for the commanders to refer to in case of any emergency incidents. G06 stated this fact in these words:

> *"The GSB structure brings to light the roles and responsibilities of each level and the people authorized to make decisions. According to this structure, orders are taken on sequence" (G06)*

5.9.2 Coordination and Information Sharing

Eight of the qualitative participants (n=8) identified this feature of the GSB structure as a useful and beneficial tool for the effective and coordinated response of activities. For G01, this benefit was considered as the use of effective coordination:

> *"The usefulness of the system stems from setting plans, using effective coordination". (G01)*

Easy and effective coordination among the commanders and among different levels of command, facilitates the timely responses and better utilisation of available resources. Through the proper and smooth flow of information for the availability and provision of all best possible solutions, that minimise the losses or negative outcomes from the emergency incidents. As in the words of G07:

> *"Information was transmitted and conveyed in time between the three levels of commanders. Most interestingly, the structure is effective in command and control, governance, transmission, and flow of information". (G07)*

A few of the Gold commanders also provided the opinion that the GSB structure has improved the coordination process within the single agency operations, as well as across the multiple agencies. As the Gold commander G01 explained how different systems of incidents are linked together for the better with improved response activities. As per G01:

> *"The involvement of commanders and the intervention of the leadership at every stage are done to link the basic systems of command and control within the sub-systems. The usefulness of the system stems from setting plans, using effective coordination and transportation systems, decision making and risk analysis systems. All of these things are linked together with the incident management and therefore must be improved altogether, either directly or indirectly". (G01)*

Consequently, it can be said from the responses provided that there is noticeable evidence regarding the beneficial and useful nature of the GSB structure in regard to improved coordination for effective incident response activities.

5.9.3 Improve Outcomes and Performance

Almost half of the participants (n=7) provided the opinion that the implementation of the GSB structure has helped in the improvement of outcomes and performances during emergency incidents. This improvement is associated with safety measures, as well as with the timeliness of response activities. Safety of the field workers through the GSB structure at the time of emergency response activities is expressed in these words by G02:

> *"The GSB structure is characterised by its ability to maintain safety in its field applications and its clarity in the standard operation procedures applications". (G02)*

Some of the participants also identified the improvement in the response itself due to the implementation of the GSB structure and this improved response was measured in terms of the timeliness of rescue activities, which has led to the minimisation of losses. S07 indicated that:

> *"The incentive of the GSB structure is that it provides quick responses to incidents, minimises human and material losses, takes a decision in the right direction and helps in controlling the incident in fewer efforts". (S07)*

According to interviewees, one of the drivers of the GSB structure is to improve the outcomes of emergency response, measured as both diminishing injuries and improving response time. Whether due to enhanced confidence or stronger commitment to the structure's procedures, these participants identified an improved performance as a benefit of the GSB.

5.9.4 Clarity in Command Structure

Similarly, seven participants (n=7) indicated that the GSB structure has brought clarity in the command structure and provided an organised framework, within which the commanders of each level are supposed to operate in accordance with the SOP's instructions. According to G03:

> *"Above all, the structure has organised the way commanders do their work and explained the order structure among commanders". (G03)*

Likewise, S03 compared the clearer command structure of the GSB structure with the ambiguous structure of a previous structure.

> *"One other benefit is that the GSB structure defined the commanders. However, previously, commanders involved in emergency response were not defined". (S03)*

Clarity in the command structure within the GSB structure depends upon compliance with standard procedures and organised frameworks at the time of the emergency incidents and clearly defined roles and responsibilities for each commander at every level. This clarity in the command structure assures the success of the response process during emergency incidents as mentioned by the SFA:

> *"The clear benefit is a single source command related to the incident, whereby you have got controlled and recordable dialogue of a chain of events that happened at the beginning of the incident right through to its completion. Therefore, from that, there is only one direction, which is usually and hopefully the correct direction that can solve the problems of the incident in a very controlled manner". (SFA)*

An analysis of the responses highlighted that the clear command procedures could be referred to as a by-product of the GSB structure because the incident management process is organised by providing clear details about the essential procedures to be followed at specific types of incidents within the limits and scope of the GSB structure. Overall, clarity over the command structure is presented by interviewees as a benefit stemming from its implementation.

5.9.5 Incident Management and Categorisation

Another important benefit presented by six of the participants (n=6) is the management and categorisation of incidents on the basis of their types and availability of resources. G01 mentioned the existence of different types of incidents and as a result the different procedures:

"The GSB details and documents the procedures that should be implemented and applied by the incident commander. Of course, incidents are of different types; therefore, commanders follow different procedures to treat these incidents". (G01)

The management and organisation of the incidents lead towards the clear identification of the roles and responsibilities of all commanders in different situations, which makes them more confident and enhances their decision-making skills. As described by G03 in these words:

"Previously, commanders exercised random decision-making and messy emergency responses during incidents, because commanders lacked the knowledge about their entitled roles and responsibilities. The GSB structure came to strictly define the role of each commander at his position in the incident response structure". (G03)

In the same way, the Silver commander S01 emphasised the successful organisation of incident management, with the maintenance of a clear command structure and identification of the roles at three levels of the GSB command.

"In addition, it is successfully organising the management of the incident. Within the Abu Dhabi civil defense, the GSB structure is effectively deployed to meet the desired objectives of the Ministry of Interior. These corporate objectives are maintained accordingly by the transfer of commands and exercising roles between the three levels (Gold, Silver and Bronze)". (S01)

5.9.6 Assures Safety and Avoids Committing Errors

One third (n=5) of the participants were of the opinion that the GSB structure has provided the assurance of safety and minimised the risks during emergency response activities because of its standardised procedures to be followed by all commanders at emergency incidents. It has also been indicated by the participants that better safety equipment and tools are provided to the emergency response commanders, which has played a significant role in the minimisation of risks and error by saving lives and properties of people in a safe manner. S02 indicated:

"The first benefit and outcome of this application are saving the lives of work teams. This civil defense type of work is associated with mutable risks, and a lack of commitment to the GSB structure exposes the lives of people to major risks; thus, the primary aim of this structure is to save or minimise the losses of lives". (S02)

The clarified predefined procedures minimise the risk of errors and help the commanders in identifying the officer in command during the emergency. So, this feature of the GSB structure ensures the safety of employees and enhances the tasks related to personal protection to have confidence in rescue operations for minimsing losses. As stated by S01:

> *"It assures the safety of employees and the better accomplishment of tasks, such as personal protection, uniforms, and matters pertaining to the firefighters' protection". (S01)*

5.9.7 Defines Better Decision-Making

All the features lead towards the better and improved decision-making skills of commanders, at all levels of the GSB structure. Hence the ultimate benefit mentioned by the five Gold and Silver commanders (n=5) is the improved decision-making for emergency response processes. According to S05 and S03:

> *"It also helped in making decisions". (S05) "It limits duplication of decision-making". (S03)*

Similarly, the SFA also highlighted that it provides much importance to the ultimate improvement in the decision-making process, which is worth mentioning the advantage of the GSB structure. According to the SFA:

> *"I can say that during my time here in the Dubai Civil Defense, since we have our SOPs implemented at almost every incident that we attend, whereby we activate the GSB structure and it works superbly well because the decision making process is well defined". (SFA)*

5.9.8 Allows Incident Evaluation

Another important benefit expressed by a few of the participants was the continuous evaluation of the GSB structure and its possibilities to follow up implications and improve the overall effectiveness of its response process. Evaluation is helpful for understanding the extent of implementation, as well as the implications of various features and characteristics of the structure as possible deficiencies, which can be traced by follow ups and comparative evaluation analysis. This driver was explained by (n=4) participants, for example, the Gold commander G06, reported that:

"The benefits of the application enable commanders to know and understand the extent and quality implementation of the structure. SOPs instruments control incident procedures and define the deficiencies, then, report these deficiencies to higher authorities in order to maintain structure continuity". (G06)

The evaluation process is not just limited to the assessment of different components of the GSB structure, as it is extended to the assessment of its quality in the response process, training programmes, and compliance with the SOPs for the achievement of international best practices. This benefit is stated by three of the Silver commanders S02, S03 and S04. For instance, in the words of S03:

"It directs the incident team and structures their activities, so, they are questioned in case of any failure". (S03)

5.9.9 Has GSB Achieved its Goals and Benefits

In the last stage of the GSB structure evaluation and identification of its drivers, the participants of the qualitative study were asked about their opinions regarding the achievement of goals and targets of the GSB command structure in the CDGC agency. From the responses of the participants, it has been analysed that three quarters (n=13) of the participants were of the view that it has been successfully implemented and has achieved its goals, whereas a nominal number of participants (n=2) were against this perception.

5.9.9.1 GSB Has Complete or Partial Success and Has Achieved its Goals

Thirteen out of a total of fifteen participants (n=13) provided positive reviews regarding the success of the GSB structure and they were of the view that significant improvements have taken place in incident response processes, since its successful implementation. For instance, G07 reported that:

"Yes, the structure has achieved its desired goals and benefits due to its clear vision and objectives. Importantly, the leadership ability and style of the commander also play a crucial element in incident management". (G07)

In the same way, participants highlighted the improvement of commander leadership skills as evidence of success due to organised roles and responsibilities during incidents. According to S04:

"Yes, the structure has achieved its desired goals and benefits. The structure increased command and control over the teams and the incident. Respect of the commander has also played a good role in enforcing discipline between commanders and team members. Above all, the GSB has organised and defined the roles of commanders during incidents". (S04)

Hence, it can be interpreted from the analysis of the responses that the GSB structure has been successful in achieving its goals and objectives by defining the clear roles and responsibilities of the commanders, organising the command structure, and improving the decision-making process. It has also brought professionalism for all the participants of the emergency response process through improved knowledge, training, experience, command skills, and a better coordination system. The SFA reported that:

"Yes. The GSB structure definitely has achieved its objectives. It has shown in the sex years I have been here, a great command of understanding and control of the incident and a great awareness of other agencies requirements to bring normality to any incident. It has also given us an ability to demonstrate our professionalism at all levels. I think that this was something lacking before because there was a misunderstanding and there was no information sharing. So, if you take it from a civil defense point of view, I think the GSB structure has achieved many benefits since we have implemented it". (SFA)

However, two of the previous thirteen qualitative participants evaluated the GSB structure as partially successful and provided the views that there is still a need for improvement to make it fully successful in the context of the UAE. As per the words of S07 and G04:

"At present, I can say that the GSB structure is successfully applied by 60%, as there are still some challenges facing its applications. These challenges can be eliminated by knowledge, training, robustness in nominations and education". (S07)

"Yes, I believe that a large part of the objectives has been achieved. The structure has solved half (50%) of the problems and the other half lies on the shoulders of the commanders. Seeking structure completeness requires effective training, experience and knowledge". (G04)

5.9.9.2 GSB Has No Success

In contradiction to the majority of opinions about the successful achievement of goals, only two of the participants provided negative reviews regarding the success of the GSB. Both of the participants were Silver commanders and they emphasised human limitations and failure in the successful implementation of the structure, rather than the failure of the structure itself. As Silver commander S01 linked the failure to a lack of experience, knowledge and skills of commanders, who are operating the GSB structure.

> *"From my point of view, the GSB structure is efficient, but it still does not achieve the desired goals because some of the operators lack experience, knowledge, and skills". (S01)*

Also, S02 was negative in terms of commanders and the implementers of the GSB structure fully understanding its functions. In the view of S05:

> *"In my opinion, I can say that the GSB structure has not achieved its desired objectives due to overlapping decisions and conflicts of powers between the commanders. The GSB is still an infant in its implementation and the commanders still need to understand its mechanisms deeply". (S05)*

Figure 5.12 below illustrates the matrix coding query for the participants, who referred to the GSB structure as successful or not in their semi-structured interview responses.

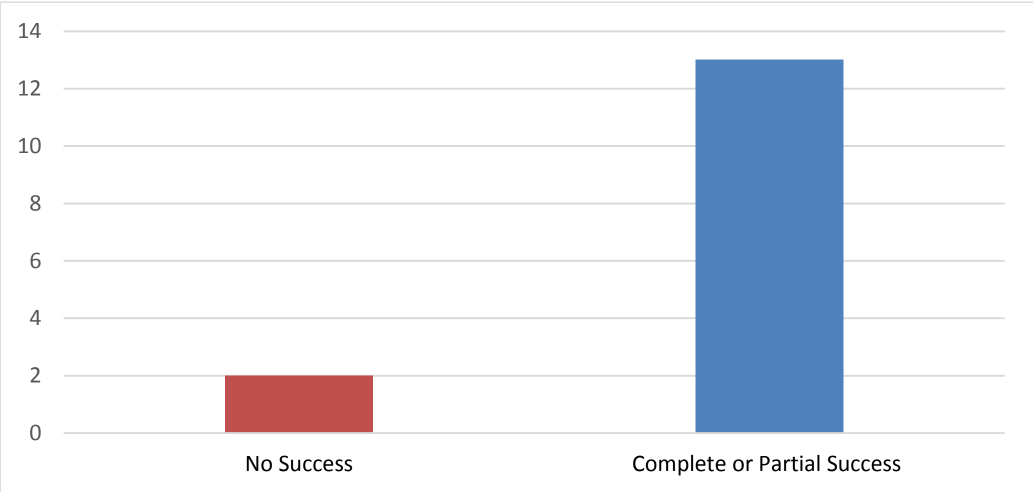


Figure 5.12: Matrix coding query of GSB goals

5.10 UAE Types of Natural Hazards

Gold and Silver commanders also provided their views about the natural hazards, which can be normally witnessed in the UAE. These natural hazards are identified by the participants as per their personal knowledge and experience. Hence, natural hazards in the UAE cannot be limited to only these provided responses because of their non-predictor nature. The identified natural hazards by the participants are categorised as emerging sub-themes and are presented in Figure 5.13 below.

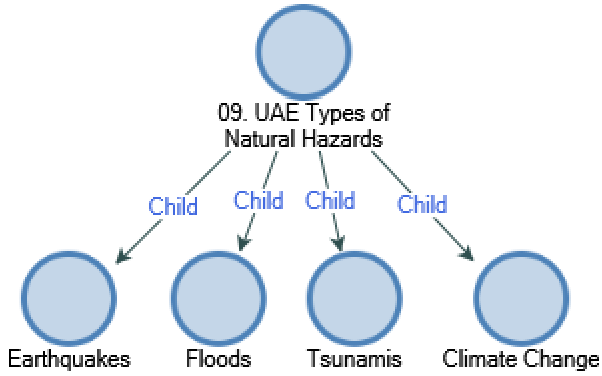


Figure 5.13: UAE types of natural hazards themes

These identified hazards are explained in a few words and statements provided by the participants. The types of natural hazards are provided in accordance with the UAE's natural and regulatory environmental context, in which possible hazards are defined by the NCEMA or federal law. Most of the Silver commanders identified the sources of possible hazards like earthquakes, floods, tsunamis, and climate change. According to S02:

> *"The GSB structure operates in different types of incidents and is useful in different natural hazards. The UAE's NCEMA has defined possible hazards according to their likely occurrence, such as earthquakes". (S02)*

Likewise, S07 indicated earthquakes, floods, and tsunamis, by saying:

> *"The GSB structure operates in different types of incidents and is useful in natural hazards. The UAE's MCEMA has also defined possible hazards from near countries, such as Iran and Pakistan, according to their likely occurrences such as earthquakes, floods, and tsunamis". (S07)*

In general, participants were able to identify a broad range of natural hazards that can affect the UAE. The regulatory and environmental context of these hazards was shared by some participants, indicating how the NCEMA defines them and, despite the relative safety of the region, they were prepared to respond. Most participants identified earthquakes, floods, and tsunamis as the most relevant hazards.

5.11 Chapter Summary

This chapter has presented an analysis of the results from the semi structured interviews conducted with Gold and Silver commanders and a senior fire advisor from the CDGC department of the UAE emergency response team. The chapter was organised and presented in five sections, which were in accordance with the objectives and research questions of the study, as well as the semi structured interview questionnaire of the qualitative study. The five key sections of this chapter were the GSB implementation, organisational key factors, individual key factors, barriers faced during implementation, driver factors, and finally recommendations for the improvement of the GSB command structure.

The first section of the chapter addressed the GSB implementation process in the UAE and qualitative participants provided their perceptions regarding the basis of implementation, important factors, information about incident command levels, and data about the incident response process. The overall responses of the participants indicated that the implementation of the GSB structure is based on the decisions of the MOI such as organisation and incident response activities. Some important reasons for the implementation structure included minimisation of negative outcomes, the organisation of the incident response process, clarification of the decision-making process, defining the clear roles and responsibilities of the commanders, and the identification of standardised procedures to be followed for different types of incidents.

Sections 2 and 3 of the chapter highlighted the key success factors for the implementation of the GSB structure and they were further categorised into organisational factors and individual factors. The main organisational factors were; identification of nomination standards, provision of training and exercises to the commanders, overall acceptance of the GSB structure, and provision of logistics and financial support. Whereas, the individual factors were; enhancement of knowledge and skills, character building through individual characteristics, improved coordination, a strong and confident decision-making process and sincere commitment for the application or adoption of the GSB structure.

Barriers faced during the implementation of the GSB structure were presented in section 4. Some of the most important challenges identified in the responses of the Gold and Silver participants were; lack of knowledge, lack of training, issues in the compliance and enforcement of the structure, evidence of resistance by the commanders, poor evaluation criteria, and a loss of experts due to retirements, resignations, or transfers from one level to another as well as from one department to another.

The perceived drivers of the GSB structure were presented in section 5 of the chapter. Responses of the participants highlighted some of the worth mentioning drivers and benefits, which are; clear identification of roles and responsibilities, a clear and strong command structure, an improved coordination process, incident management, better decision-making, and the minimisation of negative outcomes. It was observed from the responses that positive reviews were provided by the participants for the evaluation of the GSB structure and its measurements of success.

Finally, the participants of the qualitative study (Gold and Silver commanders and one SFA) suggested some recommendations, which could be helpful in the further improvement of the GSB structure adaptation in the context of the UAE. These recommendations were broadly categorised into six areas; enhancement of training and commander's qualifications with special attention paid towards skill and knowledge improvement, as well as more investment in the young commanders for future outcomes. Indeed the evaluation of the GSB structure and the implications of continuous follow up to address the issues. Also, systemised nomination criteria of job positions, skills and experience are required to achieve the desired goals, along with the flexibility of the GSB structure for adaptation in the context, culture, and environment of the UAE and the inclusion of features of clarity and transparency. Lastly, electronic SOPs is established for easy access and better understanding to improve the successful implementation as well as maximise the achievement of desired goals.

CHAPTER 6 QUANTITATIVE DATA ANALYSIS

6.1 Introduction

The primary objective of this chapter is to critically evaluate a unified incident command system for improving the UAE's incident command system performance during emergency response. To fulfill the fifth objective, a relevant and valid questionnaire was developed to gather information about the perceptions of the population on various aspects of the incident command system implementation. The questionnaire was distributed through an online survey mechanism known as Survey Monkey, to 162 commissioned and non-commissioned officers of the CDGC agency. The survey distribution and retrieval process lasted for four weeks with a response rate of 86.6% (See Equation 1 below); out of this number, only 153 questionnaires were considered for the analysis, as 9 participants had never responded to any incidents, and were therefore excluded.

The key demographic features in this study were; Gender, Involvement in Incident Response, Respondent's Assigned Department, Occupation, Job Position, Years of Experience and Academic Qualifications (See section 6.7). The demographic results suggest that a large proportion of the Bronze participants are trusted to provide credible and viable responses to help in achieving the study objective. In addition, the results were used to answer the third research question *"How the major factors influence the effective implementation of the incident command system within the CDGC agency in the UAE?"*

The questionnaire was divided into five sections and each question was measured on a five-point Likert scale to examine the perceptions of Bronze participants about the incident command implementation. A Cronbach's alpha was calculated to measure the reliability and internal consistency of the 42 questionnaire items. The Cronbach alpha coefficient showed a very high reliability rate overall (0.906) and the alphas for each section of the questionnaire were also high (0.830, 0.736, 0.845, 0.858, 0.853) as shown in Table 6.3.

To further address the main objectives of the study and explore its key factors, a Kruskal-Wallis test (KWt) and was conducted for each section of the questionnaire. The KWt aimed to determine whether the presence or absence of certain factors would increase significantly among the CDGC departments and whether the number of selected factors would vary significantly based on the department locations. The factor scores were also evaluated for the assumption of normality, so that they can be amenable to further statistical analysis when finding associations.

6.2 Questionnaire Distribution

Questionnaire designs differ in their mode of administration and collection as they can either be self or interviewer administered. Self-administered questionnaires are usually completed by the respondents and can be distributed through the internet/web, postal service or self-distributed to the participants of the study. While, interviewer-administered questionnaires are carried out by the researcher especially when the questions are complex or when additional help is required (See section 4.9 in chapter 4) (Wilson, 2013). For the purpose of this research, as it was mentioned, the questionnaire was administered in April 2017, the self-administered approach outweighs the other technique based on its benefits such as large sample size reach and the covering of a population in wide geographical areas.

A non-probability random sampling technique was applied for the selection of the sample, while self-completed and web questionnaire techniques were used for the questionnaire distribution among the participants of the sample. In the non-probability random sampling technique, assistance from the seven Silver commanders was sought out to distribute the questionnaire among potential Bronze participants, as discussed in section 4.15 in chapter 4. Additionally, the HR department of the CDGC agency was also contacted to distribute hard copies of the questionnaire among potential participants of the study, by using a delivery and collection of questionnaire method. For the purpose of the collection of completed hard copies by the respondents, the HR department was contacted weekly.

Although the total number in sample size was 196, a total of 162 questionnaires were retrieved from the selected participants over a period of four weeks; of which 140 were gathered through the Survey Monkey web link (Invitation was by WhatsApp and Email) and 22 were collected through the self-administration method (See Figure 6.1 below).

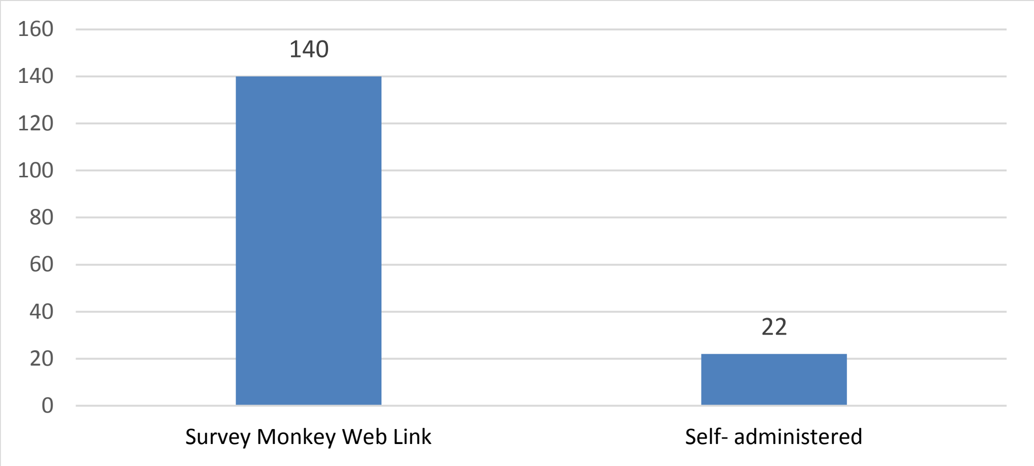


Figure 6.1: Questionnaire distribution

6.3 Total Response Rate

The highest response rate was observed in the first week, in which 108 responses were collected, and then the response rate fell gradually in the subsequent three weeks. 25 responses were gathered in week two, 24 in week three and the remaining 5 were gathered in week four (See Figure 6.2 below). In order to achieve maximum responses and the maintenance of a reasonable response rate, a follow-up from the Silver commanders and the HR department of the CDGC agency was maintained.

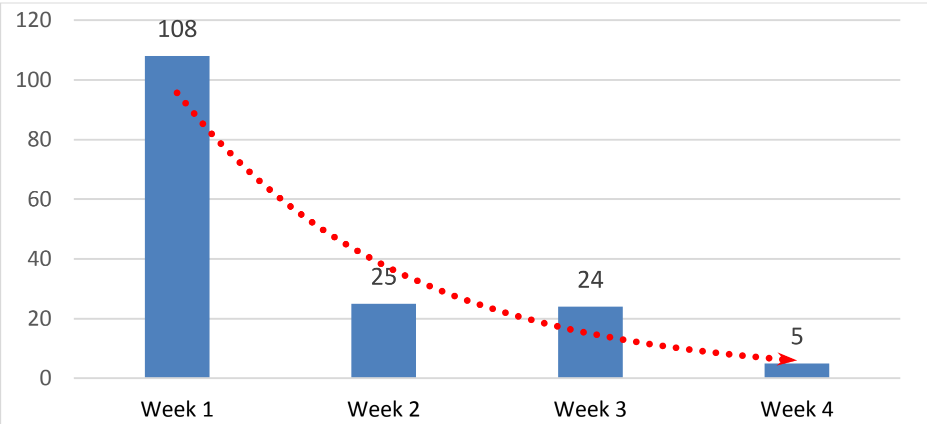


Figure 6.2: Total response rate

Although the sample size for the quantitative data collection was 196 bronze participants (Presented in section 4.11.3), only 162 responses from officers, non-commissioned officers and other participants were collected from the CDGC agency in the UAE. In order to calculate the total response rate, the researcher used a formula from (Saunders et al., 2016) (See Equation 1 below). There were 9 ineligible questionnaires, which were not of the required standard for the research and were therefore not considered in calculating the total response rate. Consequently, the calculated response rate was 86.6% as calculated below.

$$Total\ Response\ Rate = \frac{Total\ Number\ of\ Responses}{Total\ Number\ in\ Sample\ -(ineligible)}$$

$$Total\ Response\ Rate = \frac{162}{196\ -(9)} = 86.6\%$$

Equation 1: Total Response Rate Formula

6.4 Questionnaire Design

The analysis from the qualitative chapter facilitated the design of the questionnaire for quantitative data collection purposes; which is the most popular approach in exploratory sequential mixed method research design. The questionnaire was categorised into five sections, and each section was in accordance with the aims of the study. The categorised sections are namely: Demographic information, implementation factors of the incident command system, the impact of key organisational and individual factors, obstacles faced during the incident command implementation and finally its drivers and benefits. All the sections, except for demographic information contained questions based upon the Likert scale. For further information, the questionnaire design can be found in Appendix I.

6.5 Scales of Measurement

The first step in developing a questionnaire is the identification of variables and their measurement scales (Rattray and Jones, 2007). The scales of measurement can be divided into nominal/categorical (qualitative), ordinal/ranked and interval/ratio/continuous (quantitative) (Muijs, 2011, Field, 2009). The categorisation of variables and factors are important because they fundamentally affect the meaning of the variables and what can be done with them statistically.

Nominal data is categorical and is used for qualitative measurement, as it can only be measured in different categories and the frequency of the categories are considered for the measurement (Field, 2009, Ghauri and Grønhaug, 2010). The categories for nominal variables cannot be ranked and placed in any particular order (Muijs, 2011). Examples of such variables are gender, marital status, place of birth, city location, and race (McCrum-Gardner, 2008). In this case, any number is given to a particular category only refers to the category name (e.g., 1 for male and

2 for female) (Muijs, 2011). The values are not numbers but are coded words, which describe the categories (Keller, 2012).

Whereas ordinal or ranking data is a type of categorical data which involves ranking, however, the difference between the scale is unknown as it does not measure the distance between any scales (Ghauri and Grønhaug, 2010). Although this data appears to be nominal, the order of its values has a meaning (Keller, 2012). Thus, ordinal data allows the researcher to arrange the given values in order (Muijs, 2011). For instance, a scale based question includes opinions from participants, who rate how they strongly agree or disagree with a statement, e.g., the Likert scale (Field, 2009, Saunders et al., 2016).

Furthermore, interval and ratio data sets are continuous or quantitative data, which are real numbers and not only can they be measured in rank order, but also the difference and the distance between each scale can be known and compared. Examples of such variables are temperature, age, income, weight, and length (Sarantakos, 2012, McCrum-Gardner, 2008, Muijs, 2011, Keller, 2012). A comparison is shown between the scales in Table 6.1 below.

Table 6.1: Scales of measurements source (Ghauri and Grønhaug, 2010, p. 78)

Scale	Basic Empirical Operations	Typical Use
Nominal	Determination of equality and difference	Classification: • Male- Female • Occupations • Social Class
Ordinal	Determination of greater or less	Rankings: • Preference Data • Attitude Measures
Interval	Determination of equality of intervals	Index Numbers: • Temperatures Scale

The questionnaire is comprised of six main sections, and the first section covers the demographic information of participants, including; gender, involvement in emergency and incident response, the civil defence department assigned, occupation, job position, experience in the CDGC, and academic qualifications. Sections two to six of the questionnaire were designed with a 5-point Likert scale aimed at understanding the Bronzes' perceptions about different aspects of the incident command implementation. The section covering the implementation factors of the incident command framework had 8 items. While, the section on key factors was divided into two sub factors; organisational and individual, which had 6 and 8 items respectively. The section for barriers faced during the incident command implementation had 11 items, whereas the section was addressing the drivers of the incident command implementation had 9 items (Total = 42 items). Therefore, all the demographical categories are considered in nominal data, with no meaning of ranking, and have been assigned in the SPSS as nominal data, because of this. However, the variables in the remaining sections were considered ordinal because there was meaning to the ranking between the categories.

6.6 Cronbach's alpha (α) for Reliability Analysis

A variety of methods are used to measure the reliability of the attitudinal scale. According to Gliem and Gliem (2003), the majority of researchers reported that Cronbach's alpha (α) is a reliable measurement technique of internal consistency. Internal consistency reliability refers to the degree at which all the items of instruments or questionnaires measure the same attributes (Morera and Stokes, 2016, Muijs, 2011, Bonett and Wright, 2015, Jesús García de Yébenes Prous et al., 2009). The Cronbach's alpha is the most used technique, and it consists of an alpha with a value between 1 (perfect reliability) to 0 (no reliability) (Pallant, 2013). According to social sciences literature, a Cronbach's alpha of 0.7 and above is acceptable (Christmann and Van Aelst, 2006, Gray, 2014, Muijs, 2011). Similarly, a Cronbach's alpha of around 0.9 means excellent reliability, while 0.8 and above means good reliability, and 0.7 and above is acceptable (George and Mallery, 2007). Table 6.2 below indicates the value of Cronbach's alpha from being acceptable to excellent.

Table 6.2: Cronbach's alpha values for reliability source (Wuang and Su, 2009, p .850)

Cronbach's Alpha Values	**Reliability**
$\alpha > 0.9$	Excellent
$\alpha > 0.8$	Good
$\alpha > 0.7$	Acceptable

The reliability test for this study was conducted using the SPSS v23, while using Likert-type scales, and it was imperative to calculate and report Cronbach's alpha for internal consistency reliability of any scales or subscales being used. As according to Rattray and Jones (2007), a researcher should report the Cronbach's alpha for separate domains within the questionnaire, rather than for the entire survey.

Table 6.3 Cronbach's alpha reliability assessment

Data Sections	Reliability Statistics	
	Cronbach's alpha	Number of Factors
Implementation Factors	.830	8
Organisational Factors	.736	6
Individual Factors	.845	8
Barriers Factors	.858	11
Driver Factors	.853	9
Overall	**.906**	**42**

As a result, Table 6.3 above shows the reliability of each scale used to measure the different sections of the incident command framework. Each section was tested separately with items described in the previous section. Then the overall reliability was calculated for the 42 items in all sections. The overall reliability for the 42 items is 0.906, which indicates excellent reliability and internal consistency. This means that the data gathered can be used for further analysis. Indeed, Cronbach's alpha reliability assessment measured the reliability statistics of the proposed incident command system factors and showed an internal consistency within the measured factors. It also demonstrated the close correlation of the factors.

6.7 Descriptive Statistics for Demographic and Background Profiles

The first section of the questionnaire contained demographic information about the participants through closed-ended questions. To ensure the authenticity of the responses, a skip logic technique was applied. The demographic section of the questionnaire helped in determining the capabilities and experiences of the participants to take part in further questioning. The number of respondents for the survey was based on a justification provided in the target population sample size in section 4.11.3 in chapter 4. Consequently, the upcoming sub sections describe the demographic information of the participants in detail. It is to be noted that a variety of tables and figures are presented in this chapter, which illustrates the research findings. According to Saunders et al. (2016), who suggest that these tables and figures should be included in the chapter without transferring them to the appendices.

6.7.1 Gender

It is depicted in Figure 6.3 below that the total sample of the quantitative questionnaire was 162 participants. The findings from the gender question revealed that 93.8% of the total sample size was males comprising of a frequency of *n*=152, whereas only 6.2% of the sample size constituted females, thus having a frequency of *n*=10.

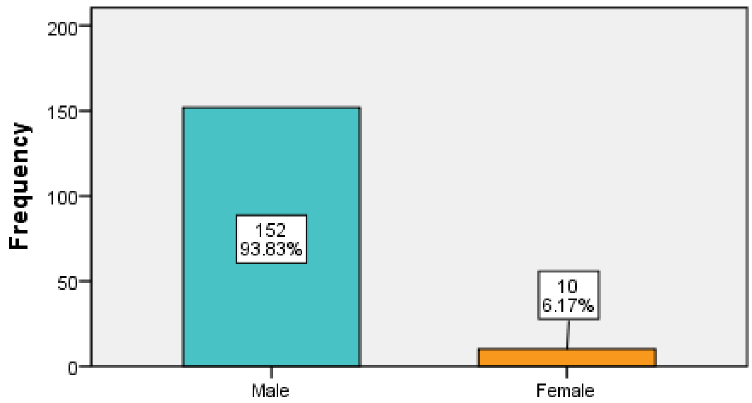


Figure 6.3: Participants' distribution of gender

6.7.2 Involvement in Incident Response

A total of 162 Bronze participants were asked about their experiences involving any incident response activities. It is evident from Figure 6.4 below, that more than half of the respondents (61.1%) provided the information that they are always involved in incident responses (*n*=99), and 29.6% of the sample participants (*n*=48) had frequent involvement in incident response activities. Contrary to this information, approximately 3.7% of the participants had very little experience in emergency response activities (*n*=6), and 5.6% (*n*=9) had no experience in the field of incident response.

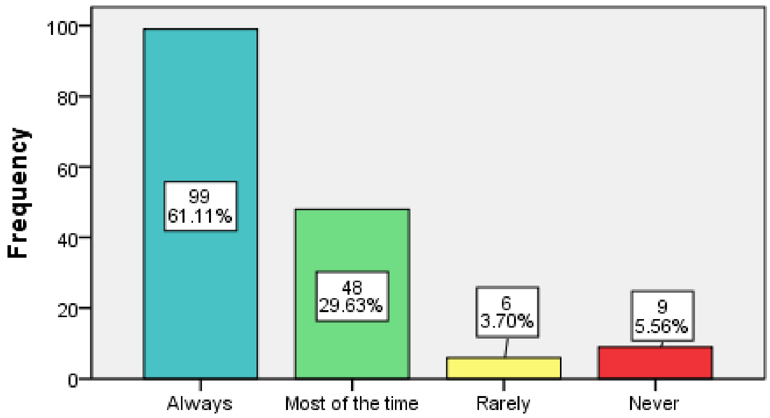


Figure 6.4: Participants' distribution of involvement in incidents response

However, data needed for the current study is limited to those participants who take part in incident response operations; hence the participants who have never responded to any incidents were excluded from the whole data analysis process (5.56% of the entire sample size comprising of *n*=9). This process modified the active sample size to *n*=153 and the rest of the quantitative results are based on this amount.

6.7.3 Assigned Department

In order to gain knowledge about the assigned department of Bronze participants in the CDGC agency, a question was incorporated into the survey to gather data from each department of the civil defence authority. The distribution of participants in each department are presented in Figure 6.5 below and this revealed that 28.1% of the participants were from CD1, where (*n*=43), 17.6% were from CD2 (*n*=27), followed by 13.1% (*n*=20) from CD3, while 11.1% (*n*=17) were from CD4, and 10.5% (*n*=16) were from CD5. Finally, the smallest proportion of 9.8% (*n*=15) was working at CD6 and CD7.

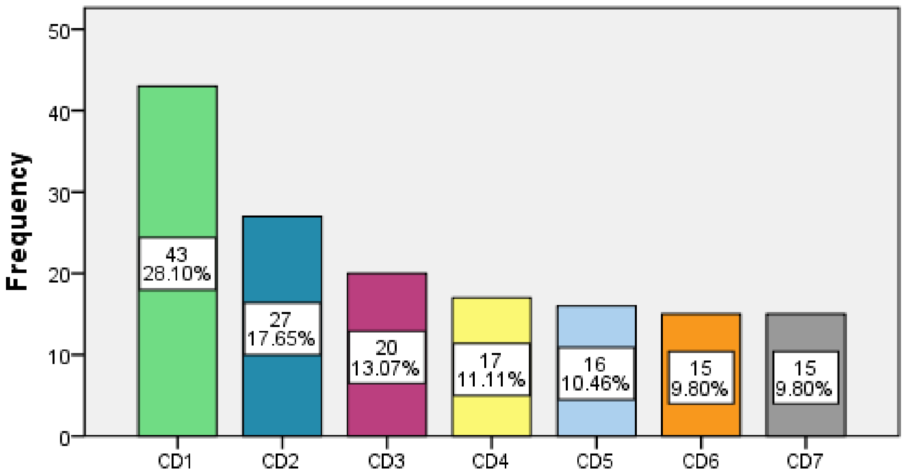


Figure 6.5: Participants' distribution of assigned department

6.7.4 Occupation

The participants were questioned about their present occupation holding and the results from Figure 6.6 below indicate that the majority of the respondents were officers, consisting of 66.7% (*n*=102) of the total sample population, whereas non-commissioned officers consisted of 33.3% (*n*=51) of the sample population.

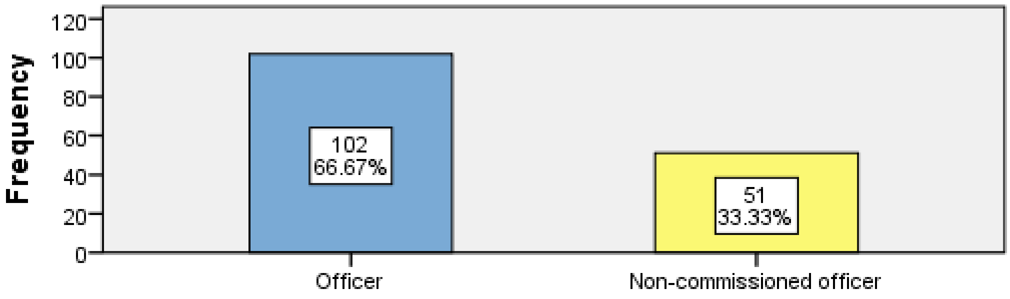


Figure 6.6: Participants' distribution of occupation

6.7.5 Job Position

The study showed that the CDGC agency has multiple job positions as participants were asked about their present position. It can be seen in Figure 6.7 below that the majority of the respondents; 30.7% (*n*=47) were Shift Officers, while 18.3% (*n*=28) were Section Managers, 17% (*n*=26) were Station Managers, 15% (*n*=23) were Branch Managers, 11.8% (*n*=18) were Duty Officers, and 5.2% (*n*=8) were Fire-fighters. Only 2% (*n*=3) were related to other jobs.

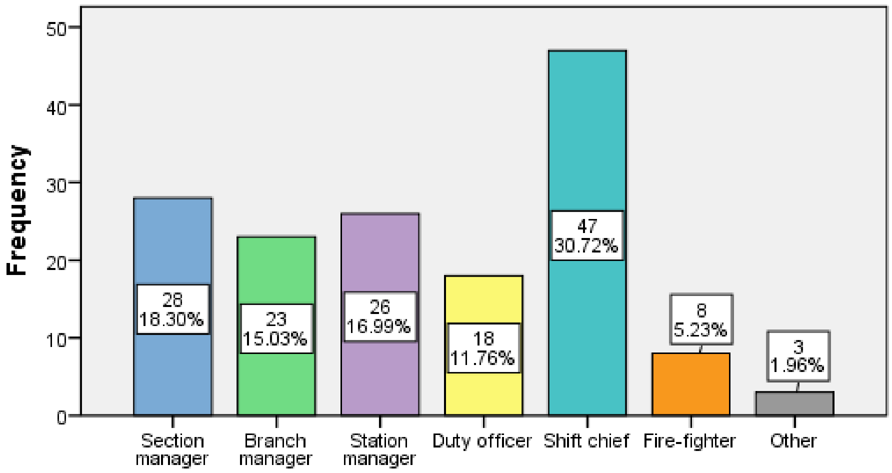


Figure 6.7: Participants' distribution of job position

6.7.6 Years of Experience

Participants were also questioned about their years of experience working in their department and Figure 6.8 below illustrates that only 3.3% (*n*=5) had the working experience of more than 25 years, 10.5% (*n*=16) had 21-25 years of experience, 26.1% (*n*=40) had 16-20 years of experience, 35.3% had 11-15 years of experience (*n*=54), 18.3% (*n*=28) had 6-10 years, and 6.5% (*n*=10) have been working for 1-5 years in their respective department in CDGC agency.

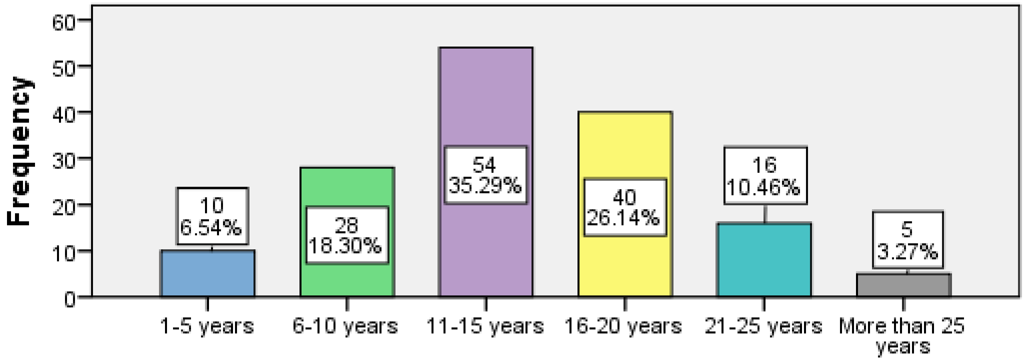


Figure 6.8: Participants' distribution of years of experiences

6.7.7 Academic Qualifications

The participants were asked about their academic qualification and Figure 6.9 below shows that most of the respondents (43.1%) had a bachelor's degree, representing less than half of the whole sample size with (*n*=66). In addition, the data also indicated that the second largest group of participants (24.2%) had a high school degree with approximately a quarter of the entire target sample size (*n*=37). The third category of the participants (16.3%) were those who hold a diploma (*n*=25). Whereas, the participants who hold a higher diploma represent 11.1% of the entire sample size (*n*=17). Finally, the remaining participants (*n*=8) representing 5.2% of the sample size hold a master's degree.

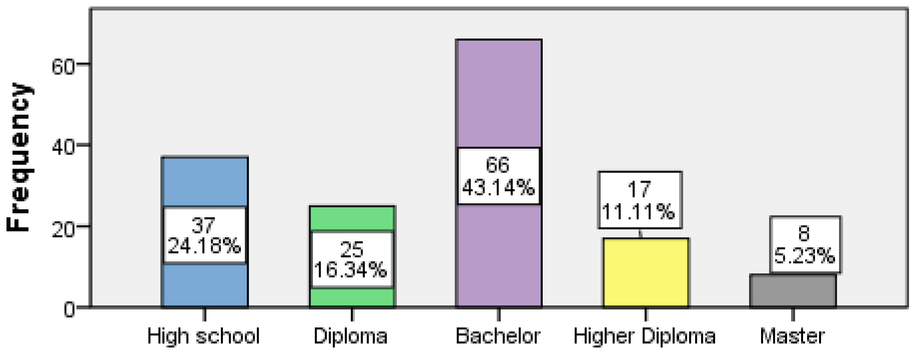


Figure 6.9: Participants' distribution of academic qualifications

6.8 Descriptive Statistics for Scales of Perceptions on Incident Command System Implementation

Sections two to six of the questionnaire consisted of questions relating to the perceptions and opinions of Bronze participants on the incident command system implementation and in this section, descriptive statistics of the responses to these questions are provided. These sections were designed to measure the participants' opinions on the implementation factors of the command structure, along with the impact of the organisational factors, the impact of the individual factors, the barriers affecting the system implementation, and finally the drivers of the incident command system.

The descriptive statistics refer to data that can be described by measuring its mean, median and mode of interval or continuous data. However, in this case, if the data is interval or continuous, a researcher may use descriptive statistics such as mean, mode, and standard deviation, so the differences between values are known and can be measured. On the other hand, in the case of categorical and ordinal data, it is preferable that the researcher uses a descriptive statistic such as the median because the differences between values are unknown and cannot be measured (Pallant, 2013).

In light of the above literature, the responses to all questions in Sections 2-6 are considered as ordinal data (5-point Likert-scale), and thus the best approach to describe such data is used (only the median). Field (2009) indicates that if the data is ordinal or ranked, a descriptive statistic such as the median should be used. Furthermore, according to Pallant (2013) the median divides the distribution of scores into half, so that the data results show the 50th percentile values of the score (which is also equal to the median value). The percentiles also indicate the location of the score in a distribution. Given the above justification, this research explored only the 50th percentile median, of the participants, as the data is ordinal, and the difference between values cannot be measured. Subsequently, the median is used for the overall representation of the score for each item ranging from strongly agree = 5 to strongly disagree = 1.

6.8.1 Implementation Factors of the Incident Command System

Section two of the questionnaire addressed the perceptions of participants towards the implementation factors of the incident command structure using eight questions (8 factors). All participants completed this section (*n*=153), and there are no missing or invalid items. Table 6.4 below presents the frequency of the participant's perception, the sum, 50th percentile median results of each factor of the incident command framework implementation.

It can be observed that the range of the median for all the factors is between 4 and 5. More importantly, the highest median is for factor 8 "Minimise negative outcomes" and factor 5 "Improved structural organisation in an emergency" with a population respectively (*n*=153) having a strong agreement as a factor for the incident command implementation.

Table 6.4: Descriptive statistics of implementation factors (n=153)

Factors	Frequency					50th Median
	Strongly Agree	Agree	Natural	Disagree	Strongly Disagree	
1. Organise incident response	68	66	15	4	0	4.00
2. Minimise Random Decision Making Confusion	74	54	19	5	1	4.00
3. Avoid unauthorised intervention in command	73	46	22	9	3	4.00
4. Organise commanders' roles and responsibilities	64	55	27	6	1	4.00
5. Improve structural organisation in emergency	88	51	11	3	0	5.00
6. Better coordination across commanders levels	63	62	24	4	0	4.00
7. Best practice of SOPs	60	59	29	5	0	4.00
8. Minimise negative outcomes	108	39	3	3	0	5.00

Overall it can be seen from the above table that there is an average median score of 4 among the participants' perceptions for the framework implementation factors, except for factors 5 and 8 from the table, which indicated the highest median score of 5.

6.8.2 Organisational Factors Impact on the Incident Command System

Section three of the questionnaire (six factors) was regarding the opinions of participants on organisational factors, which have affected the incident command implementation. The responses of two participants from the entire sample population were missing (*n*=2) which were coded and labelled in the SPSS as 99, so *n*= 151 cases were valid with a percentage of 98.7%.

It can be observed that the range of the median for all the factors is 4. Table 6.5 below shows the 50th percentile score which is equal to 4 and this indicates a high median for the organisational factors. It can be observed in the table that the organisational factor of "Training and exercise at different levels of command" (factor 2 in the table) has the highest number of responses in respect of its very high importance and impact on the incident command implementation according to the perceptions of the participants.

Table 6.5: Descriptive statistics of organisational factors (n=151)

Factors	Frequency					50th Median
	Very High	High	Moderate	Low	Very Low	
1. Commanders' nomination is based on job position, ranks and experiences	40	64	32	5	10	4.00
2. Training and Exercising at different levels of command	67	54	22	7	1	4.00
3. Logistic and financial support	37	67	33	13	1	4.00
4. Having Model experts	44	59	34	8	6	4.00
5. Rigorous regulations	40	68	35	6	2	4.00
6. Systematically grading level of commanders	63	56	21	7	4	4.00

Although different organisational factors had shown variations in the frequency, the median score for all the factors remained the same (equal to 4) as presented in Table 6.5 above.

6.8.3 Individual Factors Impact on the Incident Command System

The fourth section of the questionnaire consisted of eight factors about the influence of individual factors on the implementation of the incident command framework. The responses of two participants were missing in this section (*n*=2), and this missing data was replaced in the SPSS with 99; which makes the valid cases (*n*=151) and is 98.7% of the sample population.

It can be observed that the range of the median for all the factors is 4. Table 6.6 below shows that all the individual factors had a median of 4 and with respect to the frequency; the individual factor of "Training and exercising to improve professional capabilities" (factor 2 in the table) was given very high priority by the maximum participants (67).

Table 6.6: Descriptive statistics of individual factors (n=151)

Factors	Frequency					50th Median
	Very High	High	Moderate	Low	Very Low	
1. Improvement of Knowledge and Experience to Understand the incident command system	46	76	22	5	2	4.00
2. Training and Exercising to improve professional capabilities	67	59	19	3	3	4.00
3. Individual Characteristics self-confidence, discipline and desire, can work under pressure	46	46	47	10	2	4.00
4. Coordination / Information Sharing	44	66	35	6	0	4.00
5. Effective Decision Making	42	53	43	9	4	4.00

6. Commitment to Apply the command system	50	69	28	4	0	4.00
7. Situational Awareness	59	62	24	6	0	4.00
8. Cooperation between commanders	59	60	25	7	0	4.00

It is evident from the Table 6.6 above that the majority of participants agreed that training to improve professional capabilities, as an individual factor, has the highest impact on the incident command framework in the organisation. Whereas, the participants gave the opinion that effective decision making has the least impact on the success of the execution of the incident command.

6.8.4 Barrier Factors Facing the Incident Command System

Section five of the questionnaire comprised of eleven factors related to the perceptions of participants regarding barriers faced in the implementation of the incident command structure. For this specific section, three responses from the participants were missing, which is 2% of the overall sample size; hence the remaining valid responses are *n*=150 with a percentage of 98%.

With regards to Table 6.7 below, the 50th percentiles median value is 4 for all barriers except factor 5, which have a median score of 3. According to the frequency of all the factors, “Lack of follow-up and command system evaluation” 53 participants strongly agreed upon the severity of this barrier for the application of the command structure.

The lowest median given to the barriers, is a “Lack of acceptance and desire of the command system”, with 50th percentiles median value is 3 on the list of all barriers for successful implementation of the incident command structure in the organisation.

Table 6.7: Descriptive statistics of factors representing barriers (n=150)

Factors	Frequency					50th Median
	Strongly Agree	Agree	Natural	Disagree	Strongly Disagree	
1. Lack of knowledge	38	64	36	10	2	4.00
2. Lack of Commanders' Qualifications	31	63	41	13	2	4.00
3. Lack of Training and Exercising	43	64	27	15	1	4.00
4. Overlaps and Conflicts in Command Views	41	62	30	11	6	4.00
5. Lack of Acceptance and Desire of Command System	22	38	49	30	11	3.00

6. Lack and Losing of Expertise Due to Resignations, Retirements or Transfer	32	66	37	13	2	4.00
7. Lack of Coordination and Information Sharing Between Commanders	18	61	45	21	5	4.00
8. Lack of Follow-up and System Evaluation	53	58	22	14	3	4.00
9. Gold Commander Presence in operation sector that may create conflict and confusion	39	56	26	20	9	4.00
10. Incident Command System is New	21	59	43	17	10	4.00
11. No Nomination Standard for Commanders	46	66	22	12	4	4.00

6.8.5 Driver Factors of the Incident Command System

The last section of the questionnaire had nine factors focusing on the perceptions of participants regarding the drivers of the incident command system implementation. In this section, three responses (*n*=3) were missing, representing 2% of the sample participants. The missing data was coded 99 in the SPSS and the valid responses were *n*=150 with an overall percentage of 98% from the whole sample. All the factors in this section had the 50th percentile median score of 4.

Table 6.8 below shows that the factor of the "Incident command system assures safety and avoids committing errors" (factor 6 in the table) had the highest strongly agreed participants of 64. The last was given to the driver of "Incident command system successfully achieved its goals and benefits" (factor 9 in the table) had the lowest strongly agreed participants of 26.

Table 6.8: Descriptive statistics of factors representing drivers (n=150)

Factors	Frequency					50th Median
	Strongly Agree	Agree	Natural	Disagree	Strongly Disagree	
1. Incident command system defines clear roles and responsibilities	57	70	21	2	0	4.00
2. Incidents are treated with clarity in command far beyond random actions	54	71	22	3	0	4.00
3. Improve outcomes and commanders' performance	43	59	38	9	1	4.00
4. Coordination and Information was transmitted easily between commanders level	34	85	23	7	1	4.00
5. Incident command system facilitates incident management	62	72	16	0	0	4.00
6. Incident command system assures safety and avoids committing errors	64	60	26	0	0	4.00

7. Clearly defines decision making	48	57	38	7	0	4.00
8. Incident command system allows Evaluation and assessment of the quality of incident response	49	68	22	8	3	4.00
9.Incident command successfully achieved its Goals and Benefits	26	50	47	24	3	4.00

6.9 Assessing Normality

The second stage, before the selection and application of the appropriate inferential statistic techniques, is an examination of the normal distribution of data (McCrum-Gardner, 2008). Many statistical tests assume that the distribution of scores on variables is normal (Pallant, 2013). Whilst, most statistical analyses are based on the assumption of normality; therefore normality is a key factor for assumptions (Gilbert and Prion, 2016). The assessment of the normal distribution of the data can be categorised into two main statistical tests, i.e., parametric and non-parametric (Derrac et al., 2011). According to Gilbert and Prion (2016), parametric is a procedure that deals with the data when it is normally distributed. On the other hand, non-parametric is a procedure that deals with the data when it is not normally distributed. Furthermore, the non-parametric test is ideal when data is measured on both nominal (categorical) and ordinal (ranked) scales. Additionally, if the data is either negatively or positively skewed, a non-parametric test should be conducted (Pallant, 2013).

The normal distribution can be defined as a “bell-shaped curve” in graphical methods and this curve is a vital process. The most important reason behind this method is that it helps in understanding the types of statistical tests and assists in the selection of the right and the most suitable test for study. Another reason is that if an incorrect test is selected during the study, then misleading results may be concluded (Adamson and Prion, 2014, Pallant, 2013, Gilbert and Prion, 2016, McCrum-Gardner, 2008). The basic idea of the normal distribution is the equal distribution of a sample size below and above the mean value, for instance, 50% above or below 50%. Consequently, from reviewing articles on the subject of testing normality, it has been noted that there are two main methods used to check the normality assumptions, which are numerical and graphical.

There are a variety of numerical methods such as the Kolmogorov-Smirnov and Shapiro-Wilk tests in numerical assessment of normality (Pallant, 2013, Gilbert and Prion, 2016, Ghasemi and Zahediasl, 2012). According to Field (2009) the Kolmogorov-Smirnov and Shapiro-Wilk tests can be used to examine whether the datasets are significantly different from normal or not. Therefore, if the test is of a non-significant value, that is more than .05 (p>0.05) (far from zero), then it means that the data distribution is normal. On the other hand, if the test has significant value of less than .05 (p<0.05) (close to zero), then it indicates that the data distribution is not normal, and in such a case, it can be said that this is quite a common occurrence in a large sample size (Pallant, 2013, Pallant, 2011).

For the present study, two main types of normality tests were conducted, to support the reliability of the questionnaire. Firstly, a normality test was undertaken for all factors in the sections of the incident command system implementation, including organisational, individual factors, barriers faced in the system implementation, and its drivers. These tests were carried out using the Kolmogorov Smirnov and Shapiro-Wilk, with the tests of normality illustrated from Table 6.9 to Table 6.13. The results in the Table 6.9 - Table 6.13 demonstrate that the Kolmogorov Smirnov statistic value is .000 for all 42 factors, which indicates that the data are not normally distributed (the data distribution is not normal) as the p-values are less than 0.05 (p<0.05).

Table 6.9: Test of normality for implementation factors

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. Organise incident response	.271	153	.000	.779	153	.000
2. Minimise Random Decision-Making and Confusion	.286	153	.000	.777	153	.000
3. Avoid unauthorized intervention in command	.276	153	.000	.786	153	.000
4. Organise commanders' roles and responsibilities	.250	153	.000	.817	153	.000
5. Improve structural organisation in emergency	.348	153	.000	.715	153	.000
6. Better communication and coordination across commanders levels	.253	153	.000	.809	153	.000
7. Best Practices of SOPs	.241	153	.000	.822	153	.000
8. Minimise negative outcomes	.420	153	.000	.592	153	.000

a. Lilliefors Significance Correction

Table 6.10: Test of normality impact of organisational factors

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. Commanders' nomination is based on job position, ranks and experiences	.266	151	.000	.835	151	.000
2. Training and exercising at different levels of command	.262	151	.000	.801	151	.000
3. Logistic and financial support	.260	151	.000	.865	151	.000
4. Having model experts	.243	151	.000	.853	151	.000
5. Rigorous regulations of Incident Command System	.254	151	.000	.853	151	.000
6. Systematically grading level of commanders	.245	151	.000	.799	151	.000

a. Lilliefors Significance Correction

Table 6.11: Test of normality for impact of individual factors

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. Improvement of Knowledge and Experience	.283	151	.000	.815	151	.000
2. Training and Exercising is Needed to Improve Professional Capabilities	.255	151	.000	.776	151	.000
3. Individual Characteristics Self-confidence, Discipline and Desire, Can Work Under Pressure	.188	151	.000	.867	151	.000
4. Coordination and Information Sharing	.238	151	.000	.848	151	.000
5. Effective Decision Making	.210	151	.000	.871	151	.000
6. Commitment to Apply INCIDENT COMMAND SYSTEM	.241	151	.000	.830	151	.000
7. Situational Awareness during incident response	.237	151	.000	.817	151	.000
8. Cooperation and Coordination Between Commanders	.236	151	.000	.820	151	.000

a. Lilliefors Significance Correction

Table 6.12: Test of normality for barrier factors

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. Lack of Incident Command Knowledge	.248	150	.000	.867	150	.000
2. Lack of Commanders' Qualifications	.244	150	.000	.880	150	.000
3. Lack of Training and Exercising	.260	150	.000	.855	150	.000
4. Overlaps and Conflicts in Command Views	.260	150	.000	.855	150	.000
5. Lack of Acceptance and Desire	.170	150	.000	.915	150	.000
6. Lack and Losing Expertise Due to Resignations, Retirements or Transfer	.258	150	.000	.874	150	.000
7. Lack of Coordination and Information Sharing Between Commanders	.242	150	.000	.892	150	.000
8. Lack of Follow-up and Command System Evaluation	.256	150	.000	.834	150	.000
9. Gold Commander Presences in Operation Sector that May Create Conflict and Confusion	.253	150	.000	.869	150	.000
10. Incident Command System is New	.236	150	.000	.889	150	.000
11. No Nomination Standard for Commanders	.278	150	.000	.835	150	.000

a. Lilliefors Significance Correction

Table 6.13: Test of normality for driver factors

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. Incident Command System defines clear roles and responsibilities	.240	150	.000	.805	150	.000
2. Incidents are treated with clarity in command far beyond random actions	.242	150	.000	.813	150	.000

3. Improve outcomes and commanders' performance	.226	150	.000	.864	150	.000
4. Coordination and Information was transmitted easily between commanders level	.313	150	.000	.816	150	.000
5. Incident Command System facilitated incident management	.268	150	.000	.772	150	.000
6. Incident Command System assures safety and avoid committing errors	.272	150	.000	.784	150	.000
7. Clearly defined decision making	.212	150	.000	.849	150	.000
8.Incident Command System allows Evaluation and Assessment of the quality of incident response	.274	150	.000	.823	150	.000
9. Incident Command System successfully achieved its Goals and Benefits	.201	150	.000	.901	150	.000

a. Lilliefors Significance Correction

Secondly, the graphical method for the assessment of the normality of the data has been conducted by the histogram (See Figure 6.10 - Figure 6.14) for all sections of the questionnaire. As mentioned earlier, the bell-shaped curve should be considered so as to understand the usability of the statistical tests. Figure 6.10 below indicates that the distribution score for the section of the implementation factors of the command structure is negatively skewed because the majority of the distribution is leaning towards the right, which indicates that there are more values from the higher scores. According to Pallant (2013) if the data is negatively skewed, then this means that the distribution of scores should be at the right-hand side of the graph . In contrast to this, the positively skewed data should be at the left-hand side of the graph.

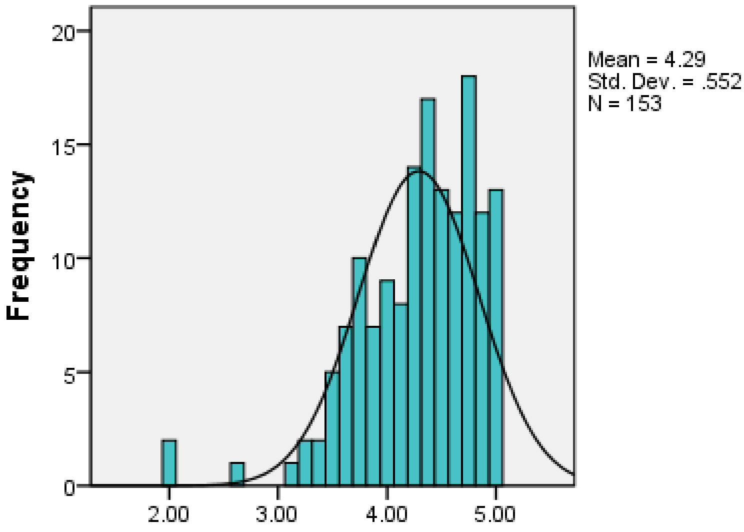


Figure 6.10: Histogram for implementation factors

Figure 6.11 from the histogram normality assessment, shows that the distribution for organisational factors is negatively skewed because the distribution is leaning towards the right side.

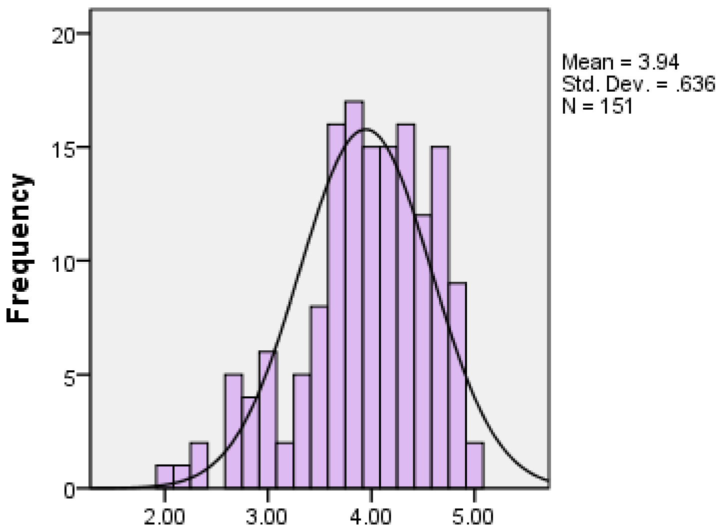


Figure 6.11: Histogram for organisational factors

Similarly, Figure 6.12 indicates a slightly negatively skewed distribution with small peaks for the section of individual factors for the incident command system implementation.

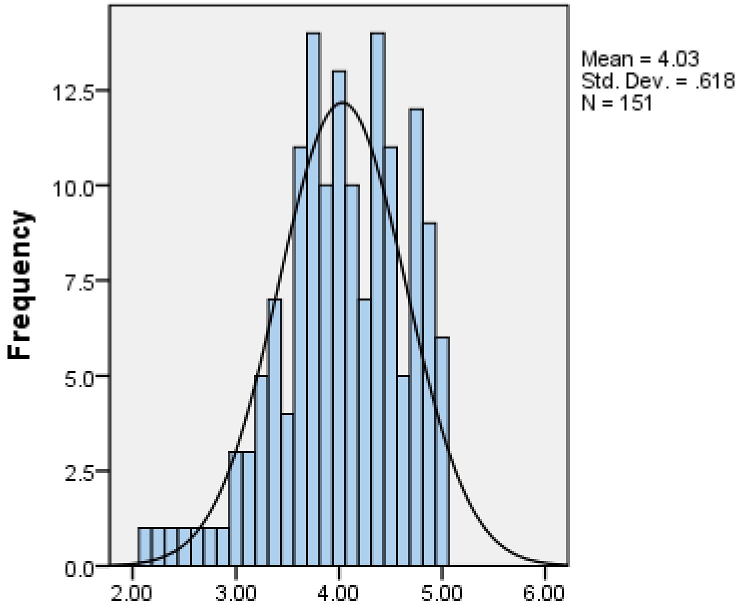


Figure 6.12: Histogram for individual factors

Furthermore, Figure 6.13 shows a similar curve pattern for the section of barriers faced in the incident command system implementation. It can be seen in Figure 6.13 that a slightly negatively skewed distribution with small peaks is shifting the distribution scores slightly to the right side of the graph.

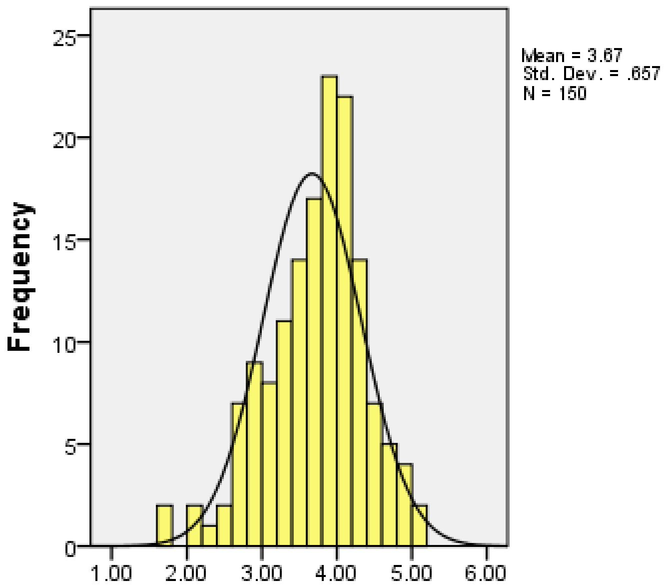


Figure 6.13: Histogram for barriers factors

The graphical representation of normality assessment in Figure 6.14 indicates the distribution scores for the section of the incident command drivers and the curve is slightly negatively skewed to the right-hand side indicating non-normality distribution. Although a quick look gives almost flat distribution, keen observation indicates a slight leaning of the curve to the right side due to the distribution of higher scores.

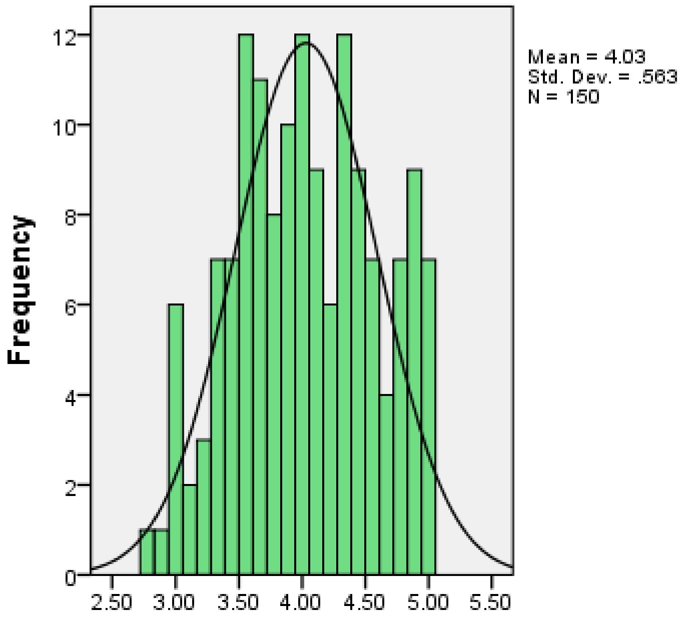


Figure 6.14: Histogram for driver factors

All the histogram figures exhibited that the distribution of all the responses from the participants appeared different to that of normal distribution. Hence, based on this graphical test, it can be concluded that all the data in all sections of the questionnaire is not distributed normally.

6.10 Kruskal-Wallis Test Results for the Incident Command Framework

This section aims to identify whether there are any significant relationships between 5 incident command systems, seven CD departments, academic qualification and job position. A total of 42 factors are examined, recommendations are also made based on the reported findings. A Kruskal-Wallis test (KWt) was conducted in this study because the literature review related to the incident command system found this type of quantitative test to be lacking. Hence, this section aims to fill this gap and gives a robust analysis of the results by identifying the significant relationship between the independent factors (CD departments, job position and academic qualification) and the dependent factors (implementation, organisational, individual, barrier and driver). An independent variable is a variable tested or measured; it is sometimes also called the predicted variable. A dependent variable is a variable which may affect the independent variable. In this study, the dependent variables are the five dimensions of the incident command framework.

The demographic survey conducted for this study was designed to gather specific data from a sample of respondents. This idea suggests that respondents can skip irrelevant parts of the survey and address only the relevant parts of it. For example, skip logic allows the researcher to guide the respondents to a future point based on how they answer a question. Accordingly, if the respondents indicate that they do not agree with a question, they cannot complete the survey or a series of questions. In the present study, the questions were arranged by revising the logic path to allow the completion of the subsequent questions. Because the sample used in this study was hard to locate, the random and snowball sampling techniques were used, followed by skip logic. However, because of the scope of this study, the skip logic technique was applied to the demographic questions to exclude respondents who did not fit certain questions to enable them to access the subsequent questions.

The demographic questionnaire, which was designed to address the descriptive independent variables of the study, was comprised of eight questions. Some questions were not statistically treated for the purpose of including only the bronze-level commanders involved in the incident command system. However, to achieve this aim, the research excluded the first, the second, the third, and the fifth questions (See Appendix I). The first question (i.e., the gender question) was not treated statistically by KWt because the sample consisted of only two independent groups. Because the proportion of female participants within the sample was only 6.17%, they were excluded from the analysis. Indeed, in the UAE and CDGC, females are linked with civil defence but they were not the target group of the study despite the general knowledge that females are commissioned in different roles in CD. The second question (i.e., work in one of the CDGC departments) was also excluded because the researcher wanted to guarantee that the survey questions were answered only by civil defence commanders. However, because the KWt technically uses more than two groups, this question was not treated statistically. The third question was intended to determine the number of individuals involved in the emergency and incident response; therefore, this question was specific to only bronze operational commanders. Consequently, based on this assumption, individuals who were not commissioned to perform incident command system activities did not respond to the questionnaire. Thus, the KWt was not applied to this question. The fifth question (i.e., current occupation) addressed only the bronze-level individuals that were commissioned to perform incident command activities. Because this question had two categories, the KWt could not be applied (See Appendix I).

However, KWt was used for the statistical treatment of the four subsequent questions (Q4, Q6, Q7, and Q8) to compare the independent variables (i.e., the question items) and the dependent variables that were used to construct the incident command system. Firstly, the fourth question, which determined the CD department to which the bronze commanders were assigned, was treated statistically using KWt to compare the independent variables in the CDs. The CDGC headquarter is located in Abu Dhabi, the capital of the UAE. Each of the seven emirates (Abu Dhabi, Dubai, Sharjah, Ajman, Um al-Qaiwain, Ras Al-Khimah, and Fujairah) runs its own civil defence department, which plays a role in emergency response at the local level. All of these civil defence departments/groups were coded as “CD” followed by a serial number: CD1, CD2, CD3, CD4, CD5, CD6 and CD7 respectively. Secondly, the sixth question, which identified the job position, was treated statistically to compare the independent variables regarding this factor. Thirdly, the seventh question explored the number of years of experience. Although this question was treated statistically, the KWt analysis showed that no significant results were associated with this variable. Finally, the KWt was applied to question number eight, which concerned academic qualification to comply with the KWt terms of analysis. For this purpose, the previous four questions were treated statistically by KWt based on whether there was any significant relationship between the dependent variables of the incident command system and the independent variables (Q4, Q6, Q7, and Q8). It was assumed that the null hypothesis was rejected ($p < 0.05$), which indicates that some of the mean ranks differed statistically among those groups.

In this study, the sample size of the Bronze commander was n=153 for the implementation factor dimension 1, and there were no missing or invalid items. The sample size was n= 151 in the organisational factor dimension 2, because the responses of two (n=2) participants from the entire sample population were missing. The sample size was also n=151 for the individual factor dimension 3, whereas the sample size was n=150 for both the barrier factor dimension 4 and driver factor dimension 5, because the responses of three (n=3) participants from the entire sample population were missing.

Non-parametric tests have the advantage of allowing one to study, for significance, data which are inherently classified (nominal scale) or which are presented in stations (ordinal scale). When the assumptions of normality and homoscedasticity are violated, the result of a traditional variance analysis cannot be relied upon, since there is a probability of committing an error. The KWt, sometimes called the Kruskal-Wallis H test, is often used when the data are categorical or ordinal (Likert scale/ranked scale) and considered non-normally distributed (non-parametric). As a non-parametric test, it is most widely used in the sciences; and is equivalent to a one-way analysis of variance (ANOVA) test (Meyer and Seaman, 2013, Knapp, 2017).

The KWt allows assessment of both the relationship and the differences between three or more groups of independent variables and one dependent variable (ordinal factor) (Pallant, 2013). Ruxton and Beauchamp (2008a) provided some useful suggestions about how the KWt could be used appropriately to provide clear guidance on how scientists can choose and conduct the most appropriate test for their research. The KWt is also used to validate and interpret a significant *p* value from the KWt as evidence of a rejection of the null hypothesis of the equality of the means.

To gain a better understanding about whether there was any significant relationship between the independent and dependent variables, it is assumed that the null hypothesis is rejected (p <0.05), this indicates that some of the mean ranks are statistically different between those variables. Thus, when the KWt does not indicate which variables are significantly statistically different or where the null hypothesis was rejected, it is also important to perform a test called Dunn's pairwise comparison as a post hoc test for non-parametric tests (Elliott and Hynan, 2011, Ruxton and Beauchamp, 2008b, Dinno, 2015). Throughout the study, Dunn's pairwise comparisons were run if the KWt scores were significant on the given dependent variable and the sample size was unequal (Elliott and Hynan, 2011, Ruxton and Beauchamp, 2008b).

The justification for using the KWt was based on three main reasons behind this choice. Firstly, the data is concluded to be non-normally distributed based on the normality tests conducted, such as the histograms' bell shape and the Kolmogorov-Smirnov and Shapiro-Wilk tests. Secondly, the information collected for Sections 2-6, falls under the data type of ordinal (Likert scale 1-5). Thirdly, all the data in all sections of the questionnaire are negatively skewed to the right side of the graphs; therefore, the type of test considered should be non-parametric and the KWt should be the preferred choice.

6.10.1 Kruskal-Wallis Test for Implementation Factors

The KWt was run to test whether incident command implementation factors were differentiated between the CDGC departments. The Chi-square (x^2) indicates the outcome of the test score.

The degree of freedom (df) is six; since there were seven CD departments, the df was measured as a subtraction of one from the number of CD departments (7 – 1 = 6). Asymp. Sig. is the *p*-value on the KWt for the implementation factor table below, which means that the Chi-square test score is significant and p <0.05 was set as the significance level (Pallant, 2013). To produce the outcomes for each dimension, the KWt was first reported for each factor, and if the KWt showed significant results, then the Dunn's pairwise comparisons test was conducted to identify the significant differences between the CD departments/groups for the given dependent variable.

As detailed in the Table 6.14 below, the KWt results showed significant differences in the overall incident command implementation factor dimension 1, n = 153, $\chi^2_{(6)}$ = 13.319, p = .038, and a significant difference between the CD departments existed on the third factor of the incident command implementation factors, which was "Avoid unauthorised intervention in command". Although the null hypothesis was rejected in factor 3, $\chi^2_{(6)}$ = 13.082, p = .042, the Dunn's pairwise comparisons test showed that there was a slightly significant difference, p = .063, between CD5 (mean = 96.91) and CD1 (mean = 61.15). Other departments did not differ significantly, indicating that the other CD departments were the same in terms of the incident command implementation factors. Overall, the KWt showed that there was no statistically significant difference in the incident command system implementation factor scores between the different CD departments.

Table 6.14: Kruskal Wallis test for implementation factors/CD departments

Test Statistics[a,b]

	1. Improve and Organise incident response	2. Minimise Random Decision-Making and Confusion	3. Avoid unauthorised intervention in command	4. Organise commanders' roles and responsibilities	5. Improve structural organisation in emergency	6. Better communication and coordination across commanders levels	7. Best Practices of SOPs	8. Minimise negative outcomes
Chi-Square	10.154	10.524	13.082	5.934	8.612	10.895	9.778	2.524
df	6	6	6	6	6	6	6	6
Asymp. Sig.	.118	.104	.042	.431	.197	.092	.134	.866

a. Kruskal Wallis Test

b. Grouping Variable: Department Assigned

The KWt was run to test whether incident command implementation factors were differentiated between the job positions. The Chi-square (x^2) indicates the outcome of the test score. The degree of freedom (df) is six; since there were seven job positions, the df was measured as a subtraction of one from the number of job positions (7 – 1 = 6). The Table 6.15 indicates no significant difference between implementation factors and job positions. Therefore, the null hypotheses were not rejected.

Table 6.15: Kruskal Wallis test for implementation factors/Job position

Test Statistics[a,b]

	1. Organise incident response	2. Minimise Random Decision-Making and Confusion	3. Avoid unauthorised intervention in command	4. Organise commanders' roles and responsibilities	5. Improve structural organisation in emergency	6. Better communication and coordination across commanders levels	7. Best Practices of SOPs	8. Minimise negative outcomes
Chi-Square	6.117	10.238	5.047	10.061	11.127	5.304	5.479	6.953
df	6	6	6	6	6	6	6	6
Asymp. Sig.	.410	.115	.538	.122	.085	.505	.484	.325

a. Kruskal Wallis Test

b. Grouping Variable: Job Position

The KWt was run to test whether incident command implementation factors were differentiated between the academic qualifications. The Chi-square (χ^2) indicates the outcome of the test score. The degree of freedom (df) is four; since there were six levels of academic qualifications, the df was measured as a subtraction of one from the number of qualification level (6 – 1 = 5). However the df indicated no PhD level as a result the df equals (5 -1 = 4). Table 6.16 indicates a significant difference between implementation factors (dependent factor) and academic qualification (independent factor). The null hypothesis was rejected for factor 6 (better communication and coordination across commanders' levels) of implementation domain and academic qualification (p=.014). In the pairwise comparison, a significant difference was noted between higher diploma and high school education (p=.014).

Table 6.16: Kruskal Wallis test for implementation factors/Academic qualification

Test Statistics[a,b]

	1. Organise incident response	2. Minimise Random Decision-Making and Confusion	3. Avoid unauthorised intervention in command	4. Organise commanders' roles and responsibilities	5. Improve structural organisation in emergency	6. Better communication and coordination across commanders levels	7. Best Practices of SOPs	8. Minimise negative outcomes
Chi-Square	9.295	9.222	6.613	6.762	10.055	12.579	6.479	7.658
df	4	4	4	4	4	4	4	4
Asymp. Sig.	.054	.056	.158	.149	.060	.014	.166	.105

a. Kruskal Wallis Test

b. Grouping Variable: Academic Qualification

6.10.2 Kruskal-Wallis Test for Impact of Organisational Factors

Table 6.17 below reports the KWt results to show a significant difference in the overall impact of organisational factors, n= 151, $\chi^2_{(6)}$ = 13.184, p = .040. The test indicated that factor 5 of the second dimension (Rigorous regulation of incident command system) significantly differed between the CD departments, $\chi^2_{(6)}$ = 18.307, p = .006. The Dunn's pairwise comparisons showed significant differences between departments CD6 and CD1, p = .019, with an averaged mean score of 54.69 for CD1, which significantly increased to 95.67 for CD6, p = .019. Dimension two did not differ between departments, and only "Rigorous regulation of incident command system" differed between CD6 and CD1. The rest of the pairwise comparisons did not show any difference between the CD departments.

Table 6.17: Kruskal Wallis test of organisational factors/CD departments

Test Statistics[a,b]

	1. Commanders' nomination is based on job position, ranks and experiences	2. Training and exercising at different levels of command	3. Logistic and financial support	4. Having model experts	5. Rigorous regulations of incident command	6. Systematically grading level of commanders
Chi-Square	12.394	1.648	7.332	7.354	18.307	7.881
df	6	6	6	6	6	6
Asymp. Sig.	.054	.949	.291	.289	.006	.247

a. Kruskal Wallis Test

b. Grouping Variable: Department Assigned

Table 6.18 indicates two significant levels between organisational factors (dependent factor) and job position (independent factor). The first one was factor 5 (rigorous regulations of incident command system) at a p-value of .041, whereas the second level was factor 6 (systematically grading level of commanders) at a p-value of 0.033. The null hypothesis was rejected for factor 5 in the pairwise comparison due to disparities between the section manager (mean ranks 57.77) and station manager (mean ranks 92.42) at a p-value of .040. Even though there was a significant p-value of .033 in factor 6, the pairwise comparison showed that there was no significant level between manager sections.

Table 6.18: Kruskal Wallis test of organisational factors/Job position

Test Statistics[a,b]

	1. Commanders' nomination is based on job position, ranks and experiences	2. Training and exercising at different levels of command	3. Logistic and financial support	4. Having model experts	5. Rigorous regulations of incident command system	6. Systematically grading level of commanders
Chi-Square	11.084	4.224	6.047	6.614	13.126	13.684
df	6	6	6	6	6	6
Asymp. Sig.	.086	.646	.418	.358	.041	.033

a. Kruskal Wallis Test

b. Grouping Variable: Job Position

Table 6.19 indicates a significant difference between two levels of organisational factors (dependent factor) and academic qualification (independent factor). Therefore, the null hypothesis was rejected. The first one is factor 1 (commanders' nomination is based on job position, ranks and experiences) with a p-value of .009, whereas the second is factor 2 (training and exercising at different levels of command) with a p-value of .011. In the pairwise comparison, a significant difference was noted between bachelor and high school for factor 1 (p=.012). Conversely, a difference was noted between higher diploma and bachelors (p=.048) as well as higher diploma and diploma (p=.003) for factor 2.

Table 6.19: Kruskal Wallis test of organisational factors/Academic qualification

Test Statistics[a,b]

	1. Commanders' nomination is based on job position, ranks and experiences	2. Training and exercising at different levels of command	3. Logistic and financial support	4. Having model experts	5. Rigorous regulations of incident command system	6. Systematically grading level of commanders
Chi-Square	13.621	13.157	7.754	3.686	2.788	3.177
df	4	4	4	4	4	4
Asymp. Sig.	.009	.011	.101	.450	.594	.529

a. Kruskal Wallis Test

b. Grouping Variable: Academic Qualification

6.10.3 Kruskal-Wallis Test for Impact of Individual Factors

Table 6.20 below details the KWt results and shows a marginally significant effect on the CD departments with an overall impact of individual factors, n= 151, $\chi^2_{(6)}$ = 12.286, p = .056. Notably, a significant difference between the CD departments on factor 7 (Situational awareness during incident response) existed, $\chi^2_{(6)}$ = 14.572, p = .024.

While, the Dunn's pairwise comparisons showed significant differences between the departments CD5 and CD1 for factor 7, p = .007. The Dunn's pairwise comparisons showed that the factor had an average mean score of 61.17 for CD5, but it significantly increased to 104.19 for CD1. The significant differences occurred between CD1 and CD5, p = .007, and there was no significant difference between other departments. Even though differences between the CD departments were not generally significant, the biggest difference was observed between CD5 and CD1, significantly different in a way identical to that dimension. CD1 differed from other departments in the first three dimensions, with lower scores in the incident command dimensions.

Table 6.20: Kruskal Wallis test for impact of individual factors/CD departments

Test Statistics[a,b]

	1. Improvement of Knowledge and Experience	2. Training and Exercising	3. Individual Characteristics Self-confidence, Discipline and Desire.	4. Coordination and Information Sharing	5. Effective Decision Making	6. Commitment to Apply Incidetn Command System	7. Situational Awareness during incident response	8. Cooperation Between Commanders
Chi-Square	12.387	9.260	7.809	5.772	8.609	5.738	14.572	5.067
df	6	6	6	6	6	6	6	6
Asymp. Sig.	.054	.159	.252	.449	.197	.453	.024	.535

a. Kruskal Wallis Test

b. Grouping Variable: Department Assigned

Table 6.21 indicates no significant difference between individual factors and job positions. Consequently, no null hypothesis was rejected.

Table 6.21: Kruskal Wallis test for impact of individual factors/Job position

Test Statistics[a,b]

	1. Improvement of Knowledge and Experience	2. Training and Exercising is Needed to Improve Professional Capabilities	3. Individual Characteristics Self-confidence, Discipline and Desire, Can Work Under Pressure	4. Coordination and Information Sharing	5. Effective Decision Making	6. Commitment to Apply Incident command system	7. Situational Awareness during incident response	8. Cooperation Between Commanders
Chi-Square	2.609	3.958	3.798	7.518	7.386	5.538	11.262	1.584
df	6	6	6	6	6	6	6	6
Asymp. Sig.	.856	.682	.704	.276	.287	.477	.081	.954

a. Kruskal Wallis Test

b. Grouping Variable: Job Position

Table 6.22 indicates no significant difference between any levels of individual factors (dependent factor) and academic qualification (independent factor). Therefore, the null hypothesis was not rejected for any factor.

Table 6.22: Kruskal Wallis test for impact of individual factors/Academic qualification

Test Statistics[a,b]

	1. Improvement of Knowledge and Experience	2. Training and Exercising is Needed to Improve Professional Capabilities	3. Individual Characteristics Self-confidence, Discipline and Desire, Can Work Under Pressure	4. Coordination and Information Sharing	5. Effective Decision Making	6. Commitment to Apply Incident command system	7. Situational Awareness during incident response	8. Cooperation Between Commanders
Chi-Square	1.585	6.610	3.367	6.058	7.313	6.963	3.896	4.004
df	4	4	4	4	4	4	4	4
Asymp. Sig.	.812	.158	.498	.195	.120	.138	.420	.405

a. Kruskal Wallis Test

b. Grouping Variable: Academic Qualification

6.10.4 Kruskal-Wallis Test for Barrier Factors

It is evident from the Table 6.23 below that the CD departments mostly differed in the factors of barriers, compared to other dimensions. The results generated from the non-parametric analysis results indicated a significant difference between the CD departments and the overall barrier factors, n = 150, $\chi^2_{(6)}$ = 17.819, p = .007. The KWt showed that there was a significant relationship between the CD departments and the four barrier factors.

Firstly, factor 6 (Lack and losing of expertise due to resignations and retirements) differed between the CD departments, $\chi^2_{(6)}$ = 17.341, p = .008. In order to interpret the significant effect on the CD departments, The Dunn's pairwise comparisons of CD departments on the sixth factor showed that there were significant differences between CD6 (mean = 38.71) and CD7 (mean = 96.57), p = .003, and between CD6 and CD1 (mean = 80.10), p= .022. The difference between CD4 (mean = 81.88) and CD6 for this factor was marginally significant, p = .074, and pairwise comparisons did not show any further significant difference on this factor. Secondly, although the CD departments influenced factor 7 (Lack of coordination and information sharing between commanders), $\chi^2_{(6)}$ = 14.768, p = .022, the Dunn's pairwise comparisons did not show any significant difference between the CD departments. Thirdly, a significant effect on the CD departments of factor 4 (Overlaps and conflicts in command views) existed, $\chi^2_{(6)}$ = 13.697, p = .033. However, the pairwise comparisons did not show any significant difference between the CD departments. And finally, the CD departments differed significantly on factor 2 (Lack of commanders' qualifications), $\chi^2_{(6)}$ = 12.988, p = .043. The Dunn's pairwise results indicated that there was a significant difference for the factor between CD2 (mean = 62.47) and CD7 (mean = 103.00), $p = .050$.Whereas, none of the other pairwise comparisons showed any difference between the CD departments.

Table 6.24 indicates a significant difference between barrier factor 9 (Gold commander presence in operation sector that may create conflict and confusion) and job position at $p= .041$. Thus, the null hypothesis was rejected. However, the pairwise comparison showed that there was no significant p-value level between managers' levels.

Table 6.25 indicates a significant difference between two levels of barrier factors (dependent factor) and academic qualification (independent factor). Thus, the null hypothesis was rejected. The first one is factor 7 (lack of coordination and information sharing between commanders) with a p-value of .018 while the second is factor 10 (incident command system is new) at $p= .001$. In the pairwise comparison, no significant difference was noted for factor 7. Nonetheless, the pairwise comparison for factor 10 showed a significant difference between higher diploma (mean ranks 40.71) and bachelor (mean ranks 77.98) at $p= .009$ as well as between higher diploma and high school (mean ranks 91.96) at $p= .000$.

Table 6.23: Kruskal Wallis test barrier factors/CD departments

Test Statistics[a,b]

	1. Lack of Incident Command Knowledge	2. Lack of Commanders' Qualifications	3. Lack of Training and Exercising	4. Overlaps and Conflicts in Command Views	5. Lack of Acceptance and Desire	6. Lack and Losing of Expertise Due to Resignations, Retirements	7. Lack of Coordination and Information Sharing	8. Lack of Follow-up and Incident Command Evaluation	9. Gold Commander Presence in Operation Sector	10. Incident Command is New	11. No Nomination Standard
Chi-Square	10.545	12.988	4.058	13.697	9.062	17.341	14.768	7.849	10.270	11.883	9.758
df	6	6	6	6	6	6	6	6	6	6	6
Asymp. Sig.	.104	.043	.669	.033	.170	.008	.022	.249	.114	.065	.135

a. Kruskal Wallis Test

b. Grouping Variable: Department Assigned

Table 6.24: Kruskal Wallis test barrier factors/Job position

Test Statistics[a,b]

	1. Lack of Incident Command Knowledge	2. Lack of Commanders' Qualifications	3. Lack of Training and Exercising	4. Overlaps and Conflicts in Command Views	5. Lack of Acceptance and Desire	6. Lack and Losing of Expertise Due to Resignations, Retirements	7. Lack of Coordination and Information Sharing	8. Lack of Follow-up and Incident Command Evaluation	9. Gold Commander Presence in Operation Sector	10. Incident Command System is New	11. No Nomination Standard
Chi-Square	9.114	6.320	3.931	9.433	4.676	5.208	5.406	8.580	13.160	5.124	5.989
df	6	6	6	6	6	6	6	6	6	6	6
Asymp. Sig.	.167	.388	.686	.151	.586	.517	.493	.199	.041	.528	.424

a. Kruskal Wallis Test

b. Grouping Variable: Job Position

Table 6.25: Kruskal Wallis test barrier factors/Academic qualification

Test Statistics[a,b]

	1. Lack of Incident Command Knowledge	2. Lack of Commanders' Qualifications	3. Lack of Training and Exercising	4. Overlaps and Conflicts in Command Views	5. Lack of Acceptance and Desire	6. Lack and Losing of Expertise Due to Resignations, Retirements	7. Lack of Coordination and Information Sharing	8. Lack of Follow-up and Incident Command Evaluation	9. Gold Commander Presence in Operation Sector	10. Incident Command System is New	11. No Nomination Standard
Chi-Square	1.955	5.852	1.321	8.836	7.642	4.457	11.898	6.318	4.798	17.868	5.735
df	4	4	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.744	.210	.858	.065	.106	.348	.018	.177	.309	.001	.220

a. Kruskal Wallis Test

b. Grouping Variable: Academic Qualification

6.10.5 Kruskal-Wallis Test for Driver Factors

As seen in the Table 6.26 below, the non-parametric analysis results indicated a significant difference between the CD departments on the overall driver factors, *n*= 150, $\chi^2_{(6)}$ = 14.841, *p* = .022. The KWt showed that there was a significant relationship between the CD departments and the two driver factors, 4 and 9. Factor 4 (Coordination and information sharing was transmitted easily between commander levels) differed between the CD departments, $\chi^2_{(6)}$ = 18.470, *p* = .005. The Dunn's pairwise comparisons showed significant differences between the departments CD2 and CD5 for factor 4, *p* = .009. The Dunn's pairwise comparisons of the CD departments on this factor showed that there was a significant difference for CD5 (mean = 104.09), which was significantly greater than for CD2 (mean = 60.74; *p* = .009) and CD3 (mean = 61.92; *p* = .030).

Factor 9 (incident command successfully achieved its goals and benefits) was significantly influenced by the CD departments, $\chi^2_{(6)}$ = 15.580, *p* = .016. The Dunn's pairwise comparisons showed that there was a significant difference between CD5 (mean = 104.16) and CD6 (mean = 56.50) on this factor, *p* = .038. The rest of the pairwise comparisons did not show any difference between CD departments.

Table 6.26: Kruskal Wallis test for driver factors/CD departments

Test Statistics[a,b]

	1. Incident Command System defines Clear Roles and Responsibilities	2. Incidents are treated with clarity in command far beyond random actions	3. Improve Outcomes and Commanders' Performance	4. Coordination and Information Sharing was transmitted easily between commanders level	5. Incident Command System facilitates Incident Management and Categorisation	6. Incident Command assures Safety and Avoids Committing Errors	7. Clearly defines Better Decision Making	8. Incident Command allows Evaluation and Assessment of the quality of incident response	9. Incident Command successfully achieved its Goals and Benefits
Chi-Square	8.702	6.025	9.920	18.470	9.927	5.636	11.194	10.590	15.580
Df	6	6	6	6	6	6	6	6	6
Asymp. Sig.	.191	.420	.128	.005	.128	.465	.083	.102	.016

a. Kruskal Wallis Test

b. Grouping Variable: Department Assigned

In the driver factors dimension, Table 6.27 indicates that the null hypothesis is rejected for factor 4 (coordination and information sharing was transmitted easily between commanders' level), which is significant at *p* =.023. Pairwise comparison showed that there is a significant difference between shift chief (mean ranks 84.75) and duty officer (mean ranks 50.44) at *p*= .048.

Table 6.27: Kruskal Wallis test for driver factors/Job position

Test Statistics[a,b]

	1. Incident Command System defines Clear Roles and Responsibilities	2. Incidents are treated with clarity in command far beyond random actions	3. Improve Outcomes and Commanders' Performance	4. Coordination and Information Sharing was transmitted easily between commanders level	5. Incident Command System facilitates Incident Management and Categorisation	6. Incident Command System assures Safety and Avoids Committing Errors	7. Clearly defines Better Decision Making	8. Incident Command System allows Evaluation and Assessment of the quality of incident response	9. Incident Command System successfully achieved its Goals and Benefits
Chi-Square	6.610	7.073	6.311	14.649	12.541	11.177	11.693	12.984	8.275
df	6	6	6	6	6	6	6	6	6
Asymp. Sig.	.358	.314	.389	.023	.051	.083	.069	.063	.219

a. Kruskal Wallis Test

b. Grouping Variable: Job Position

Table 6.28 indicates a significant difference between two levels of driver factors (dependent factor) and academic qualification (independent factor). Therefore, the null hypothesis was rejected. The first one is factor 5 (incident command system facilitates incident management and categorisation) at *p*= .015, whereas the second one is factor 7 (clearly defines better decision making) at a significance of *p*= .030. In the pairwise comparison, the null hypothesis was rejected for factor 5 between higher diploma (mean ranks 46.09) and bachelor (mean ranks 77.94) at *p*= 0.029 and between higher diploma (mean ranks 46.09) and high school (mean ranks 84.71) at *p*= .009. Similarly, the pairwise comparison of factor 7 showed that the null hypothesis was rejected at *p*= .031 between higher diploma (mean ranks 48.12) and high school (mean ranks 84.29) .

Table 6.28: kruskal Wallis test for driver factors/Academic qualification

Test Statistics[a,b]

	1. Incident Command System defines Clear Roles and Responsibilities	2. Incidents are treated with clarity in command far beyond random actions	3. Improve Outcomes and Commanders' Performance	4. Coordination and Information Sharing was transmitted easily between commanders level	5. Incident Command System facilitates Incident Management and Categorisation	6. Incident Command System assures Safety and Avoids Committing Errors	7. Clearly defines Better Decision Making	8. Incident Command System allows Evaluation and Assessment of the quality of incident response	9. Incident Command System successfully achieved its Goals and Benefits
Chi-Square	5.172	1.450	7.351	2.345	12.303	5.371	10.696	9.705	4.101
df	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.270	.835	.118	.673	.015	.251	.030	.064	.392

a. Kruskal Wallis Test

b. Grouping Variable: Academic Qualification

6.11 Validity of the Questionnaire

The development of survey questionnaires is an important step in any research design, and validity is essential to justify and authenticate the study. Previous studies can be consulted in this regard, but if no such examples can be found in other studies for the measurement of the desired outcomes, then the evaluation of a new questionnaire can play a useful part in validity (Jesús García de Yébenes Prous et al., 2009). In the case of the present study, there was no specific questionnaire or study available in the literature relating to the UAE, for the achievement of the research objectives. Therefore, a set of questionnaires was designed to measure the perceptions of the Bronze commanders regarding the qualitative results.

6.12 Chapter Summary

The statistical results mentioned in this chapter can be used in the development of the UAE's CDGC Incident command system framework. This is because the measured values of implementation, organisational, individual, driver and barrier factors were observed to have values that vary in significance, thus, there is a need to focus on certain values to repair the gaps observed in the studied incident command system. To this end, the quantitative stage of this research has assisted the validation of the incident command system framework, which has five main sections based on the evaluation of the current command structure already being implemented in the CDGC agency. The main purpose of this section was concentrated on testing the reliability of the responses and construction of scales for validation using correlation and factor analysis techniques. The reliability test results have revealed that the survey questionnaire is highly reliable and the items in each group are associated significantly. Therefore, the validation of the questionnaire items has been proven through the factor analysis technique and the number of factors has been determined by using various tests and procedures as described in this chapter.

The obtained factor scores were assessed for normality, which concluded that the factor scores are distributed on a non-normal basis for the selected sample size. The incident command system framework was developed in accordance with the qualitative results obtained through the semi-structured interviews from Gold and Silver commanders of the CDGC agency in the UAE. The results of the quantitative study, as well as the qualitative study, are discussed in alignment with the related literature in the following chapter, whereas the factor analysis will be used in the discussion of the validation of the incident command system framework.

CHAPTER 7 DEVELOPMENT OF THE INCIDETN COMMAND FRAMEWORK FOR IMPROVING MANAGEMENT OF EMERGENCIES IN UAE

7.1 Introduction

This chapter discusses the empirical findings generated from the qualitative and quantitative analysis concerning the literature review. This discussion will enable achievement of the sixth proposed research objective of this doctorate study, as well as answering the fourth research question concerning the role can be played by the UAE's proposed incident command system framework to assist the UAE's CDGC agency in different emergency responses. The attainment of both the six objective and the fourth research question are required to develop and evaluate the proposed UAE incident command system framework that will facilitate the improvement of the total management of emergencies for improving emergency response in the UAE's CDGC agency. The UK, USA, and international (Japan, China, Australia, Taiwan, Norway, Sweden, and Netherlands) incident command systems were analysed to investigate their validity in the context of the UAE emergency response. The framework will address key factors related to the successful implementation of the incident command system. In addition, it will investigate facts into how the incident command structure is being applied, thus it will provide in-depth and breadth information.

This chapter will also discuss the findings of the exploratory sequential mixed method design approach of the qualitative and quantitative analysis and will triangulate the evidence with the support of literature. In other words, the qualitative and quantitative findings are being compared with the literature findings. This discussion and triangulation will help the researcher in developing a framework for the incident command system in the CDGC agency, which was the main aim of the research. In addition, the exploratory sequential mixed method design findings will help the researcher to generalise the framework between other emergency agencies.

This discussion chapter will be divided into five sections in accordance with the qualitative findings, quantitative findings, and reviewed literature for the implementation of the incident command system. As mentioned previously, the qualitative results were drawn from semi-structured interviews with Gold and Silver commanders, while the quantitative results were extracted from the questionnaire conducted with the Bronze commanders of the CDGC agency.

Thus, a total of forty-two (42) factors representing the quantitative findings will be discussed, according to the qualitative findings with the Kruskal-Wallis test (KWt) findings and literature review. An analysis of the variances of the KWt conducted previously in the quantitative chapter six is used to measure the significant level of relationships between all incident command system framework factors. The last section of this chapter is a discussion on the confirmation of each factor in the UAE incident command system framework through the conduction of KWt technique, which represents forty (42) factors. Lastly, the survey findings from experts will be validated for the UAE incident command system framework.

7.2 Characteristics of the Respondents

In order to collect the qualitative data from the respondents, semi structured interviews were conducted with (*n*=15) senior commanders from the CDGC agency. The researcher used purposive sampling techniques, when selecting a total of fifteen (seven Gold Strategic, seven Silver tactical and one Senior Fire Advisor) commanders from the civil defence departments across the UAE and interviewed these fifteen Gold and Silver commanders in person for the data collection (See interviewee characteristics profile in the Table 5.1 in chapter 5).

A questionnaire was designed to critically evaluate the key factors that influence the effective implementation of the incident command system in the CDGC agency. Furthermore, the questionnaire was collected to confirm the framework factors based on quantitative results. The quantitative data was collected from 162 CDGC officers and non-commissioned officers through an online survey mechanism, known as survey-monkey. Nevertheless, out of these totals, the data needed for the current study has been limited to only the participants who take part in the incident response operations. Hence, the participants who have never responded to any incidents were excluded from the whole data analysis process (5.56% of the entire sample size comprising of *n*=9). The excluded process modified the active sample size from 162 to 153 Bronze commanders (For more details see the demographic results in section 6.7).

7.3 Discussion of Qualitative, Quantitative and Literature Review Results

The discussion of the results drawn from both the qualitative and quantitative analysis, as well as the literature review and respective data, is focused on five primary sections. The importance of the discussion will focus on similarities and differences witnessed at each of these sections in accordance with the literature review, and documentation of the SOPs provided by the CDGC agency.

The views and opinions of the Gold, Silver commanders and SFA about how and why the incident command system has been implemented in the UAE, were gathered through the semi structured interview for the purpose of qualitative data analysis. Participants were questioned about their knowledge and understanding of the incident command system implementation factors in the UAE.

7.3.1 Basis of Incident Command System Implementation

Without a clear understanding of the basis for the implementation of the incident command system in the UAE, it is hard to achieve the objective of improvement in emergency response during any natural hazard. Therefore, the commanders at the CDGC agency should be aware of the basic procedures of implementing the incident command system. Including the reasons why the incident command system is essential for effective emergency response, and how this structure has been adopted in the contexts of the UAE as basic foundation steps towards the successful implementation of the command structure. A detailed qualitative analysis of the basis of incident command system implementation is presented in section 5.4.1. According to the qualitative findings, four basic mechanisms were identified as the basis for the incident command implementation in the UAE. These four mechanisms are:

1. Dubai General Directorate of Civil Defence Committee (CD2);
2. Ministry of Interior Decree (MOI);

3. International Best Practices;
4. Creation of Standard Operation Procedures (SOPs).

The qualitative analysis of the responses has indicated that the initiative for the incident command system implementation in the UAE was taken in 2012. At the early stage, the emergency response structure was formed by the General Director of Dubai Civil Defence committee (CD2). In order to implement the incident command system in the UAE, the CD2 committee was appointed to identify the international best practices and develop the SOPs. Three teams of officers from the CD2 were trained in international schools located in Canada, Singapore, and the United Kingdom. As per their training, three styles of handling incidents were unified to form the best practices and SOPs to be adopted in the UAE, as discussed in section 5.4.1.2.

The decision for the implementation of the incident command system was taken by the Deputy Prime Minister and the MOI Decree during 2010. The official implementation decree was issued on the 25th of October 2010, under the administrative decree decision number (27), as discussed in section 5.4.1.3. The SOPs were developed by the CD2 committee in the light of international best practices. Therefore, the flowchart for the basis of the incident command system implementation can be described as the first step in creating a CD2 committee to examine the best practices adopted internationally for the purpose of emergency response. Moreover, the formulation of the SOPs is used in the context of the UAE for the incident command system as the second step. Finally, the release of the MOI decree for generalising the implementation of the incident command system in the UAE.

According to the CDGC (2015a) the SOPs formulated by the CD2 with regard to international best practices defined the process of incident command for the better understanding and knowledge of the commanders of each department. So that they can be aware of the emerging situation and respond as per the requirements of the emergency as well as international practices. The SOPs defined the incident command as a process in which risk management is done to achieve the operational target within the limited time safely. The command procedure should be flexible and adaptive according to the size and extent of the incident. In order to delegate the duties and responsibilities in the incident command system, the incident commander is the person who is responsible for the effective management of a designated unit and the safety of all its personnel. The roles and responsibilities of the different hierarchical levels of commanders are also identified and explained in the SOPs, which are developed by the committee (See section 5.4.1.4).

The review of the related literature has revealed that the incident command system is being used in the UK by the emergency response services. The basic function is an establishment of a hierarchical framework for command and control of major incidents and disasters in the country (LESLP, 2012). The United Kingdom's Civil Contingencies Act 2004 introduced the Gold, Silver and Bronze command structure to deal with major incidents (Cabinet Office, 2004, Mishra et al., 2015). A number of initiatives have been taken by the UAE government to adopt standards and response structures like the Gold, Silver, and Bronze structure used in the UK, and other developed countries, to improve response to the emergency events (Khaleej Times, 2015). In addition, it was developed for holding responsibilities in the coordination of command and control efforts (Kahn and Barondess, 2008).

7.4 Section 1: Implementation Factors

As per the results of the qualitative and quantitative analysis and the study of related literature, the following important factors were identified for the incident command system implementation in the UAE. These implementation factors were categorised based on the rankings from the semi structured interviews.

7.4.1 Improve and Organise Responses during Emergencies

The majoroty of qualitative results from the Gold and Silver commanders have indicated that the CDGC agency has made the decision to adopt the UK GSB structure in the UAE. The foremost reason for the implementation of the UK command structure in the UAE was bringing improvement to the emergency response and incident command structure in the case of any emergency. The review of the literature and results from the qualitative analysis (See section 5.4.2.1), as well as quantitative analysis (See section 6.10) have revealed that there are many implementation factors associated with the incident command structue. These factors can be broadly categorised under the head of improvement in response during emergencies.

The results of the quantitative analysis indicated that the incident command system is being adopted in the UAE to improve and organise the response for different incidents. The KWt obtained results that showed no significant effect on the 3 independent variables (CD departments, job position and academic qualifications) of the factor (Improve and organise incident response). The KWt showed that the null hypothesis was retained (See Table 6.14, Table 6.15 and Table 6.16).

This is also supported by the literature, which revealed that the command structure adopted in the UK and the ICS structure applied in the USA, are the basis for the implementation of the command structure in the UAE. As both these countries are advanced and developed countries, their infrastructure for the response to any emergency and their adopted structures, are considered as the best recognised international approaches for handling any incident or emergency in a country.

A review of the related literature has revealed that emergencies require quick and immediate response actions to safeguard the lives and properties of people. In addition, the incident response needs better coordination and arrangements between the three levels of command to enhance and organise the response actions (Cabinet Office, 2013b). In the UK, emergency response principles have recognised that there is a need for effective incident management and minimisation of confusion during incidents (Comfort et al., 2004). So, the intentions were to increase professionalism and the effectiveness of emergency response activities for emergency management. Consequently, this need for management and organisation led to the implementation of the command structure for reliable and effective results in incident response.

According to several authors' views of the literature (Linney et al., 2011, Groenendaal et al., 2013, Ramchurn et al., 2015) in the UK, and the qualitative analysis results conducted in the UAE, it can be argued that the incidetn command system has been considered as the best fit to improve responses to the incidents. This structure gives a guideline to organise the management of incidents during the emergency response. The incident command system has the quality of organising the command procedures as per the needs and requirements of different incidents. The command structure follows a hierarchical framework, which allows an effective command structure at lower and higher management across the structure, for improved and segregated operations at different levels within the CDGC agency of the UAE.

7.4.2 Minimise Random Decision Making and Confusion

Another factor for the incident command system implementation is minimising decision-making confusion. A qualitative analysis of the minimisation of random decision-making and confusion was presented in section 5.4.2.2. The qualitative study found that previously the decision-making process in the command and control structure was fragmented, and multiple officers tend to make their own decisions rather than following a set of protocols and procedures.

According to the quantitative results, no significant effect on the 3 independent variables (CD departments, job position and academic qualifications) was found to exist for this factor (Minimise random decision-making and confusion). The KWt showed that the null hypothesis was retained (See Table 6.14, Table 6.15 and Table 6.16). This showed that the Bronze participants felt the need for clear and joint decision-making in response to emergencies as per the standard protocols and practices. The command structure follows set patterns and procedures for the decision-making process, with the roles and duties assigned to the command and control structure. Therefore, the chances for any uncertainty in the decision-making authority, as well as the decision itself, can be eliminated by following the SOPs.

Regarding the results from the SOPs documentation (CDGC, 2015a), the strategic commanders (Gold Commanders) are responsible for the overall decision-making, whereas the tactical and operational commanders (Silver and Bronze) have to follow the instructions of the strategic command in the case of any emergency. The Gold commanders were required to identify the procedures to be followed for the response, while, the Silver and Bronze commanders are responsible for the process of decision-making at their assigned units and operations. Accordingly, these commanders will utilise their knowledge and understanding, and take help from their exercises and drills, to make better and improved decisions at the level of operations. This allocation of responsibility for decision-making has also eliminated the issue of unauthorised intervention in command, which refers to the activities of a person to complete a mission, and random decision-making at the time of an emergency.

A review of the related literature has focused on the fact that the incident command system helps the commanders in the improvement of decision-making in the case of emergencies (Chlimintza, 2008). There are exercises, trainings and drills within the incident command system, which are provided to the officers to familiarise them with the command structure and help them in making the right decisions. The incident command system also helps in minimising the confusion in decision-making within three hierarchical levels of commanders (Fritz et al., 2013, Coppola, 2015, Cabinet Office, 2013c). It can be seen that the majority of the respondents were of the view that before the implementation of the command structure, there was confusion in the decision-making process, which had caused some serious issues for the command in emergency response.

7.4.3 Avoid Un-authorised Intervention in Command

One important factor highlighted by the qualitative and quantitative respondents was the avoidance of unauthorised intervention in the command process. Mainly the majority of Silver commanders presented this issue and stressed that the incident command system has helped in the avoidance of such interventions. This process of unauthorised intervention was defined as the attitude of the Gold commanders, who enter in the hot zone during an emergency and make decisions at that time (See section 5.4.2.3).

One of the reasons for the implementation of the incident command system in the UAE is an improvement in decision-making and delegation of authority to avoid intervention in command. Time to time drills and exercises are an important part of the incident command and control procedures, which enable the commanders to make an informed and best sought out the decision in the light of prevailing scenarios and situations. The quantitative analysis showed that the null hypothesis was rejected in this factor as shown in Table 6.14, as “Avoid unauthorised intervention in command”, indicating that $\chi^2_{(6)} = 13.082$, $p = .042$. According to the quantitative Bronze commanders, the foremost reason for the implementation of the incident command system was the avoidance of unauthorised intervention in command. These results showed that the commanders at the operational level (Bronze commanders) were highly inclined towards the unauthorised intervention in command in the case of any natural hazard in the UAE.

This observation emphasised the importance of synchronised operations in emergency situations. A major incident can be described as one whose locality, severity of injury and living casualties warrant extraordinary resources (Lowes and Cosgrove, 2016). Once a major incident has been declared, there is a need to execute a multi-service, organised rejoinder that is founded on the key tenets of authority, regulation, wellbeing and communication. The three well-known levels of command are Bronze, Silver and Gold. In emergency happenings involving the coordination of rescue operations, police officers need to coordinate with hospitals in a process that entails triage, treatment and transportation. Another notable problem arises during communication, which is usually hampered by the fear of making unauthorised interventions. However, there was no significant difference between the CD departments in the pairwise comparison. This observation meant that various CD departments had varying levels of perceptions regarding this factor.

The study of related literature has revealed that the common terminologies used in the incident command system can eliminate the issue of confusion in the decision-making process (Pearce and Fortune, 1995, Kirrage et al., 2007). Thus, the incident command system follows the top-down structure to assure the authority and delegation of duties between different levels for an improved and clear decision-making process. According to the reviewed literature, the briefing is an essential practice in the incident command system, and these briefings are coordinated to all commander levels. One of the important benefits of a briefing is ensuring the clarity of roles and responsibilities of the commanders and communication strategies during emergency response activities.

7.4.4 Organise Commander's Roles and Responsibilities

Regarding organising commanders' roles and responsibilities, the qualitative analysis (See section 5.4.2.4) has also revealed that more than one third of the Gold and Silver commanders are now well aware of their roles and responsibilities at the time of an emergency. This organisation is also one of the reasons for the implementation of the incident command system in the UAE.

Moreover, from the quantitative findings, it can be seen that the incident command system has been useful in the understanding of roles and responsibilities. The structure also assists the Bronze commanders in identifying the procedures to be taken in response to any emergency, as the role is assigned to them according to the SOPs. A better understanding of the roles and allocation of duties has minimized uncertainty in the decision-making and reporting process. According to the generated quantitative results, no significant effect on the 3 independent variables (CD departments, job position and academic qualifications) for this factor. The KWt results showed that the null hypothesis was retained (See Table 6.14, Table 6.15 and Table 6.16).

To further support the importance of this factor, according to the SOPs documentations (CDGC, 2015a), the Gold commanders have the responsibility of strategic decision-making; the Silver commanders are assigned the duty of tactic formulation; whereas the operational responsibilities are the duties of the Bronze commanders within the command structure. UK documentations have supported the fact that the delegation of roles and responsibilities for each level of commanders is more clear and channelled and can be easily understood at the time of an emergency (HM Government, 2008, NPIA, 2009a, JESIP, 2012).

The incident command system follows a specified procedure for the delegation of duties and responsibilities, in which the commanders of different hierarchical levels are assigned their specified roles to be performed at the time of any emergency incident. As per the review from the related literature, injuries and / or deaths can be reduced by the delegation of duties and responsibilities within the incident command structure, so that the personnel at each level are well aware of their duties and the extent of their responsibilities at the time of any emergency

(Kirby et al., 2014, Young et al., 2013). This organisation has served as the base for the identification of roles and responsibilities of the commanders in the SOPs. Before the incident command was implemented in the CDGC agency, officers lacked a basic understanding of their roles to be performed in the case of an emergency response. This misunderstanding has caused chaos in the past during the response for an emergency. As command tasks are carried out by personnel in substantial roles, and commanders need to combine their ability to evaluate the situation with decision-making.

7.4.5 Improve Structural Organisation in Emergency

The incident command implementation was also favoured for the improvement of structural organisation in emergency incidents. The qualitative analysis found that two of the participants highlighted the importance of improvement in the structural organisation for effective response during the time of an emergency. The incident command offered a path and guideline for the adoption of change within the organisation to improve the effectiveness of its performance and response activities. Such a change in the structural organisation also faced resistance to change, but this resistance was mainly due to a lack of trust and less understanding of the change management process.

The quantitative findings revealed that the second reason for the implementation of the incident command system highlighted by the Bronze commanders was an improvement in the structural organisation in an emergency. The KWt results showed a null effect for the 3 independent variables (CD departments, job position and academic qualifications) on this factor (Improve structural organisation in emergency). The KWt showed that the null hypothesis was retained, as showed in Table 6.14, Table 6.15 and Table 6.16.

Before the command system, officers lacked the basic understanding of their roles to be performed in the case of an emergency. This misunderstanding has caused chaos in the past during the response to an emergency. Command tasks are carried out by personnel in substantial roles, and thus commanders need to combine their ability to evaluate the situation with decision-making (Young et al., 2013, Alexander, 2008).

As it can be seen, the incident command structure follows a detailed procedure for the delegation of duties and responsibilities, in which the officers of different hierarchical levels are assigned their specified roles to be performed at the time of any emergency (Eyerman and Strom, 2008, Ministry of Defence, 2007). According to the review of the related literature, the injuries can be reduced by a delegation of duties and responsibilities within the incident command system, so that the personnel at each level are well aware of their duties and the extent of their responsibilities at the time of any emergency (Kirby et al., 2014). This organisation has served as the base for the identification of the roles and responsibilities of commanders in the SOPs.

7.4.6 Better Coordination and Communication

It was evident from the qualitative findings that few respondents believed coordination is required within a single agency to improve the flow of information, for better coordination between each level of the structure (See section 5.4.2.6). Moreover, coordination and communication are important for the operations and effectiveness of different agencies. One of the reasons to implement the incident command system was an enhancement of coordination among the three levels of commanders.

likewise, this is supported by the quantitative analysis, as the KWt scores did not show any significant difference between the CD departments and factor (Better communication and coordination across commander levels). This is also supported by the quantitative analysis as the KWt scores showed a significant difference between academic qualification and this factor. The null hypothesis was rejected (See Table 6.16). The quantitative analysis showed that the null hypothesis was rejected in this factor indicating that $\chi^2_{(4)}$ = 12.579, p= .014. The implementation domain and academic qualification can be explained by the impact of education on communication skills. Technical systems that place a lot of emphasis on safety require efficient communication and harmonisation of their operations. Advanced training exposes respondents to various examples of emergency scenarios through simulations (Young et al., 2013), which is conspicuously absent in conventional high school education. Therefore, it is expected that an individual with an advanced level of training will be better placed to coordinate rescue operations and communicate effectively to team members. In the pairwise comparison, the significant difference noted between higher diploma and high school education was attributed to the knowledge gap that was bridged by attaining a higher diploma as opposed to having a high school education. This observation implies that being educated to higher diploma level enhances an individual's communication and synchronisation skills thus making them more efficient leaders or commanders.

According to the review of related literature, it can be seen that one of the reasons for the implementation of the incident command system is an improvement in the communication and coordination among the officers and different units of the structure (NPIA, 2009a). Coordination has been identified as a factoring problem in emergency response (Kusumasari et al., 2010, Flin et al., 2008, Alexander, 2008). As the exchange of information between commanders' levels plays an essential part in effective communication during the task. Notably, coordination can affect teamwork, and if it is inadequate it can cause failures in communication and increase conflicts.

In terms of communication management tools, the results from the literature review and the qualitative analysis have revealed that the majority of the participants have identified the Terrestrial trunked radio (TETRA) wireless system. Whereas, some other modes such as wired and face to face communication have also been identified as communication management tools during the response to an incident (Ghafoor et al., 2014). The TETRA system is personal mobile technology, which is most commonly available in the market for the purpose of response activities. Some of the advantages of TETRA technologies are high spectral efficiency, fast calling setup, and flexibility for one to one communication, as well as one to many and many to many (Fragkiadakis et al., 2011, Mikulic and Modlic, 2008, Yarali et al., 2009). Significantly, all of the Gold and Silver commanders highlighted the use and benefits of the TETRA wireless system as their communication method during an emergency incident. The clear communication can enhance the effectiveness of response at the time of any emergency incident, as discussed in section 5.4.2.6.

Communication through radio and phone is more suitable at the time of emergencies, to improve the coordination of response activities (Steigenberger, 2016). Nevertheless, there are many other forms of communication, which have been mentioned by some of the participants, such as face to face, office meetings, and video conferences. One of the most interesting modes of communication pointed out by the SFA was the visual cues provided by coloured T-shirts, uniforms or surcoat. Consequently, these T-shirts and surcoats can serve as an unnotified means of communication during the time of an emergency. The surcoat strategy has been used in many emergency scenarios and it is a very effective and purposive method of properly communicating a desired meaning through visual cues. However, in order to properly communicate through visual cues, both the sender and receiver should be aware of them in order for it to work effectively.

The literature emphasised that the command and control structure can serve as a helpful tool in improving coordination due to an increase in the frequency of communication between the three levels of commanders.

7.4.7 Best Practices of SOPs

One more implementation factor highlighted by the participants of the qualitative and quantitative study was the identification and formulation of the best practice procedures of the SOPs to be followed at the time of an emergency for better and improved response. The interviewees' opinions indicated that the formulation and identification of the SOPs had helped the authorities in creating awareness about the responsiveness for emergency incidents among the department personnel. These documents identified by the CDGC agency are based on internationally adopted best practices for emergency response (See section 5.4.2.5).

The quantitative findings contradict with the qualitative results, which revealed that the non-parametric test results showed no difference between the 3 independent variables (CD departments, job position and academic qualifications) on this factor. The KWt showed that the null hypothesis was retained (See Table 6.14, Table 6.15 and Table 6.16).

This factor was also supported by UK documentations (Cabinet Office, 2013c) that revealed the command system is one of the best practices for emergency and major incident response (Anderson and Adey, 2012). The literature review pointed out the importance of SOPs to be adopted systematically in response to any emergency incident. As emergency plans and procedures are used by organisations to perform efficiently with other emergency agencies (Moynihan, 2009). The CDGC agency in the UAE has adopted the command structure to handle the occurrence of disasters and emergencies. This command structure follows international best practices. The agency is responsible for improving responses towards emergencies and the assignment of roles and responsibilities to commanders in different types of emergency incidents.

In order to eliminate the uncertainty of command at the time of an emergency, there is a need for standardised actions in specific situations. Therefore, the SOPs were formulated because they can help officers in understanding operations and their duties. The standardised guidelines and procedures can assist an individual at the time of an emergency and in this way, risk of error can be reduced by following these procedures (Goodman et al., 2011). Furthermore, at the time of certain events, it has been reported that there remains uncertainty about the actions to be taken and what should be done to minimize the loss (Christensen and Painter, 2004). In agreement with this, the SOPs provide guiding checklists, which are important for emergency preparedness. Hence, it can be said that the formulation of the SOPs is the first step towards an emergency response process (Alexander, 2015).

7.4.8 Minimise Negative Outcomes

One of the factors highlighted by the qualitative as well as quantitative respondents was the minimisation of negative outcomes from an emergency. In any emergency, the authorities tend to minimise the losses by improving the response times and procedures. As per the findings of the qualitative analysis, the expected reduction in the losses is the last important reason for the implementation of the command structure in the CDGC agency, as discussed in section 5.4.2.8.

Two of interviewees (one Gold/one Silver) highlighted the reason of reduction in losses of lives and properties at the time of different types of hazards and emergencies for the safety and security of the population of the country. According to the quantitative Bronze commanders, the last reason for the implementation of the incident command was the minimisation of negative outcomes. These results showed that the commanders at the operational level (Bronze commanders) were highly inclined towards the reduction of losses of lives and properties in case of any natural hazard in the UAE. However, the KWt obtained results revealed that there was no significant effect on the 3 independent variables (CD departments, job position and academic qualifications) of this factor (Minimise negative outcomes). The KWt results indicated that the null hypothesis was retained (See Table 6.14, Table 6.15 and Table 6.16).

As per the review of related literature, the main purpose of any type of response structure for emergency incidents is the minimisation of losses (Jackson et al., 2010, Alexander, 2008). No country of the world can afford the heavy losses either due to natural disasters or human interventions.

7.5 UAE Emergency Response Levels

The qualitative analysis has also identified three activation levels of the incident command system, and the emergency response process for these three levels is activated or triggered by their specified authorities. These activation levels were: Local, Regional, and National. This section and the subsequent section, which is levels of command, were supported by only the qualitative analysis (See section 5.4.3), documentation and the literature review. This is because after conducting the first qualitative data collection phase, and before designing the second quantitative data collection phase, during the pilot study of the survey, the removal of the second quantitative section from the survey was recommended. This was due to the scope of the aim and objectives of this study, which is basically focusing on building a framework. Nevertheless, the literature review and documentation indicate the importance of this section having a much better explanation.

As per the responses of the qualitative respondents, the governing body responsible for emergency response at the national level is the NCEMA, and at the regional level the MOI is responsible for the task of emergency response activities. Whereas, the CDGC agency regulates the emergency response tasks at the local level of any incident (See section 5.4.3). Thus, in light of the literature and qualitative analysis, the levels can be categorised as:

1. Level 1: National Emergency Crisis and Disasters Management Authority (NCEMA) at National level;
2. Level 2: Ministry of Interior (MOI) at Regional level;
3. Level 3: Civil Defence General Command (CDGC) at Local level.

At level 1, the hazards or disasters at the national level are dealt with by the assistance of the NCEMA. While the national response level requires intervention from the NCEMA and other stakeholders. Whereas the CDGC is the leading agency in emergency response operations and the other multi-agencies such as the police and ambulance services support it (NCEMA, 2014a), as discussed in section 5.4.3.3.

Many scenarios of emergency can be witnessed in the UAE. Some incidents remain limited to the local level, while some spread over the other emirates, whereas some hazards, can be seen at the country level. The extent of an incident determines the extent of response level. Therefore, it can be argued that the literature has helped in the identification and categorisation of three different levels for emergency response process. These levels are local, regional and national (NPIA, 2009a, Baliga et al., 2012).

Furthermore, the literature review has revealed that the NCEMA is the authority created at the national level to regulate the efforts and procedures adopted in the incident command system, to achieve the pre-defined national objectives and targets for emergency response effectiveness (NCEMA, 2014a, Alaajel, 2005). The NCEMA assigns different roles and responsibilities to different departments under its supervision, and it also organises the efforts of stakeholders in the effective implementation of the incident command system for better and improved response in the case of any hazard or disastrous situations in the country.

Regarding the MOI responsibilities, the qualitative analysis revealed that the majority of its employees are police officers, but they differ in roles and responsibilities to be performed at the time of emergency response within the incident command system. Moreover, this is supported by the literature review, which has revealed that the MOI is responsible for initiating the emergency response at Level 2 (regional level). Some incidents spread from the local level to the regional level and the consequences of these incidents become the responsibility of the MOI. According to the literature review, the MOI is responsible for providing security, peace, and stability to all citizens and residents of the UAE (MOI, 2016a). The MOI supervises the CDGC agencies of each of the seven states and plays an essential role in emergency and disaster response management (Alaajel, 2005).

Regarding the CDGC responsibilities, the activation level of the incident command system at Level 3 or local or inside a single state, is monitored under its supervision. Simple and non-radical incidents are treated under the CDGC agency, but the responses towards the incidents vary according to the intensity and type of incident. The CDGC is the most vital directorate of the MOI, and its main purpose is the protection of lives and properties of the residents of the UAE (Dhanhani, 2010). In any emergency, it is responsible for managing the response and safeguarding the lives, properties, and interests of people as much as possible (GDCD-D, 2015). As aforementioned, it is considered the leading agency in emergency response operations and other agencies like the police and ambulance services fall under its supervision, and support its operations (NCEMA, 2014a), as discussed in section 5.4.3.1.

7.5.1 Levels of Command

The qualitative study has revealed that all the participants easily identified the three levels of command, which mean that they have a good understanding and knowledge of command in the incident command system. The levels of command can be distinguished on the basis of their roles and responsibilities performed by the incident command system in an emergency (See Table 5.3 and sections 5.4.4.1, 5.4.4.2, and 5.4.4.3).

This was also supported by the review of the literature and the results of the qualitative analysis, which have revealed that there are three levels of command namely; Gold, Silver, and Bronze. These levels of command were presented in detail, sections 3.3.1.1, 3.3.1.2, and 3.3.1.3 in chapter 3 (Cabinet Office, 2013c, Groenendaal et al., 2013, Ramchurn et al., 2015). These levels of command have been identified in the SOPs with their specific goals and duties to be performed in the case of any emergency. The Gold level is associated with strategic level;

Silver for tactical and Bronze for the operational level. The incident command structure is also termed as a strategic, tactical, and operational structure.

Furthermore, according to the SOPs (CDGC, 2015a, CDGC, 2015b), the Bronze commanders have to perform their duty in the field, while the Silver commanders regulate the operations from mobile operational rooms and the Gold commanders make decisions from the directorate operational room. The Gold command follows strategic decision-making responsibility by civil defence officers, who have been nominated as the commander of a strategic role. The major general and strategic heads of the civil defence are members of the gold command. The Silver command is nominated for the tactical command and is normally operational majors and senior managers of the civil defence. The basic role of the tactical command is to formulate tactical plans which can be adopted to achieve the strategic objectives. It can be argued that the Bronze command is the provision of operational response in an incident closest to the scene and control of the resources of their respective services, within a specific area of the incident.

The literature and qualitative analysis have revealed that the participants identified the command levels as per their location during an emergency. Three locations have been identified for three command levels during the time of an emergency, which are a cold zone for the gold level, a warm zone for the silver level and a hot zone for the bronze level (Arbuthnot, 2008, Mishra et al., 2015, Kirby et al., 2014, Andrew, 2012, HM Government, 2008). In other words, it also means that the Bronze commanders are the first responders, who have to handle any emergency by performing the duty of personal presence at the time of it.

7.6 Section 2: Impact of Organisational Factors

The Gold, Silver commanders and SFA were assessed for their knowledge and perception about the factors influencing the implementation of the incident command system in the CDGC agency through the qualitative tool of interview protocol (See section 5.6 and Table 5.4). While the Bronze commanders were cross-examined with the help of the quantitative tool of the questionnaire (See Table 6.5). All of the participants (Gold, Silver, SFA and Bronze) identified the key fundamental factors as per their perceptions, understanding, and personal experiences.

Many research studies have also identified some important factors, which can be considered as barriers to the effective and successful implementation of the incident command system.

The participants identified a variety of key organisational factors, which are influencing the implementation of the incident command system. Also, a review of the related literature also identified influential factors at the organisational level. The importance of each factor depends upon the understanding of the participant, in respect to the effect on the implementation of the incident command system as per their experience and knowledge. All of the participants (Gold, Silver, SFA and Bronze) identified the following organisational factors, which have had an impact on the successful implementation of the incident command system in the CDGC agency. Thus, all organisational factors in this section are sequenced according to their qualitative analysis and quantitative KWt results.

7.6.1 Commanders' Nomination Standards

Another important organisational factor indicated by the Gold, Silver and Bronze commanders is commander nomination standards, which are based on the job position, experience/length of service, and rank. Nominations basically relate to the designation characteristics of the Gold, Silver and Bronze categorisation of commanders.

The findings of the qualitative analysis identified three bases for the nomination standards, which are job position and experience, duration of service, and rank. The evidence from the qualitative findings revealed that a recommendation from the MOI is considered as the most important nomination standard for the appointment and allocation of jobs within the incident command system. The MOI recommends the nominations of Gold commanders, who select their teams of Silver and Bronze commanders. Recommendation of Gold commanders is mainly based on their job description.

However, as evidenced by the qualitative results, the nomination of the Gold commanders on the bases of job position, important factors and aspects of experience and skills in the related field, are being ignored by the MOI, whereas, in the views of the qualitative respondents these factors should be considered during the nomination procedure.

Another factor for nomination is experience and duration of service. Some of the qualitative participants were of the view that related experience and length of service are also considered when nominating a commander for a position. Nonetheless, some interviewees declared that experience for the related job is not as important for the selection of a commander, instead knowledge, field experience, and length of service are more important.

The third factor indicated by some of the interviewees for the nomination standard is rank. For instance, G05 reported that the nomination of Silver commanders is mostly associated with their rank. Additionally, most of the Gold commanders nominated by the MOI are from Colonel or above rank, and Silver commanders are from Major to Lieutenant Colonel Rank, although one of the Gold commanders was against the association of rank with nomination standard.

By concluding the qualitative findings, it can be observed that most of the Gold and Silver participants considered the factor of job position as a determinant for nomination standards by the MOI. Whereas, a few of the participants gave the view that experience and length of service are of given importance when nominating the commander. While very few interviewees were of the perception that rank plays an important role during the nomination process of the Gold commander for the incident command system (See section 5.6.2).

According to the findings of the quantitative analysis, there was a significant difference between the academic qualification on this factor (Commanders' nomination is based on job position, rank and experience), $\chi^2_{(6)}$ = 13.621, p = .009. The KWt showed that the null hypothesis was rejected (See Table 6.19). The significant difference between the first level of organisational factor 1 (commanders' nomination is based on job position, ranks and experiences) and academic qualification can be explained by the relationship between education level and leadership skills. Leadership has advanced because of alterations in demographics, economic progress, know-how and work procedures. Studies have been done to show the impact of leadership on organisational functioning, the effect of different leadership approaches on organisational culture, efficiency of employees, retention, enthusiasm and satisfaction in institutions (Alonderiene and Majauskaite, 2016). Incident command systems are tasked with dynamic risk assessment. Therefore, the training of commanders in high-risk domains often encompasses this attribute. In a study conducted by Okoli et al. (2016), the problem strategies used by 16 firefighters were compared using the critical decision method. It was observed that dynamic risk assessment was not just a matter of weighing the possible risk of a certain decision against its benefits. Other crucial factors came into play, for example, the level of education of the firefighter, their experience and pattern recognition process. Furthermore, individuals tended to advance in ranks based on their level of education and work experience. Therefore, the observed phenomenon corroborated what is common in many other settings.

Furthermore, the evidence from the literature tends to support the qualitative findings for the selection of commanders based on their characteristics. Emergency response management requires a set of complex skills and deep understanding. Therefore, the selection of human resources should be considered an important aspect of investment, while implementing the command and control system (Quero, 2012). Several studies are compatible with these findings. It has been claimed that an emergency commander should be nominated as per the highest characteristics, which enable the commander to manage and operate the emergencies with flexibility and creativity (Coppola, 2015, Devitt and Borodzicz, 2008).

However, the researcher argues that commander nomination standards must be built based on the level of qualification regulations in the UK. It appears from conducting both the qualitative and quantitative data collection that the participants are not aware that there is a regulation for commander grading that must be followed. This argument is supported by the literature review, as according to Lamb et al. (2014), the grading and nomination of commanders should be based on the Office of Qualifications and Examination Regulations in the UK, that has categorised four levels of command qualifications. Thus, to improve commander experiences in applying the incident command system, their grading must be built on the UK qualification and examination regulations. In this case, the commander has an opportunity to enrol on one of the four levels of qualifications. However, this approach needs an arrangement between the MOI, the CDGC agency and the Office of Qualifications and Examination Regulations in the UK.

7.6.2 Training and Exercising

An organisational factor highlighted in the review of the literature and in the qualitative and quantitative findings is training and exercising. This factor was categorised from both the qualitative and quantitative findings, as an important factor for the implementation of the command structure in the UAE.

The qualitative findings of this study also supported the literature review, with regards to training and exercising being the most crucial factor for the successful implementation of the command system, in any country. Most of the participants termed the training and exercise factor as a basic requirement of the incident structure. The basic requirements and factors which should be considered are ongoing training of the incident command and training on similar possible scenarios. As training and exercising can provide the commanders with necessary tools and techniques for the successful running of the structure in any situation, most of the interviewees highlighted the importance of training at all three commanding levels within the organisation. They argued that ongoing training programmes updated as per the needs of the time should be available for all the Gold, Silver and Bronze commanders (See section 5.6.1).

This was also evidenced from the quantitative findings, which revealed that the organisational factor of training and exercising at different levels of command for the improvement of professional capabilities and knowledge has the highest value of ranking by the Bronze commanders. The KWt results revealed that there was an effect on the academic qualifications of this factor (Training and exercising at different levels of command), $\chi^2_{(6)} = 13.157$, $p = .011$. The KWt showed that the null hypothesis was rejected (See Table 6.19). The significance between factor 2 (training and exercising at different levels of command) and education level is corroborated by the findings of Mossel et al. (2017). Effective training in incident command entails simulating potential disasters and empowering each member of the incident command to respond appropriately. In a study involving virtual reality training systems for disaster preparedness, about 45 soldiers were asked to simulate various scenarios (Mossel et al., 2017). Members of each command level were expected to complete specific tasks to solve the key mission task. Such an approach made it possible to target decision makers at different levels of command.

As it was evidenced from the literature, it is the most important requirement for the effective and successful implementation of the incident structure in any country of the world, with the quality of the response to emergency efforts associated with the commander's knowledge, skills, and abilities to put them into practice in a range of emergencies. With the emergency training of the commander focused on developing the capacity to respond as per the demands during a disaster (McEntire and Myers, 2004).

Additionally, many studies have been conducted in different areas of the world to identify individual and organisational training requirements for the improvement of emergency response during the time of a disaster or hazard. However, there has been little written about the training of leaders and commanders when they manage incidents (Salmon et al., 2011). Almost every country of the world has identified the basic goals of emergency response, which are saving lives, protecting property and maintaining public services. However, due to the differences between available resources and the types of threats faced, it is a challenge to formulate a standardised set of training requirements for commanders (Wilson and Gosiewska, 2014). Furthermore, Lamb et al. (2014) note that when the emergency commanders have to make a suitable decision, they visualise the situation to what they have learned from experiences, training or previous emergencies and act accordingly. Therefore, it can be argued that an effective command of the incident hierarchy structure is based on the existence of training, exercises, and experience.

7.6.3 Logistic and Financial Support

Another organisational factor highlighted during the analysis of the qualitative and quantitative data, as well as the literature review, is the availability of logistics and financial support for the best implementation of the incident command structure.

The qualitative findings clearly indicate the influence of logistics and financial support on the incident command implementation. According to the qualitative findings, the interviewees also identified the need and importance of resource management, particularly logistics and financial support. In the views of interviewees, logistics refers to the vehicles and machinery used to carry out emergency response activities (See section 5.6.3). Under the logistics and financial support, some specified materials and equipment are provided to the emergency unit, which can be deemed as a necessity for improved response.

According to the quantitative findings, the KWt results showed that there was no effect of the 3 independent factors on this factor (Logistic and financial support). The KWt showed that the null hypothesis was retained. These findings concluded that logistics and financial support, mainly considered as vehicles, machinery, tools, and equipment, are an important organisational factor, which has an impact on the implementation of the incident structure (See Table 6.17).

The previous results are also supported by the literature, as logistics and financial support are sub categories of resource management. In the UK's command and control structure, the vehicle units are termed as 'Forward Command Vehicles' or 'Mobile Incident Command Units' and they are normally engaged by Silver commanders at the time of an incident playing the part of command centres for the purpose of information sharing (Allen et al., 2014). It is critical to provide needed resources on time to reduce the impact of hazards (Arora et al., 2010). These resources can be medical services, logistics and equipment, shelter and financial support, to carry out the emergency response activities (Perry, 2003, Moeller, 2006).

7.6.4 Having Structure Experts

The fourth important organisational factor identified in the review of the qualitative and quantitative analysis, is the availability of the command system experts within the organisation to improve the response operations carried out under the command structure.

According to the findings of the qualitative analysis, the minority of the Gold and Silver participants gave the view that there is a lack of structure experts in the organisation, which is the cause of problems regarding the effectiveness of training programs. Also, the participants highlighted the need for training in the context of the UAE and argued the importance of structure experts to impart the training to new commanders. It was also evidenced that the resignation and retirement of experts have created a gap in the departments, which is affecting the sustainability of the structure in different subdivisions and in the organisation as a whole, as discussed in section 5.6.4.

Moreover, this is supported by the findings of the quantitative analysis, and the organisational factor of having structure experts in the organisation and departments for the improvement of performance, which was ranked as 4^{th} and as high priority. The KWt results revealed that there was no effect of the 3 independent factors on this factor (Having model experts). The KWt showed that the null hypothesis was retained (See Table 6.17).

The qualitative findings are supported by the literature review, which has indicated that emergency management experts play an important role in the development of training programmes and continuous evaluation of the response activities. An expert is a person who knows what needs to be done based on experiences and processing that experience for understanding (Rake and Njå, 2009). The Office of Qualifications and Examination Regulations in the UK has approved four levels of command qualifications for an individual to be termed as an expert commander (See section 3.7.3) (Lamb et al., 2014). Regarding the experience; ten years of experience has been identified in some studies as sufficient to term someone an expert (Van Den Heuvel et al., 2012). It can be argued that, although the commanders have little experience in applying the command structure, which is still relatively new, it has not been evidenced that the CDGC agency applies the four levels of command qualifications. According to the literature, it is important to categorise commander levels based on UK regulations. Therefore, this qualification regulation must be a condition for the expert nomination.

7.6.5 Rigorous Regulations

The review of the literature and analysis identified the importance of rigorous regulations as an organisational factor, which can impact on the successful implementation of the incident command system.

The qualitative analysis showed that few of the Silver commanders argued about the importance of rigorous regulations for the successful application of the incident command system, as well as setting examples for future references. The majority of the Silver commanders have indicated that these regulations are applied in CD2 and there should be enforcement of penalties in the case of noncompliance of the incident command system. Moreover, the views of the participants emphasised a regular review of the roles at the organisational level, to access the evolution and performance of individuals, departments, and the whole organisation (See section 5.6.5).

According to the findings of the quantitative analysis, the KWt results revealed a significant effect on the CD departments of this factor (Rigorous regulation of incident command system), $\chi^2_{(6)} = 18.307$, $p = .006$, and the null hypothesis was rejected for this factor. This means that rigorous regulations and evaluations of the incident command system have a high degree of impact on the successful implementation of the command structure in the CDGC agency (See Table 6.17).

The significant difference between factor 5 of organisational factors versus the CD departments meant that the CD departments laid emphasis on the incident command system by setting up a comprehensible disaster response approach. This decision is usually informed by unrelenting natural calamities, intentional threats, epidemics and human suffering due to conflict situations that demand rapid and efficient response standards. In the recent past, it has become apparent that efforts to address disasters require a logical disaster response method and organisational arrangements that are based on combining efforts across various organisations. In the study conducted by Khorram-Manesh et al. (2015), the lack of standardisation was frequently underscored as a serious shortcoming in existing disaster training methods. Other obvious problems included communication breakdown and disparities in the control and command levels. Furthermore, the significant pairwise comparison between CD1 and CD6 implied that the two departments differed in their regulation of the incident command.

In addition, the KWt results revealed a significant effect on the job position of this factor, $\chi^2_{(6)} = 13.126$, $p = .041$, and the null hypothesis was rejected for this factor (see Table 6.18). The significant difference between organisational factor 5 (rigorous regulations of incident command system) and job position could be linked to the conventional organisational structure of the incident command system. The GBS system has three ranks: Gold (strategic), Silver (tactical) and Bronze (operational). In a police department, these three levels correspond to different job positions. Employees at each level are aware of their duties and responsibilities as well as the chain of command that determines who they report to. This natural status quo explains why there was a significant relationship between factor 5 and job position. In the pairwise comparison for factor 5, the observed difference between the section manager and station manager was due to the lack of a clear distinction of roles between the job positions.

This was also supported by the literature review, where it has been observed that the application of the incident command system can be improved and enhanced by applying rigorous regulations and the enforcement of required rules by the commanders at the time of incidents. One way of achieving this is by enforcing the SOPs be followed by each and every commander of every unit and for the evaluation of roles and responsibilities to cater for the emergency response activities. According to Coppola (2015), emergency commanders must follow emergency plans or SOPs to identify their extent of responsibility and in the case of failure, there must be procedures and regulations to evaluate the consequences faced by the commander in failing to comply with the authorised SOPs.

From the previous discussion, it can be argued that standardised manuals are adopted all over the world for emergency response management, to identify the roles and responsibilities of personnel and make provisions for the evaluation of any errors at the time of the incident. Standard prevention approaches are beneficial to decrease the amount of errors and reduce the amount of information that individuals have to process. Therefore, it can be established from the results that in the CDGC agency, the enforcement of penalties to evaluate commander performance when they are implementing the incident command system do not exist.

7.6.6 Systematic Commanders Grading

Another factor which has emerged under the umbrella of organisational factors is commander grading. It has been identified in various studies that there should be a systematic grading of commanders as per their roles and responsibilities.

The qualitative analysis reveals that one interviewee (Silver commander), was of the view that the systematic grading of commanders is essential for the effective and smooth functioning of all operations within the incident command system. This systematic grading can enable all three levels of commanders to exercise all the roles and make themselves aware of the different needs at different levels, in different situations, as discussed in section 5.6.6.

The quantitative findings highlighted that the systematic grading of commanders is another important organisational factor as per the perception and knowledge of the Bronze commanders. The KWt results revealed that the job position affected this factor, $\chi^2_{(6)}$ =13.684, p =.033. The KWt showed that the null hypothesis was rejected (See Table 6.18). These findings indicate that the systematic grading of commanders could have a significant influence and impact on the successful implementation of the incident command system. the observed significance between factor 6 (systematically grading level of commanders) and job position was attributed to the duties and responsibilities of incident commanders in a GBS system. The Gold commanders are in control of their organisations' resources. They are not on site but are located at distant control rooms where they devise strategies of handling the pending incident. In cases where Gold Commanders are in different places, they ensure continuity of information through constant communication with each other. These commanders also meet at regular intervals to discuss and put together policies and operating procedures. During these meetings, they also strategise how they will coordinate their activities. In the scenario under investigation, this position can be likened to the branch, station and section managers. On the other hand, the Silver commander is the highest-ranking member of the institution at the scene of an incident. This officer is responsible for the utilisation of available resources to attain the strategic goals of the Gold commander. They also make decisions regarding specific approaches to be employed. The Silver commander is equivalent to the duty officer and shift chief. The Bronze commander works directly with the Silver leaders of other groups at the scene of the incident. Their operations occur in specific command vehicles or temporary command chambers. However, they do not handle the incident directly but manage the institution's resources at the scene in conjunction with other staff members who may be present. In instances where an incident is spread over a big physical area or different geographical locations, several Bronze commanders can take charge of different areas. Complicated incidents may compel a number of Bronze commanders to share duties or obligations. In the first phases of an incident, the first person to reach the site takes up the functions of Silver or Bronze commander while waiting to be released by someone with a more senior position. This position can be assumed by the firefighter.

Within an organisation a systematic grading of the commanders guarantees that all are functional in their own role, as well as the roles of other commanders. Thus, it can help in gaining more knowledge and experience about different operations at the time of incidents, which can subsequently help in the decision-making process.

7.7 Section 3: Impact of Individual Factors

A review of the literature and views of the participants (Gold, Silver, SFA and Bronze) identified some of the individual factors, which can have an impact on the successful implementation of the incident command structure in the CDGC agency. These individual factors depend upon the individual characteristics and understanding of the incident command structure by the participants. The CDGC agency has adopted the incident command system, and the individual factors are identified by the evaluation of field work. The literature has emphasised that these individual factors impact the commanders' abilities during emergency response. The following individual factors emerged during the studies, which could ultimately lead to successful implementation.

7.7.1 Improvement of Knowledge and Experience

According to the findings of the qualitative analysis, all of the participants emphasised the importance of knowledge and experience for the identification of roles and responsibilities, as well as for successful operations within the incident command structure. Knowledge about the incident command system is mainly concerned with the understanding of its components and their functions. Most of the Gold and Silver commanders rank knowledge and experience as the first most important individual factor for the successful implementation of the incident command system (See section 5.7.1). There has been diversity in the views of the participants regarding the current state of organisation in respect to experience. Most of the participants who have perceived that there is adequate commander knowledge about the incident command system and their roles and responsibilities, were of the view that there is also adequacy of experience in the organisation. While the participants who differed in opinion with regards to the adequacy of knowledge factor also indicated an inadequacy of experience.

Some of the commanders were of the view that the knowledge competency of the commanders in the organisation is up to the mark and all of the commanders are well aware of the incident command system and its components. While, some of the participants gave their perception that there is a lack of knowledge, which is affecting the continuity of the incident command system. Consequently, it can be concluded that there is an agreement in the importance of knowledge and experience as an important individual factor in the successful implementation of the incident command system. However, there is a difference in opinions about the current state of knowledge within the organisation.

The findings of the quantitative analysis revealed that the Bronze commanders ranked this individual factor high in their priority list, which defines the importance of this factor for the success of the command structure. It was observed that there was no significant difference between the 3 independent variables (CD departments, job position and academic qualification) for this factor (improvement of knowledge and experience). The KWt showed that the null hypothesis was retained (See Table 6.20, Table 6.21 and Table 6.22)

An important individual factor, which was identified in the literature review and analysis is knowledge and experience to understand roles and responsibilities. Every commander at every structural level should be aware of the roles and responsibilities displayed in the response phase. Particularly as the Gold commanders are responsible for the determination of the strategy and plan and observation of the overall command of the emergency (HM Government, 2008). This determination of the strategy plans by the Gold commanders depends upon the knowledge of skills training and the experience of commanders in related fields. Moreover, the Silver commanders have the responsibility for tactical operations such as appointing Bronze commanders and achieving strategic objectives set by the Gold commanders. This is carried out by making a tactical plan, collecting and sharing information, evaluating the sufficiency of resources, and maintaining effective communication with other Silver and Bronze commanders. While the Bronze commanders have responsibility for carrying out functional or geographical responsibilities related to the Silver's tactical plan (NPIA, 2009a). According to Mishra (2014) in incident response operations, if the commander has more experience, then mental ability can be used to predict what could happen and what needs to be done. For instance, a lack of experience between commanders was identified in a case study on the police force responding to terrorist attacks in Norway/Oslo.

Consequently, it can be argued from the above discussion that the experience of a commander is given as much importance as knowledge and skills. This is why higher the hierarchal ranks of the incident command structure should have the requirement of experience along with knowledge and qualification.

7.7.2 Training and Exercising

The qualitative analysis revealed that the majority of participants emphasised appropriate training, along with skills and knowledge. Training is not only important for any specific structural level in the incident command system for a commander, but also as a process that should begin at the earliest stage for all levels, for development of the necessary skills.

Concerning the qualitative results, some of the participants highlighted the variances of training opportunities, in different departments of the organisation. A comparison of the participants' experiences indicated that some of the departments have enough training experts, while there is a lack of training process and experts in other departments (See section 5.7.2). Therefore, there should be a standardised training process at the national level with benchmark training at international level to adopt the international best practices for the improvement of emergency response.

Consequently, the quantitative analysis revealed that the individual factor of training and exercising to improve professional capabilities shows up no significant. The obtained KWt results revealed that there was no significant effect of the 3 independent variables (CD departments, job position and academic qualification) on this factor (Training and exercising is needed to improve professional capabilities). The KWt showed that the null hypothesis was retained (See Table 6.20, Table 6.21 and Table 6.22).

The individual factor highlighted from the previous studies and in the findings of analysis was training and exercising to improve the professional capabilities of the commanders. This is supported by the review of the literature, as training is defined as knowledge, skills and attitudes for emergency services, in order to enhance the capabilities for response towards emergencies and disasters (Wilson and Gosiewska, 2014). Different studies have identified diverse problems in the field of training, such as a lack of support and awareness among participants (Nazli et al., 2014, Sharma et al., 2015). It can be argued that there are difficulties in designing perfect training programmes for emergencies because the training programmes depend upon the context of a country, availability of resources, the type of hazard, and the objectives of the response system. Notably, training and exercise cannot be considered as a one-time course, so there must be continuity and progression in training courses, as well as exercises and drills conducted for a specific situation.

7.7.3 Individual Characteristics

The fifth important individual factor highlighted during the study is the individual characteristics of commanders within the incident command structure. A significant number of the Gold and Silver commanders identified some of the important characteristics, which are important for the commanders to be in the command structure and play an effective role during emergency response situations. Some of these command and control characteristics are self-confidence, leadership skills, bravery, the ability to work under pressure, and discipline to follow the incident command structure framework (See section 5.7.3). Hence it can be concluded that the specific personality traits of a commander can affect his performance because these individual characteristics are associated with the capacity of the commander for command and control activities.

This is contradicts with the quantitative findings, which indicate that the Bronze commanders of the incident command structure also identified the importance of individual characteristics, such as self-confidence, leadership skills, bravery, the ability to work under pressure and discipline. The obtained KWt results revealed that there was no effect of the 3 independent variables (CD departments, job position and academic qualification) on this factor (Individual characteristics self-confidence, discipline, desire, can work under pressure. The KWt showed that the null hypothesis was retained (See Table 6.20, Table 6.21 and Table 6.22). Overall, the Bronze participants emphasised the importance of individual characteristics, which are related to the command and control activities of the commanders, for the successful implementation of the incident command structure and improved performance within the organisation.

In addition, based on the literature review, it has been proven in studies that every individual has some specialised characteristics (Paton and Flin, 1999). Some of these characteristics are inherited and some are attained over a period of time through knowledge and experience. The individual characteristics of a commander can influence performance and commanding skills, which will subsequently impact on the effectiveness of response activities at the emergency incident.

7.7.4 Coordination and Information Sharing

The sixth important individual factor is communication and information sharing for awareness and an improved decision-making process. As per the qualitative analysis, one third of the participants highlighted the importance of information sharing for the Silver level commanders. According to their perceptions, coordination and information sharing skills are as important as any other skill within the command structure. As ineffective communication and delays in information sharing can cause problems in the continuity of response activities, as discussed in section 5.7.4.

The quantitative findings of the analysis have indicated that the Bronze commanders also supported the fact that coordination and information sharing by the commanders is an important individual skill, which can influence the success of the command structure. The gained KWt results showed that there was no effect of the 3 independent variables (CD departments, job position and academic qualification) on this factor (Coordination and information sharing). The KWt also showed that the null hypothesis was retained (See Table 6.20, Table 6.21 and Table 6.22).

This is supported by the literature review, which indicates that good information sharing and coordination is considered as a crucial element for the effective response to an emergency, whereas, difficulties and a delay in information sharing can create major issues in the emergency response activities. According to Paton and Flin (1999) a need for additional information can cause a delay in response at the time of emergency. In order to maintain a cooperative environment within an organisation, the sharing of information is the most important aspect in this regard. One example of a situation when coordination between incident commanders was lacking, is in Sweden where the multi emergency services responded to an incident on the 31st of July 2014, when one of the largest wildfires in 40 years broke out on its border. As the chain of command and who was in charge was unclear, the mismanagement of the incident carried on for a few days, until a highly experienced incident commander was assigned by the administrative board (Bergström et al., 2016). Many of the studies have identified coordination as the most important problem in emergency response. The individual skills of commanders related to information sharing and coordination can play a vital role in the success of the incident command system and the smooth operations of different departments.

7.7.5 Decision Making

The fourth individual factor that has emerged during the analysis of the participants is the decision-making process. One third of the participants of the incident command structure highlighted the skill of decision-making as a key individual factor, which plays an important role at the time of emergency incidents. The decision-making skills of the commanders are built upon the support of knowledge, experience, and self-confidence. Participants also related decision-making skills with good situational awareness and individual characteristics, such as self-confidence, bravery to handle the incidents, and the ability to work under immense pressures, as discussed in section 5.7.5.

Bronze commanders identified the need for promptness and speed in decision-making at the time of emergency incidents. The KWt results showed that the 3 independent variables (CD departments, job position and academic qualification) were not affected by this factor (Effective decision making). The KWt showed that the null hypothesis was retained (See Table 6.20, Table 6.21 and Table 6.22).

Furthermore, according to support from the literature review, several factors affect the decision-making process. For example, time availability, meaning when the time is available, consultation between commanders can be made, whereas when the time is lacking the Silver commanders make decisions individually (Mishra, 2014, Mishra et al., 2015). As previously mentioned, the command and control structure gives a bottom up approach, which means that the decision comes from the bottom operational level. Therefore, it is very important to improve the decision-making qualities of commanders, so that they can make appropriate decisions at the time of emergency incidents at the local level. Various studies have highlighted the importance of decision-making as an important outcome during the response phase (Crichton and Flin, 2002, Flin and Arbuthnot, 2002, Peerbolte and Collins, 2013, Young et al., 2013). Moreover, many factors have been identified in different studies, which can impact the decision-making abilities of the commanders during emergencies. Some of the factors are complexity in dealing with a situation, uncertainty due to a limitation in information, time pressure and personal experiences.

7.7.6 Commitment to Apply the Incident Command System

Another important factor discussed by the participants of the qualitative and quantitative study is the commitment of the commanders when applying the command structure. According to the views of Gold and Silver commanders, the success of the command structure depends upon the individual level of commitment by the commanders to apply it at its fullest in practical life scenarios.

In short, Gold and Silver commanders were of the perception that commitment of the commanders for the application of the incident command system is an important individual factor which cannot be ignored when assessing the barriers and problems of command implementation. Also, there is the issue of a lack of commitment by higher level hierarchical commanders to apply the incident command system at its fullest, as discussed in section 5.7.6.

The quantitative findings have revealed that the commitment of commanders is one of the most important and influential individual factors, pointed out by the majority of Bronze commanders through the quantitative responses. However no significant effect on any 3 independent variables was found for this factor (Commitment to apply incident command system). The KWt showed that the null hypothesis was retained (See Table 6.20, Table 6.21 and Table 6.22).

Moreover, based on the reviewed literature, since all the commander levels are categorised into category 1 responder, they have a commitment to carry out all agreed responsibilities within the structure (Cabinet Office, 2011). Commitment is considered to be an important factor which affects a teams' goals. According to Flin et al. (2008) an effective team develops a commitment to achieve goals and this is especially essential for a high risk work setting. It consists of many elements, such as supporting other team members, conflict solutions, information exchange, and coordination. The support of other team members can be through the sharing of experiences and working relationships, and social support, which provides skills to carry out the work tasks (Jensen and Waugh, 2014). As a result, it has been observed that there should be a strong commitment to improving the incident command structure and individuals should be committed to implementing it.

7.7.7 Situational Awareness

Another important factor that has emerged during the literature review and analyses is situational awareness of the Gold, Silver and Bronze commanders, at the time of an emergency.

A few of the participants from the qualitative findings highlighted the need and importance of situational awareness for improvement in the performance of the goals and responsibilities of individual commanders at different departments. Some of the Gold and Silver commanders were of the view that situational awareness is important for decision-making (See section 5.7.7).

Similarly, the Bronze commanders also agreed upon the importance of situational awareness for the success of incident command structure implementation. The KWt results showed a significant effect on the CD departments of the factor (Situational awareness during an incident response), $\chi^2_{(6)} = 14.572$, $p = .024$. The KWt showed that the null hypothesis was rejected (See Table 6.20).

Situational awareness is delineated as the act of perceiving elements within the surroundings in the context of space and time, understanding their meaning and envisaging their status in the future. Situational awareness in incident operations is usually directed by the specific goals. Therefore, each participant strives to obtain relevant information to achieve these goals. Furthermore, disaster rejoinder procedures need rapid, synchronised activities that are founded on accurate facts about the situation. Effective responses are crucial in the light of tumultuous circumstances to minimise efforts that would be needed to quell the situation if things were allowed to escalate. Therefore, incident responders can become proactive if they are furnished with the right information within the shortest time possible. Additionally, the quality of information provided should match the expected disaster response since inadequate or wrong information can hinder rescue operations and result in injuries or destruction of property (Seppänen and Virrantaus, 2015).

Moreover, according to the literature review, situational awareness depends upon the gathering and sharing of information. There are three main levels of situational awareness, namely perception, comprehension of the current situation, and anticipation (Endsley, 2000). The first level is mainly concerned with the gathering of information about the emergency (Flin et al., 2008). This is the basic information which commanders need for the establishment of situational awareness. While, the second level is concerned with the integration, interpretation, and combination of multiple pieces of information to provide meaning (Endsley, 2000). Finally, the third level of anticipation is associated with the ability of the commanders to predict the future situation events (Gonzalez and Wimisberg, 2007). Significantly, a study conducted by Cohen-Hatton et al. (2015) in which 23 incident commanders from six UK emergency services, participated and provided the evidence, stated that there was a lack of situational awareness knowledge between the participants.

7.7.8 Cooperation between Commanders

Cooperation between commanders depends upon information sharing and communication. The factor of cooperation was emphasised by a few of the Gold and Silver participants, with one Gold and one Silver commander highlighting the need for cooperation between commanders and departments (See section 5.7.8).

The Bronze commanders were also of the view that cooperation is an important aspect to be considered while evaluating the success of the command structure. The 3 independent variables did not differ on this factor (Cooperation between commanders). While the KWt showed that the null hypothesis was retained (See Table 6.20, Table 6.21 and Table 6.22).

In addition, the reviewed literature indicated that coordination could be achieved through clarity in information sharing by using common terminologies between commanders irrespective of complexity, scope or location of the incident (Seyedin et al., 2013, Lenz and Richter, 2009). According to Sommer et al. (2017) during police response to the terrorist attacks on the Government Complex in Oslo, the coordination between the strategic and operational level was poor. This was because the resources were insufficient on the scene.

Subsequently, the good coordination and communication skills of a commander at a briefing and debriefing can play an important part in effective coordination and cooperation within the department, as well as within the organisation (Stott et al., 2008). Therefore, to ensure competent response to an emergency, adequate cooperation is required between and within the local category 1 responders, in order to integrate good practice.

7.8 Section 4: Barrier Factors

The Gold, Silver, SFA and Bronze participants were analysed for their views and opinions about the barriers which are being faced in the implementation of the incident command system. These obstacles were perceived as reasons for the failure of the command structure implementation because they are hindering the successful implementation and effectiveness of the incident command system. The Gold, Silver and SFA participants gave their opinion through semi structured interviews, whereas the Bronze commanders gave their views through a quantitative questionnaire. Seven barrier factors showed a significant difference in CD departments, job position and academic qualification. Additionally, available literature relating to the implementation of the incident command system and possible obstacles faced in the process were also identified, to cross examine the qualitative and quantitative findings. The barriers and obstacles highlighted in the analyses and literature are as follows.

7.8.1 Lack of Knowledge

One of the important barriers highlighted by the qualitative and quantitative respondents was a lack of incident command knowledge for its successful implementation in the CDGC. The qualitative findings have revealed that this specific factor was most highlighted by the Gold, Silver and SFA participants, who identified that there are some specific areas in which a lack of knowledge is creating issues and hindrances for the successful implementation of the command structure. The participants also indicated that a lack of knowledge is associated with a lack of understanding about the roles and responsibilities of the commanders. More than half of the qualitative respondents associated the success of the incident command structure to its understanding of implementation.

Most of the participants were of the view that knowledge of the incident command structure is in fact knowledge about the roles and responsibilities within the structure. In addition, knowledge about the SOPs was also highlighted by few of the participants, which indicated that knowledge about the incident command system has different aspects and features as per the perceptions of the qualitative respondents (See section 5.8.1).

This perception was condradoctory with the quantitative findings evaluated through the quantitative analysis. The obtained KWt results showed a null effect of the 3 independent variables on this factor (Lack of knowledge). Therefore, the KWt showed that the null hypothesis was retained (See Table 6.23, Table 6.24 and Table 6.25). This lack of knowledge by the commanders within the incident command structure can be termed as a reason for failure in the successful implementation of the command structure.

Moreover, a review of the related literature has revealed that a lack of understanding of the incident command system by the commanders can impact on the effectiveness of emergency response operations. Therefore, according to the literature, if there is a lack of understanding of the incident command from commanders, this can lead to the failure of effective emergency response (Chlimintza, 2008). As mentioned previously, in the UAE, the command structure is still relatively new and this lack of understanding can cause problems for the successful implementation of the incident command structure.

7.8.2 Lack of Commander's Qualifications

Qualified and competent commanders are considered to be in a better position of understanding the technicalities of the incident command structure, as well as performing better in the successful implementation of the command and control structure at its best. The qualitative respondents (Gold, Silver, and SFA) were of the view that the appropriate qualification of the commanders within the incident command structure can affect the success of the incident command structure implementation. More than half of the qualitative respondents highlighted the issue of commander qualifications. The respondents were of the view that a lack of necessary qualifications can adversely affect the decision-making abilities of the commanders, as well as misunderstanding their roles and responsibilities in an emergency.

As per the findings of the quantitative analysis, the KWt scores revealed that there was a significant difference for the CD departments with respect to this factor (Lack of commanders' qualifications), $\chi^2_{(6)} = 12.988$, $p = .043$. The KWt showed that the null hypothesis was rejected (See Table 6.23).

Additionally, a review of the literature indicated that the assignment of a role to a non-qualified officer at the time of an emergency could result in the inefficiency and ineffectiveness of response activities (Eyerman and Strom, 2008). Similarly, non-qualified officers can have difficulty in the training process, with less chance of gaining knowledge and experience from real life emergencies, which subsequently affects the decision-making abilities of the officers (Young et al., 2013). As previously mentioned in section 3.3.1 in chapter 3, there are four levels of command qualifications for an officer, which are approved by Office of Qualifications and Examination Regulations to become a commander (Lamb et al., 2014). Therefore, the CDGC agency must use the best practices from other developed countries such the UK, to observe how commanders in the three levels should hold their positions.

7.8.3 Lack of Training and Exercising

The training and exercising of the commanders for any type of emergency is also one the most important features of the incident command system. Commanders at three levels are trained by experts to familiarise them with emergency events and the required roles they should play at that time. The qualitative analysis has revealed that a lack of training and exercising is also a challenge for the successful implementation of the command system in the CDGC agency. The majority of participants were of the view that this factor is important for sustainability and the gaining of experience and training should be arranged on a regular basis. It was also highlighted that there is a significant lack of commander training at the local level in the CDGC agency.

The majority of the qualitative respondents emphasised the need for continuous training programmes for commanders at different levels for the sustainability of the command structure (See section 5.8.3). The issue of commander training and exercising was also pointed out by the quantitative respondents (Bronze commanders). The 3 independent variables did not differ with respect to this factor (Lack of training and exercising). The KWt showed that the null hypothesis was retained (See Table 6.23, Table 6.24 and Table 6.25).

Additionally, the training of the commanders was also highlighted in the literature as an important factor for the effective implementation of the incident command structure and the enhancement of the command and control abilities of the officers. For example, it is reported that during the terrorist attacks in Norway (Sommer et al., 2017) the police responding to the situation were linked to a lack of command capacity. With the suggestion being that training in real situations, could help commanders to improve their performance competence and capabilities. As indicated by Flin and Slaven (1996), the command abilities of the officers can be enhanced through training and the gaining of experience. This ability is a key factor in the management of emergencies. As the effectiveness of the command depends upon the thinking and problem solving skills of officers, these skills can be enhanced through knowledge and training.

Training often consists of emergency exercises to increase the capability of operational skills. However, the necessary competencies may not have been identified and developed. According to Sommer et al. (2017), incident commanders stated the need to participate in more training sessions on incident command. Therefore, emergency response organisations such as fire and rescue should improve the professional skills of their officers through exercises, drills and training programmes to have an effective and worthy human resource for a long period of time (Seyedin et al., 2013).

7.8.4 Overlaps and Conflicts in Command

The incident command system follows a command procedure in which the commanders of different levels are assigned their specified roles and responsibilities and are bound to them for emergency incidents. One third of the qualitative respondents were of the view that an overlap and conflict in the command mechanism can create problems for the effective and smooth performance of emergency response activities. Mainly the Silver commanders were of the view that such interventions overlapping in command cause a challenge while performing the response activities at the time of an emergency (See section 5.8.4). In order to avoid such conflicts and overlaps in command, the SOPs were formulated to identify and assign specific roles and duties to specific levels of commanders within department operations.

According to the findings of the quantitative analysis, a significant effect existed for the CD departments with respect to this factor (Overlaps and conflicts in command views) of dimension four, $\chi^2_{(6)} = 13.697$, $p = .033$ (See Table 6.23).

Furthermore, a review of the literature has indicated that sometimes an overlap and conflict in command occurs when a senior officer takes over, on the basis of rank structure rather than following the incident command structure. The command function depends on the position of an individual in the organisation, or it depends on what tasks are assigned as well as the level of authority and responsibility of the function (Nylén, 1996). According to Arbuthnot (2008), an overlap in command can be witnessed between and within the structure and can cause failures. However, the incident command system follows the principles of briefing and debriefing before and after the response activities respectively, which can be helpful in eliminating ambiguity relating to the roles and responsibilities of the commanders and their assigned tasks to be performed during emergency response operations.

7.8.5 Lack of Acceptance and Desire

When a new system or structure is being implemented in an organisation there exists chances of resistance and non-acceptance of it by the members. One of the issues highlighted by the qualitative participants was the lack of acceptance and desire by the commanders of the CDGC agency. This non-acceptance has led towards and non-enforcement of incident command principles.

From the findings of the quantitative analysis, it has been observed that Bronze commanders were also of the view that non acceptance of the incident command system by commanders is an important barrier, in the way of successful implementation. The quantitative analysis showed no effect on the 3 independent variables of the factor (Lack of acceptance and desire). The KWt showed that the null hypothesis was retained (See Table 6.23, Table 6.24, Table 6.25).

This is also supported by the literature review, where problems were highlighted by the need for a successfully implemented command and control structure, which should be accepted by all the participants to carry out emergency response activities efficiently (Wise, 2006). These assertions were also emphasised by (Lutz and Lindell, 2008) by giving an understanding of different problems related to emergency response activities and highlighting the need to solve such problems. Therefore, the commanders should be committed to implementing the command structure (Jensen and Waugh, 2014).

7.8.6 Lack and Loss of Expertise

A few of the qualitative participants were concerned about the loss of experts within the system, due to retirement, resignation, or transfer to other departments. They were of the view that expert commanders, who had gained their experience, knowledge, and skills through training and field operations, sometimes retire or resign from their posts which creates a shortage of expert commanders within the structure. This loss needs to be compensated in a timely fashion and through a proper mechanism to maintain balance and sustainability within the command structure. The transfer of expert commanders from one department to another and the adjustment of less prepared commanders within the structure is a challenge, which can be categorised as a weakness and possible cause of failure (See section 5.8.6).

Findings from the quantitative analysis have indicated that the factor, lack and losing of expertise due to resignations and retirements, significantly differed between the CD departments, $\chi^2_{(6)} = 17.341$, $p = .008$. The KWt showed that the null hypothesis was rejected (See Table 6.23).

It has been emphasised in the literature that the knowledge and experience of experts can serve as a catalyst to the success of the incident command. According to Hosseini and Izadkhah (2010), the services of experts can be utilised to improve and upgrade the efficiency of training programmes and the preparation of training manuals for the commanders. An expert is a person who has adequate knowledge and experience to handle the emergencies and can analyse what should be done by utilising experience, training, understanding and critical decision-making.

7.8.7 Lack of Coordination and Information Sharing

It has been witnessed during the study that coordination and information sharing were the most important and highlighted features for the success of the incident command structure. Coordination and information sharing are organisational factors as well as individual factors of the commanders, which can influence their personal performance as well as the effectiveness of the incident command structure and its utility in the case of emergency incidents. The qualitative respondents were of the view that there are many shortcomings and discrepancies in the coordination between the three levels of command, which is causing difficulties for the success of the incident command system (See section 5.8.5).

This challenge was also indicated by the Bronze commanders through their quantitative responses. The KWt scores revealed a significant difference for CD departments with respect to this factor (Lack of coordination and information sharing between commanders), $\chi^2_{(6)} = 14.768$, $p = .022$. In addition, the KWt scores revealed a significant difference for academic qualification with respect to this factor, $\chi^2_{(4)} = 11.898$, $p = .018$. The KWt showed that the null hypothesis was rejected (See Table 6.23 and Table 6.25).

According to the review of related literature, coordination and information sharing between commanders is being categorised as an important feature in emergency response (Kusumasari et al., 2010). The command structure can be enhanced and made effective by improving the mechanisms of information sharing and the coordination of duties. Notably, according to the literature, when a survey was carried out that included the statement “information sharing among participants was successful in the exercise”, 57.3% disagreed. As a result, the coordination and sharing of information as a factor impacting on the individual in an incident response has a very high effect (Bharosa et al., 2010).

7.8.8 Lack of Follow-up and Evaluation

An important challenge highlighted in the qualitative and quantitative findings is the lack of evaluation in the incident command system. Evaluation can also be termed as a follow up procedure for the command and control structure. The respondents of the qualitative study were of the view that this is a potential issue, which is already a challenge for the successful implementation of the command structure. It was also indicated that failure in the evaluation of the incident command structure is on the shoulders of the MOI because it is their responsibility to evaluate the performance and effectiveness of the incident command structure on a timely basis, to track any discrepancies or issues within the implementation and application of the command system (See section 5.8.9).

As per the views of the Bronze commanders through the quantitative findings, there is a lack of follow up and evaluation, which is causing potential issues for the successful implementation of the incident command structure and its effective application for emergency response operations. No significant effect on the 3 independent variables was found for this factor (Lack of follow-up and incident command system evaluation). The KWt showed that the null hypothesis was retained (See Table 6.23, Table 6.24, Table 6.25).

In addition, a review of the literature has revealed that there is a constant need for evaluation, as per the requirements of different types of emergency activities. Most emergency incidents can have a large amount of information and situational intelligence strategies, which are gathered from different sources and can be significant for future incidents. Therefore, all of this information and GSB operations should be evaluated and assessed to make future recommendations (Lamb et al., 2014, Jensen and Waugh, 2014). However, the evaluation of emergency management is always a challenging task and management of emergency events is a problematic job to undertake (Owen et al., 2016). Consequently, although the incident command structure follows a range of emergency plans and procedures, the commander's skills and application of these plans when adopting emergency procedures at the time of an emergency, should be evaluated frequently to improve performance.

7.8.9 Gold Commander Attendance at Scene

Some of the qualitative respondents were of the view that the presence of Gold commanders at the operation sector cannot be good for the compliance of roles and responsibilities assigned to the Bronze and Silver commanders under the incident command structure. This issue was mainly raised by the Silver commanders and they highlighted that sometimes the presence of Gold commanders at the scene confuses the Silver and Bronze commanders and this confusion affects the performance of the team, as well as the decision-making of the commanders.

The findings of the quantitative analysis involving the Bronze commanders were also of the view that the presence of the Gold commanders at the site of the emergency rescue operations, may create conflict and confusion for the Silver and Bronze commanders. There is a significant effect on the job position was found for this factor (Gold commander presence in operation sector which may create conflict and confusion), $\chi^2_{(6)} = 13.161$, $p = .041$. Therefore, the KWt showed that the null hypothesis was rejected (See Table 6.24).

Furthermore, a review of the related literature has highlighted many factors which can affect the decision-making skills of commanders during emergencies. Notably, one of them is the presence of a Gold commander. In this case, the Gold commander starts acting like the Bronze commander, which results in confusion in the decision making. This was supported by the literature but within a different level of command. According to Mishra (2014), the Silver commanders start acting like the Bronze commander, and this is because the Silver commander tends to feel comfortable doing the operational job. For instance, in the terrorist attacks on the Government Complex in Oslo, confusion about who was in charge of the response, was identified (Sommer et al., 2017). Many scholars have mentioned that the Bronze commanders are the closest to an emergency event and in a situation where they have to make split second decisions to minimise the loss, therefore their decision-making can be impacted by many factors such as their confidence level (Peerbolte and Collins, 2013, House et al., 2014).

Therefore, from the above discussion, it can be argued that the Gold commanders should not be attending the hot zone, because this zone is only for the Bronze commanders. Gold attendance in the hot zone may impact the Bronze commander and create conflict in the decision-making process.

7.8.10 Incident Command System is New

Three of the Gold and Silver commanders from the qualitative study have declared that the command and control structure is a new concept in the CDGC agency. As the UK's command system has been adopted and it is a new concept for implementing authorities as well as for the Gold, Silver and Bronze commanders, some issues of implementation and understanding are being witnessed. Participants are of the view that the continuous application of the structure over a significant period of time will help in clarifying potential issues and problems within the incident command structure. One of the participants suggested that a minimum of five years is required to achieve the objectives (See section 5.8.11).

Findings from the quantitative analysis indicated the non-parametric test results showed a significant effect on the academic qualification of the factor (Incident command system is new), $\chi^2_{(6)}$ = 17.868, p = .001. The KWt showed that the null hypothesis was rejected (See Table 6.25).

The UK's GSB structure has been implemented in the UAE since 2012, to achieve the improved and effective response of emergencies (Khaleej Times, 2015). The concept of the GSB structure is that three main levels of command and control are introduced and these levels have their commanders, which are strategic, tactical and operational (O'Brien and Read, 2005, Hill and Long, 1996). Although the UK's command and control principles are important concepts, more time is needed in the CDGC agency to improve commander performance when responding to emergencies.

7.8.11 No Nomination Standards for Commanders

It has been identified earlier in organisational key factors, that nomination standards are based on job position, experience, and ranks. Findings of the qualitative analysis have revealed that there is a lack of nomination standards in the incident command structure, which is a challenge and obstacle in the adaptation of the command structure at its fullest. A few of the Silver commanders identified that no set nomination standards are being followed by the authorities for the commanders who are actually implementing the incident command system and this issue causes uncertainty and insecurity, which affects performance and the overall effectiveness of the incident command system (See section 5.8.10).

Bronze commanders from the quantitative study also agreed that the lack of nomination standards for commanders is a potential challenge for the success of the incident command structure and its effective performance. The KWt revealed that there was no significant effect on the 3 independent variables of this factor (No nomination standard for commanders). The KWt showed that the null hypothesis was retained (See Table 6.23, Table 6.24, Table 6.25).

Moreover, the literature supports the fact that the nomination of emergency commanders should be according to their expertise and characteristics (Coppola, 2015). As indicated previously in section 3.7.3 in chapter 3, nominations should be based on the Office of Qualifications and Examination Regulations in the UK that has categorised four levels of command qualifications (Lamb et al., 2014). Thus, to improve commander experiences in applying the incident command structure, their grading must be built on the UK qualification and examination regulations, where the commander has an opportunity to self-enrol for one of the four levels of qualifications. Therefore, it can be argued that there should be a systematic grading and nomination of commanders within the incident command system through the UK qualification and regulation levels, to improve the chances of gaining knowledge and experience through different operations and training.

7.9 Section 5: Driver Factors

The participants of the study were evaluated to give their perceptions and opinions regarding the drivers of the incident command system. The Gold and Silver commanders were also assessed to evaluate the usefulness and success of the incident command system through the achievements of its pre-defined goals and targets. The Gold, Silver and SFA commanders gave their opinion through the semi structured interview, whereas the same aspects were inquired from the Bronze commanders through the quantitative tool of a questionnaire. Hence, the benefits and advantages are identified by all the participants through their opinions and perceptions. The review of literature indicated that the drivers of the command structure are highlighted by multiple scholars and researchers in their studies and the significant advantages have guided towards the usefulness and effectiveness of the structure for emergency response activities. In light of the qualitative and quantitative findings with the help of available literature, the following drivers of the incident command are identified.

7.9.1 Defines Clear Roles and Responsibilities

As per the perceived identification of the qualitative participants, the most recognised driver is clarity in the roles and responsibilities of the commanders. The majority of the interviewees highlighted this advantage and expressed their satisfaction for a clear understanding of the roles in the command structure, as discussed in section 5.9.1.

The results obtained from the quantitative analysis showed that there was no effect on the 3 independent variables of the factor (incident command defines clear roles and responsibilities). The KWt showed that the null hypothesis was retained (See Table 6.26, Table 6.27, Table 6.28).

In addition, the literature has identified several times that the emergency commander is responsible for the overall management of the command structure at the time of emergencies (Flin and Slaven, 1996). Three main command hierarchy levels are identified in the UK GSB structure within a single agency (Groenendaal et al., 2013). When providing clear lines of responsibility through the command approach, injuries and losses can be reduced, which is an immense benefit of the structure (Kirby et al., 2014). This specific benefit of the command structure has been identified in several studies, which means that it has a very positive impact on the clarification of responsibility for the commanders to deal with emergency situations. However, past literature has identified that one of the main issues in managing emergencies, has been a lack of inter coordination.

7.9.2 Clarity in Command Structure Far Beyond Random Actions

Another benefit of the command system highlighted by the Gold, Silver and SFA commanders is clarity in the command structure. With the proper following of the command and control structure, the orders and procedures are conveyed more clearly and in a more effective manner to the respective commanders. Because the command system provides a standardised and organised framework within which the commanders are required to operate their duties and functions. Overall clarity in the command structure is a very crucial driver for its successful implementation. In addition, it has provided guidelines to be followed by each commander at the time of an emergency (See section 5.9.4).

No significant effect on the 3 independent variables was found for this factor (Incidents are treated with clarity in command far beyond random actions). The KWt also showed that the null hypothesis was retained (See Table 6.26, Table 6.27, Table 6.28).

According to the review of literature, the command is the use of legal authority to make someone do something (Coppola, 2015). The common terminologies used in the GSB command structure help in minimising confusion and as the command system is a top down structure, it maintains the authority between the different levels of hierarchy (Kirrage et al., 2007).

7.9.3 Improved Outcomes and Performance

According to almost three quarters of the total qualitative participants, the command structure has improved the outcomes and performance of response activities during emergency incidents; therefore this can be categorised as an important benefit. The response activities have shown a remarkable improvement in safety measures and timely conduction of response. By following the procedures of the command structure, a task force is assigned to a specific incident and maintains the safety protocols, which is a very satisfactory benefit for the field officers. Furthermore, injuries to the rescue team members have been reduced after implementation of the command structure and the response time for the incidents has also improved, which has helped in the reduction of losses at the time of an emergency, as discussed in section 5.9.3.

In terms of the quantitative results, no significant effect on the 3 independent variables was found for this factor (Improve outcomes and commanders' performance). The KWt showed that the null hypothesis was retained (See Table 6.26, Table 6.27, Table 6.28).

A review of the related literature has identified that effective command is an analytical process, which requires analytical thinking, situational analysis, and problem solving skills by the commanders at the time of an emergency (Crichton et al., 2005). The command structure is focused on the minimisation of losses, whether they are of lives or properties, so the lives and safety of the rescue personnel are equally as important to be maintained at the time of rescue operations (House et al., 2014).

7.9.4 Coordination and Information Sharing

More than 50% of the qualitative respondents identified the factor of improved coordination and information sharing with the help of the command system as a valuable driver in the CDGC agency. The identified procedures and guidelines of the command system tend to eliminate ambiguity in the information sharing and the communication process is facilitated through different tools and techniques adopted at different levels of the command structure. A good decision depends upon the quality of information and timely communication. The incident command system has features which facilitate the proper and smooth flow of information within different hierarchical levels in an organisation, as discussed in section 5.9.2.

From the Bronze commanders' perspectives, the incident command system is useful for communication and the transmission of information between the commanders of three levels. The driver factor 4 in dimension five (Coordination and information sharing was transmitted easily between commander levels) was found to be significantly different between the CD departments, $\chi^2_{(6)} = 18.470$, $p = .005$. The KWt showed that the null hypothesis was rejected, (See Table 6.26). Research proves that the dissemination of data is simplified by awareness, having a shared comprehension of issues, application of vocabulary and semantic meaning. However, in extreme settings such as during calamities, it may not be possible to develop this factor because the involved parties may come from diverse environments and may have very little experience working together. Waring et al. (2018) reported that inter-team information sharing was held up by constrained situation awareness and poor communication.

In addition, the driver factor 4 in dimension five was found to be significantly different between the job position, $\chi^2_{(6)} = 14.649$, $p = .023$. The KWt showed that the null hypothesis was rejected (See Table 6.27). The significant difference between factor 4 and job positions was also linked to the pre-established chain of command. Junior employees are socialised to obey orders from their superiors. Such a culture enhances the flow of information from the topmost to lowest levels thus improving the overall efficiency. On the other hand, the substantial difference in the pairwise comparison between shift chief and duty officer was because of a lack of clarity regarding the differences between these two positions

This is supported by the literature review, as according to Flin et al. (2008), one of the benefits of the command system is the improvement of communication as the frequency of information sharing increases between the three levels of commanders. This increase in frequency leads to the reduction of misunderstanding and gives way for clear decision making (Kirby et al., 2014). The decision-making process can be improved if the quality of information is shared timely with the designated level of commander (McLennan et al., 2006, Alexander, 2008). It can be said that commanders in the command structure should be aware of their responsibilities through proper coordination and orders at the time of the incident and are required to be coordinated through effective communication and information sharing.

7.9.5 Facilitates Incident Management and Categorisation

Facilitation in the management of emergency incidents with the help of the command and control procedures is also a driver, which increases its worth. The command structure gives guidelines to the commanders so that they can address the incident as per the specific procedures to minimise the loss and negative outcomes. The usefulness of the command structure for different types of emergency incidents increases its value and importance. The guidelines provide organised, well communicated and coordinated response activities with a clear understanding of the roles and responsibilities for effective decision-making, as discussed in section 5.9.5.

Bronze commanders of the study were also of the view that the command structure has facilitated the management of emergency incidents in a very effective and efficient manner. The KWt revealed that there was a significant effect on the academic qualifications of the driver factor in dimension five (incident command facilitates incident management and categorisation), $\chi^2_{(4)} = 12.303$, $p = .015$. The KWt showed that the null hypothesis was rejected (See Table 6.28). The significant difference between driver factor 5 and academic qualification could be linked to the key goal of the development of incident command systems. Conventionally, an incident command system is a harmonised method to the direct, control and synchronisation of emergency responses by availing a common chain of command that responders must follow to achieve effectiveness. It has been developed into the National Incident Management System, which has been adopted in various hazard situations, including shootings, fires, terrorist attacks and hazardous materials. Consequently, people with proper education qualifications are charged with the responsibility of managing disasters. For this reason, academic qualifications play a big role in determining incident management tasks that are assigned to commanders.

Moreover, a review of the related literature has identified that the term command and control is derived from the military domain and it is related to the management of personal and organisational resources for a specific situation (Arbuthnot, 2002). The management of emergency incidents requires planning, directions, coordination, and control functions to reach the best decision and the command structure provides these vital tasks and enhances the ability of commanders for such activities (Sommer et al., 2017, Stanton et al., 2008). It can be said that the management of an incident is not a single activity and simple task to be carried out without proper knowledge and planning. A well-managed incident can be categorised into the command and control activities of effective planning, monitoring, controlling and coordination.

7.9.6 Assures Safety and Avoid Committing Errors

The most important driver factor highlighted by the participants was the assurance of safety and the better accomplishments of tasks and error avoidance. The incident command system gives guidelines for the performance of designated duties by the commanders at the time of any emergency incident. While the provision of appropriate safety tools to the commanders for the performance of their technical jobs has minimised the risk of errors and facilitated the commanders in their personal safety as well. The qualitative participants provided their opinions through semi structured interviews that the incident command system and its applications have assured safety (See section 5.9.6). It has also provided clarity in procedures, with employees trained to take the required safety measures for the protection of their lives.

This has provided a sense of security and protection to employees, and they perceive that they are fully equipped to handle the emergency in a better way.

The quantitative results revealed no significant effects on the 3 independent variables of the factor (incident command assures safety and avoids committing errors). The KWt showed that the null hypothesis was retained (See Table 6.26, Table 6.27, Table 6.28).

From the review of related literature, it can be noted that complex and uncertain environments require special consideration for the protection of lives, properties, and the continuation of rescue operations in the case of emergency management (Comfort, 2007). Moreover, Baliga et al. (2012) report that one of the key emergency management factors is a systematic approach, that manages the safety of the responder. Therefore, the SOPs are normally formulated to identify the procedures and plans which are mandatory at the time of an emergency event, and these procedures and plans are considered as a systematic approach to handle the situation (Launder and Perry, 2014, Van Den Heuvel et al., 2012).

7.9.7 Defines Better Decision Making

According to one third of the Gold and Silver commanders, the incident command structure has improved the decision-making abilities of the commanders because the roles and responsibilities of each commander are clearer and the authority of the commanders is aligned. Before the implementation of the command system, there were issues of unauthorised interventions, duplication of decisions, and confusion in the command process, as well as ambiguity in the authoritative responsibility. The command system has provided a platform for the commanders, who can exercise their skills and abilities as per their authority to enhance the response activities, while, clarity in authority has provided a definite procedure, which can lead to better informed decision-making, as discussed in section 5.9.7.

In addition, according to the quantitative respondents, clarity in defined decision making should be given much importance as a benefit of the command system. The KWt non-parametric test results showed a significant effect on the academic qualification of the factor (Clearly defines better decision making), $\chi^2_{(4)} = 10.696$, $p = .030$. The KWt showed that the null hypothesis was rejected (See Table 6.28). The observed difference between factor 7 and academic qualification is a direct reflection of the impact of education and training on decision making. Certain situations such as the management of natural or artificial catastrophes warrant hasty decision making, which may be done under pressure such as time constraints. Nonetheless, managers should deliberate thoroughly before making these decisions because they could have irreversible consequences or affect a series of future occurrences. Therefore, decision-making is rarely a straightforward act of selecting one choice from a list of available solutions. When managing a crisis, decisions are informed by reasoning and intuition. Furthermore, a range of facts, data and experience may also be required to inform decision making. These qualities can be enhanced through training in settings that permit regular decision-making without dire consequences if the decisions are wrong. Through academic training, candidates can develop good decision-making skills by attending lectures and learning theoretical models.

According to Chlimintza (2008), the GSB structure can help commanders in making the right decisions because the command structure has an impact on the process of decision making. The decision-making process depends upon the personality of the commander, as well as the skills and experience. Situational analysis is the process being performed by the commander, and it helps to make good decisions (Van Den Heuvel et al., 2012). Therefore, frequent exposure of commanders to exercises and drills helps them in understanding the procedures and protocols to be followed at the time of emergency incidents, and this can minimise the chances of misunderstanding and increase the possibility of better decisions (Lamb et al., 2014).

7.9.8 Allows Incident Evaluation

A few of the qualitative participants also identified the evaluation and assessment of incident response quality through the command system as a worthwhile advantage of this structure. The evaluation also follows a specified procedure, which helps the commanders in understanding the success of the structure and any possible shortcomings can be traced in a timely fashion. The command structure gives the possibility of follow ups which can be used to make comparisons, and the quality of response activities can be enhanced to achieve the maximum possible outcomes from the structure, as discussed in section 5.9.8.

The Bronze commanders of the study were of the view that the evaluation and assessment feature of the command structure is helpful in identifying the differences in the main response activities by comparing them with standardised procedures. The quantitative results showed a null effect on the 3 independent variables of the factor in dimension five (Incident command allows evaluation and assessment of the quality of incident response). The KWt showed that the null hypothesis was retained (See Table 6.26, Table 6.27, Table 6.28).

Concerning the evaluation and assessment of the incident response activities, the SOPs are being considered as the standardised principles to be followed at the time of an incident and are consulted to make any comparisons or trace any errors or mistakes. The emergency plans and procedures formulated as SOPs are essential to perform the response activities efficiently and effectively. In the command structure, the set of objectives are formulated by the Gold commanders, which are to be achieved through coordinated activities and the effectiveness of these response activities can be measured by the achievement of these pre-defined objectives (Kahn and Barondess, 2008, Sinclair et al., 2012). It can be argued that evaluation and assessment guide the improvement of training programmes, drill exercises and better understanding of roles in specific incidents.

7.9.9 Achieved its Goals and Benefits

Lastly, the participants of the study were questioned to provide their opinions on whether the incident command system has achieved its goals or not. From the qualitative findings, 11 participants provided the opinion that the incident command system has successfully achieved its goals, whereas only 2 participants were of the view that it has been unsuccessful in attaining its predefined targets and 2 of the participants had a mixed view (See section 5.9.9). Therefore, it can be said that the command structure has been successful in the UAE and has achieved its goals as per the majority of views of the Gold and Silver commanders, who state that improvements can be witnessed in the emergency response activities as they are well organised and better communicated. The participants were also of the view that this success is associated with the provision of clear objectives and the understanding of the commander's leadership roles and responsibilities. Furthermore, a comparison of the command system response activities with the previously existed procedures indicates a distinctive improvement and enhancement of response goals.

The two participants who provided a neutral opinion were of the view that there are some challenges and issues, which are still to be addressed to improve the effectiveness of the incident command. Therefore, the structure cannot be categorised as completely successful. The remaining two participants who have stated that the command structure has not achieved its goals were of the view that this failure is due to human error in implementation, rather than the structure itself.

From the quantitative data, the KWt scores revealed that there was a significant difference in the CD departments for this factor, the driver factor of dimension five (incident command system successfully achieved its goals and benefits), $\chi^2_{(6)} = 15.580$, $p = .016$. When an incident command team attains organisation goal successfully, team members are motivated to work harder as observed in the significance of factor 9. The KWt showed that the null hypothesis was rejected (See Table 6.26).

7.10 Improvement Strategy of the UAE Incident Command System Framework

Previous research showed that the UAE command system and the UK's GSB system were similar in some ways. For instance, both systems are marked by three levels of command; Gold, Silver and Bronze in the UAE system, which corresponds to strategy, tactics, and operational activities in the UK scheme. It was noted that several limitations could be addressed to enhance the efficiency of future operations in the two systems. The review also identified a knowledge gap regarding the application of the incident command system in the UAE. Later, dimensions and factors from the UK, USA, and international (Japan, China, Australia, Taiwan, Norway, Sweden, and Netherlands) command systems were combined to develop the research conceptual framework. The qualitative study consisted of semi-structured interviews of 15

Gold and Silver commanders and the quantitative study involving 153 Bronze commanders in seven CD departments. It sought to classify and examine the factors identified in the research conceptual framework, as well as other factors that may arise in the UAE's CDGC agency. The findings from the semi-structured interviews, the Cronbach's alpha and the KWt results led to the development of a proposed UAE incident command system framework, which consists of five main sections with 42 factors. However, before the proposed incident command system framework can be implemented, it is necessary to determine its strengths, and how it differs from the conceptual framework, which aims to achieve the last research question of; "*What is the greater role that can be played by the UAE proposed incident command system framework to assist the CDGC agency in different emergency response*?"

The initial conceptual framework in Figure 3.4 was developed through the literature review detailed in chapter three. It is based on the phases of the administration process and an analysis of the problems encountered during the response to incidents. Accordingly, three major components were grouped as follow: implementation and driver factors, Key fundamental factors and barriers factors. These three areas all have common links that identify them, so they were grouped into the following characteristics:

(i). Implementation and driver factors included: better decision making, minimisation of confusion, better coordination, clear roles, and responsibilities, an increase in the safety of the respondents, leadership clarification and command issues, controlled chaos, better information sharing, and application for the type of hazard.

(ii). Key fundamental factors were divided into organisational factors and individual factors. Firstly, key organisational factors included coordination, training and exercising, the importance of SOPs, resources, and logistics. Secondly, individual factors included knowledge and understanding, decision making, training, and exercising, cooperation and information sharing, the qualification and experience level, commander characteristics, personal conflicts, and situational awareness

(iii). Barrier factors were composed of the following variables: transferring from theory to practice, delays in structure settings, a lack of system understanding and knowledge, a lack of consistency regarding who is in charge, insufficient qualifications, inflexibility in command and control, a lack of clearness of roles and responsibilities, and training and exercising.

The UAE proposed framework was examined for a better structure and functioning incident command system framework. The UAE framework includes five levels as shown in Figure 7.1. The levels of the UAE proposed framework are illustrated as follow:

(i). Implementation factors included some important factors namely: minimise random decision making, improvement of structural organisation, organise roles and responsibilities, avoid unauthorised intervention in command, better coordination/cooperation, minimise negative outcomes, organise the incident response and best practices of the SOPs.

(ii). Organisational factors were composed of: commanders' nomination is based on job position, ranks and experiences, system grading of commanders, rigorous regulations, having a model expert, logistic /finance, training, and exercising at different levels of command.

(iii). Individual factors were composed of: training and exercising, knowledge and experience, cooperation between commanders, commitment to apply the incident command system, situation awareness, coordination and information sharing, effective decision making and individual characteristics.

(iv). Barrier factors included: a lack of nomination standards, a lack of follow up and evaluation, a lack and loss of experience, overlaps and conflicts in command, insufficient coordination and information sharing, the presence of the Gold commander at operational scene, a lack of acceptance and desire, insufficient qualifications of the commanders, a lack of training and exercising, lack of incident command system knowledge, and incident command system is new.

(v). Driver factors were composed of: incident command system defines clear roles and responsibilities, incidents are treated with clarity in command far beyond random actions, improve outcomes and commanders' performance, coordination and information sharing was transmitted easily between commander levels, incident command system facilitates incident management and categorisation, incident command system assures safety and avoids committing errors, clearly defines better decision making, incident command system allows evaluation of the quality of incident response and incident command system successfully achieved its goals and benefits.

The incident command system framework is shown using the hierarchical approach justified in the above section. The framework presents the findings of the study extracted through the exploratory sequential mixed method approach. The qualitative findings provided the base for the quantitative study and validation of results. The qualitatively analysed data was categorised into five sections which are: a) implementation factors b) organisational factors influencing successful implementation of the system c) individual factors influencing the successful implementation of the structure d) barriers faced during the incident command system implementation, and e) driver factors of the incident command system.

These sections were presented in the proposed UAE incident command system framework. Every five sections were provided by the participants in the qualitative study from the Gold, Silver, and SFA participants (*n*=15). The qualitative analysis of the participant responses provided the factors under each section, which were further analysed and confirmed quantitatively from the Bronze commanders (*n*=153).

Each of the factors within each section are given code names for the purpose of clear visibility and understanding see Table 7.1. The code of each factor is provided along with the proposed framework. In the UAE framework factors from the KWt are shown in different colours for better understanding and visual representation. Consequently, the three independent variables were given these colours respectively: CD departments from all the sections is given a blue colour; job position from all sections is given a red colour, whereas academic qualification from the section is given a green colour. The factors from each section constitute the command structure being implemented in the three variable contexts for the successful and effective implementation of the command system. As can be observed from the Figure 7.1, the UAE incident command system framework can have five main sections for the improved and successful implementation of the command and control structure in the CDGC agency.

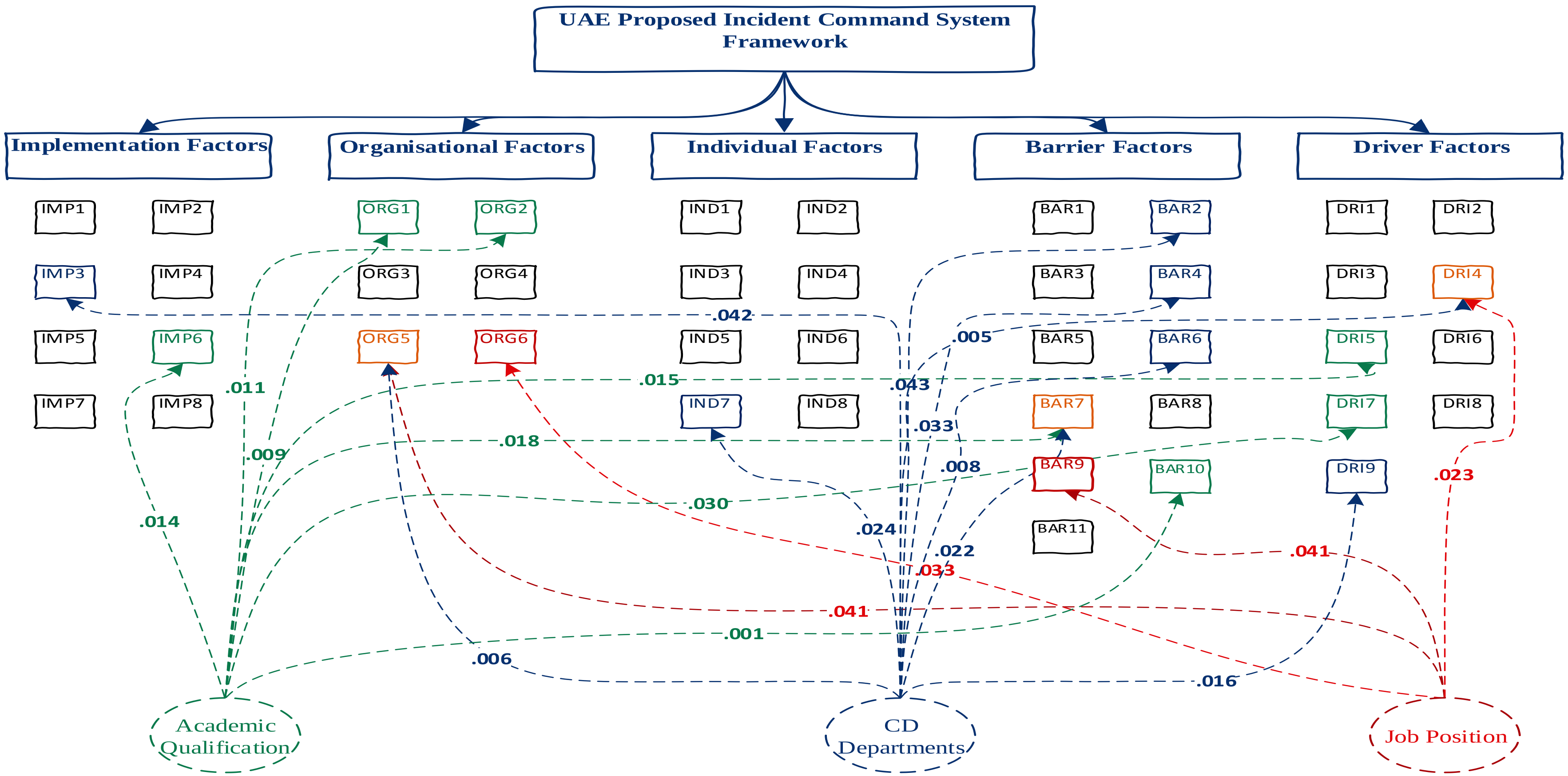


Figure 7.1: UAE proposed incident command system framework

Given the fact that emergency response management in the UAE rarely attends to the incident command system, a gap has been created that gives urgency to improving the CDGC capacity for managing emergencies. The current UAE proposed incident command system framework is a management system that allows for the effective and efficient handling of incidents by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organisational structure. The basic premise of this framework is its broad application, for it is used to organise both short- and long-term operations for a wide range of emergencies, from small to complex incidents, both natural and man-made. This system is designed to be used by government emergency response entities at the national, regional, and departmental levels. The UAE proposed incident command system framework is composed of five factors: the implementation of eight sectional factors, organisations with six sectional factors, individuals with eight sectional factors, barriers with eight sectional factors, and drivers with nine sectional factors. These factors are the dependent variables of this study, as seen in Table 7.1

Table 7.1: Incident command system factor coding

Implementation Factors (IMP)	**Code**
1. Improve and organise incident response	IMP1
2. Minimise random decision-making and confusion	IMP2
3. Avoid unauthorised intervention in command	IMP3
4. Organise commanders' roles and responsibilities	IMP4
5. Improve structural organisation in emergency	IMP5
6. Better communication and coordination across commander levels	IMP6
7. Best practices of SOPs	IMP7
8. Minimise negative outcomes	IMP8
Organisational Factors (ORG)	
1. Commanders' nomination is based on job position, ranks and experiences	ORG1
2. Training and exercising at different levels of command	ORG2
3. Logistic and financial support	ORG3

4. Having model experts	ORG4
5. Rigorous regulations of incident command system	ORG5
6. Systematically grading level of commanders	ORG6
Individual Factors (IND)	
1. Improvement of knowledge and experience	IND1
2. Training and exercising is needed to improve professional capabilities	IND2
3. Individual characteristics self-confidence, discipline and desire	IND3
4. Coordination and information sharing	IND4
5. Effective decision making	IND5
6. Commitment to apply incident command system	IND6
7. Situational awareness during incident response	IND7
8. Cooperation between commanders	IND8
Barrier Factors (BAR)	
1. Lack of incident command system knowledge	BAR1
2. Lack of commanders' qualifications	BAR2
3. Lack of training and exercising	BAR3
4. Overlaps and conflicts in command views	BAR4
5. Lack of acceptance and desire	BAR5
6. Lack and losing of expertise due to resignations, retirements or transfer	BAR6
7. Lack of coordination and information sharing between commanders	BAR7
8. Lack of follow-up and incident command evaluation	BAR8
9. Gold commander presence in operation sector that may create conflict and confusion	BAR9
10. Incident command system is new	BAR10
11. No nomination standard for commanders	BAR11
Driver Factors (DRI)	
1. Incident command system defines clear roles and responsibilities	DRI1
2. Incidents are treated with clarity in command far beyond random actions	DRI2
3. Improve outcomes and commanders' performance	DRI3
4. Coordination and information sharing was transmitted easily between commander levels	DRI4
5. Incident command system facilitates incident management and categorisation	DRI5

6. Incident command system assures safety and avoids committing errors	DRI6
7. Clearly defines better decision making	DRI7
8. Incident command system allows evaluation of the quality of incident response	DRI8
9. Incident command system successfully achieved its goals and benefits	DRI9

The KWt statistically treated these dependent factors in relation to three independent factors, namely, CD departments, job position and academic qualifications. The KWt technique intended to investigate whether there was any significant level (p <0.05) in the relationship between the dependent incident command factors across the 42 independent sectional variables of the CDGC. The KWt was conducted in this study because the literature review related to the incident command system found the use of this type of quantitative test to be uncommon. Consequently, the statistical analysis of the independent variable years of experience with the five dependent variables revealed no significance, and, thus, the results, interpretation, and researcher's opinion regarding this result were not obtained in this part of the research, section 6.10 provides more details concerning the independent variables.

The results showed 20 significant relationships between the independent variables (3) and dependent variables (42), in terms 'CD department', 'academic qualification', and 'job position' (Table 7.2)

Table 7.2: Relationships between dependent and independent variables

Variables	**CD department**	**Academic qualification**	**Job position**
Implementation factors	• IMP3: Avoid unauthorised intervention in command p =.042	• IMP6: Better Communication/ coordination p =.014	
Organisational factors	• ORG5 Rigorous regulations p =.006	• ORG1: System grading of commanders p =.009 • ORG2: Training/exercising p =.011	• ORG5: Rigorous regulations p =.041 • ORG6: Systematic grading of commanders p =.033
Individual factors	• IND1: Knowledge and experience p =.024		

Barrier factors	• BAR4: Overlaps in command *p* =.033 • BAR6: Lack and losing of expertise *p* =.008 • BAR7: Lack of coordination/Information sharing *p* =.022	• BAR7: Lack of coordination/information sharing *p* =.018 • BAR10: Incident command system is new *p* =.001 • BAR2: Lack of commanders' qualifications *p* =.043	• BAR9: Gold commander presence in operation scene *p* =.041
Driver factors	• DRI4: Coordination between commanders *p* =.005 • DRI9: incident command system achieved its goals *p* =.016	• DRI5: incident command system facilitates incident management *p* =.015 • DRI7: incident command system defines decision making *p* =.030	• DRI4: Coordination between commanders *p* =.023

These variables were employed to provide a foundation for the UAE proposed incident command system framework that is currently under development. The UAE proposed framework reviewed the existing barriers regarding the scope of the improved emergency response management. In this regard, the interpretation only concerned the seven barriers addressed as follows:

1. BAR2: Lack of commander qualifications *p* =.043
2. BAR4: Overlaps in command *p* =.033
3. BAR6: Lack and loss of expertise *p* =.008
4. BAR7: Lack of coordination/information sharing *p* =.022
5. BAR7: Lack of coordination/information sharing *p* =.018
6. BAR9: Gold commander presence in operation scene *p* =.041
7. BAR10: Incident command system is new *p* =.001

The results regarding the incident command system analysed in the previous research study triggered the current study's aim to improve the incident management process in order to meet the objectives set at the beginning of the study. The improvement process requires the relaunching of the Plan-Do-Check-Act (PDCA) cycle, also known as the Deming cycle, which was designed to achieve an improvement in the quality of management using a cycle of four steps (Deming, 2000). The concept was originally developed by Walter Shewhart and W. Edwards Deming in the 1950s in Japan to encourage the use of small-scale improvements for continuous performance improvement while allowing for the rapid assessment of improvement actions (Bereskie et al., 2017). According to Prashar (2017), the PDCA cycle is a quality tool that facilitates decision-making aimed at ensuring the achievement of the goals necessary for the survival of organisations (Figure 7.2). According to Theophilus et al. (2018), the acronym is comprised of the following:

- Plan: to identify the problem and establish the objectives and processes needed to deliver results according to the pre-determined requirements and policies.
- Do: to develop solutions and implement the necessary actions.
- Check: to check, verify, monitor, and measure processes and products in regard to established policies, objectives, requirements, and report results.
- Act: to take action to continually promote process improvement.

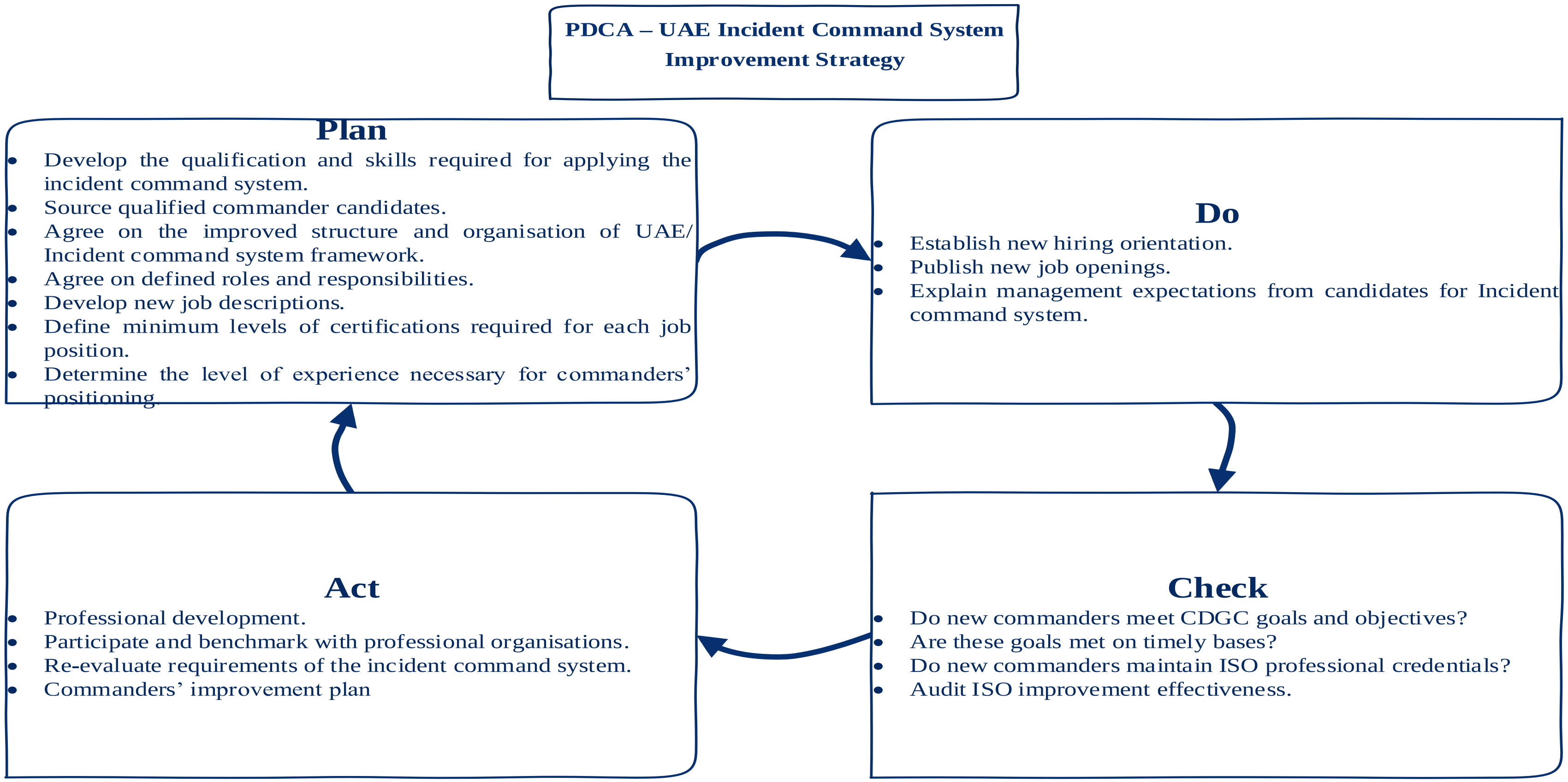


Figure 7.2: UAE Incident Command System Improvement Strategy

For this reason, a corrective and preventative action plan was developed to improve the incident command system that has been modelled and addressed (Figure 7.1). By analysing the 20 aforementioned variables, it can be noted that seven barrier factors exceeded the target value of significance, with others below the target value. However, by reviewing the results and indicators that represented deficiencies in the deployment of the framework, the researcher acted on the barrier factors to correct the deficiencies observed. The barrier factors that exceeded the target value including BAR2: Lack of commander qualifications; BAR4: Overlaps in command; BAR6: Lack and loss of expertise; BAR7: Lack of coordination/information sharing; BAR9: Gold commander presence in operation scene; and BAR10: Training and exercising. It is noted that BAR7: Lack of coordination/information sharing was found significant in both CD departments and academic qualification.

The PDCA cycle was employed at the strategic and the tactical levels. The strategic level determines the development of the incident command system in the UAE, and the tactical level determines the application of the PDCA in all processes within the framework, while the overall processes start with an input and end with an output in order to produce the desired results that fulfil all the requirements. The UAE-improved incident command framework identifies the gaps and steps taken to address these gaps in a manner that develops the CDGC's resilience to emergencies. This framework develops strategies to improve the function and operation of the CDGC and keeps commanders trained and well-qualified for implementing the detailed emergency response plans. It also ensures that the resources are capable of accomplishing their tasks when needed. However, before these improvements can materialise, the framework must be established and the top CDGC management must demonstrate commitment to this new framework. Overall, a thorough understanding of the framework by the CDGC staff leads to the implementation of the policy and procedures.

7.10.1 Plan

Learning and seeking higher levels of performance in terms of incident command and emergency response are the foundation of continuous improvement and should comprise commander activities to eliminate problems by addressing their root cause and seeking improved methods for job performance. The continuous improvement of incident command and emergency response should be the goal of the CDGC and developed as its overall culture. This improvement, however, implies an organisational, cultural change that can be exercised from the top to the bottom of the organisational pyramid. Overall, it can be concluded that the organisation's various management policies (i.e., quality, environment, social responsibility, occupational health, and safety) possess a function regarding the formal demonstration of top management commitment to the performance of these organisational policies.

The first step that should be taken by the CDGC management is reshaping their strategic business planning so that the improvement of the incident command system can be included in their desired vision for the future. This will ensure that the policy, objectives, goals, programmes, and formulation of activities are related to the improvement of the incident command system and associated with the organisation's strategy. An Incident Evolution Methodology for incident planning and response allows the first respondent to identify potential cascading effects, determine the key decisions in which they can be broken, enable resources, and prioritise decisions. This vision commissions an incident evolution methodology, initiates incident impact propagating, and presents the possible impact of emergencies. Thus, it generates a sequential order to the cascading responses. This methodology suggests that every incident is a unique case through which lessons can be learned via preparation and response activities. However, to this end, this approach is transdisciplinary and requires both a shift in mentality, on how commanders should follow sequential procedures to plan for incident response and inducing highly qualified specialists to use new methodologies and supporting tools. Ultimately, coordination between commanders is necessary in the incident evolution methodology phase to achieve the consistent and systematic implementation of the method.

The CDGC contains an area of corporate education linked to the area of HR with the aim of sourcing and training qualified commanders. Job descriptions and newly defined roles and responsibilities established by the HR area in conjunction with the managers of the various areas are maintained in order to determine the minimum levels of certification required and the abilities needed to carry out the activities given by the commanding positions. With the implementation of the philosophy of the incident command system, a review of these job descriptions is necessary, since new qualification and training requirements have been detected. The improved UAE and incident command system framework suggests a training programme for its commanders in order to develop their skills and disseminate the incident command system philosophy. The training programme has three levels:

- Basic: This type of training employs a generic thematic approach in order to reach all commanders of the CDGC. The purpose of this training is to educate, inform, persuade, promote, and encourage action within the incident command system. At this level, there interest is place in developing specific skills.
- Medium: This type of training is carried out with the commanders involved with the emergency response process.
- Higher: This type of training is extremely specific and a powerful tool for spreading or propagating attitudes regarding the improved incident command framework. At this level, the training focuses on preparing commanders to critically analyse the incident command framework, identify opportunities for responding to emergencies, and, in some cases, implement the SOPs options in real scenarios.

7.10.2 Do

The implementation of the improved incident command process begins with understanding the quality foundation of this system. Considering quality management, the improved framework includes the suitability of the emergency response activities and presents a recognised value and desired expectation from commanders. Incident commanders and response teams should understand the complexities, uncertainties, and potential damages of events and predict possible occurrences in order to successfully respond to an emergency. This can be attained by enhancing the quality of commanders. Indeed, the incident command system management should create new job openings for more highly qualified commanders.

Moreover, there is a need to ensure the adequate expertise of CDs by recruiting more personnel to replace the specialists who have left these stations.

The dimensions developed in this axis are: 1) commander qualifications: key to the development and achievement of excellence; 2) coordination/information sharing: a scientific process through which the practice is observed and relevant findings are recorded to facilitate the understanding, verification, or explanation of emergencies or situations in order to seek solutions and generate new knowledge; and 3) scientific-technical update: the adaptation and empowerment of rapid changes in all areas of science and technology that make it necessary to identify the various academic requirements (i.e., diploma, postgraduate, master's degree, and doctorate) of different job profile personnel in correspondence with the incident command system and the strategic objectives of the MOI.

7.10.3 Check

The defined management policy is communicated to all commanders of the CDGC with the intention of alerting them to their individual obligation to the incident command system. In addition, the policy is made available to all stakeholders (i.e., customers, suppliers, population, and partners). For the dissemination of the management policy, the employment of the IBM intelligent operations centre for emergency management is suggested to ensure that commanders and other interested parties have access to knowledge on the incident evolution methodology. In order to assess the level of commander disclosure and awareness regarding the new policy's incident command system, the CDGC should use a system of periodic, internal audits to measure its progress in these areas and identify opportunities for improvement in its process. Through internal audits, it is possible to identify a significant change in the culture of the organisation based on the information collected; in other words, the commanders should ensure the ISO-based incident command system is the foundation for the performance of their activities. To this end, staff members should be prepared to reach the level of training that is expected of incident commanders, and CDGC with low levels of coordination and information sharing should strive to emulate other departments that performed well in respect to these attributes. Accordingly, CDGC should adopt behaviours that encourage common structures to better understand inter-team capabilities and informational needs. This process enhances information dissemination and can reduce the efforts required for information processing.

7.10.4 Act

The management of the incident command system requires understanding and acting on the problems that deprive commanders of the ability to perform their tasks satisfactorily. It is uncommon that new commanders learn their roles from those who never received appropriate training. More significantly, the focus of the action would be on the operation process, its design, and the conduct of emergency response activities following the SOPs. The operational process, thus, needs to translate into personnel core competencies that often encompass broad leadership skills. Ultimately, qualified personnel are required for emergency management roles, and these roles are enhanced by coordination to achieve consistent and systematic implementation of training and personnel qualifications. The performance would be realised to employ benchmark, professional global incident command system practices in developed countries (the UK Qualifications and Examination Regulations). Management of this new concept should be undertaken on the basis of re-evaluating the requirements of the system and the commander improvement plan.

7.11 Barrier Factors Interpretation

Four barrier factors showed a significant difference in various CD departments. They included BAR2 (Lack of commander's qualifications), BAR4 (Overlaps and conflicts in command views), BAR6 (Lack and losing of expertise due to resignations, retirements or transfer) and BAR7 (Lack of coordination and information sharing between commanders). Several explanations can account for these observations, which are indications of the most common impediments that CD departments face. An empirical study involving the observation of police officers before a terrorist attack in Norway led to the realisation that officers' reaction to and management of the attack did not match the expectations (Sommer et al., 2017). However, the pairwise comparison between the different departments showed a significant difference between CD2 and CD7. This observation was linked to the fact that learning undertakings in the police force mainly focused on day-to-day activities and usual crises but did not prepare officers and commanders to handle new, big tragedies, for example, terrorist attacks.

Overlaps and conflicts in command views often delay decision making and reduce the efficiency of responders. Direction and coordination in a disaster response context are crucial elements to the attainment of direction and synchronisation of existing resources to satisfy various needs during the critical phase of a disaster (Bergström et al., 2016). Therefore, if a commander is incapable of making these two decisions due to overlaps or conflicts in their point of view, inefficiencies are bound to happen (Fleming et al., 2015).

Lack and losing of expertise counts as a significant barrier to the quality of implementing the incident command system. Most incident commands have few commanders with adequate training because of the lack or loss of expertise due to resignations, retirements or transfers. These occurrences usually leave gaps that should be addressed. It is a well-known fact that alterations in job responsibilities due to the loss of key personnel as well as modifications in shift hours can have negative outcomes on process safety (Wincek et al., 2015). In addition, the loss of personnel may occur through job transfers, resignation and the retirement of experts without appropriate replacements, which can cause a significant shortfall with potentially dangerous after-effects.

The lack of coordination and information sharing between commanders is a substantial barrier that affects many incident commands globally. Going by news headlines in recent times, the incidence and relentlessness of disasters are increasing progressively. Therefore, successful coordination by leaders of security organisations is important to guarantee the provision of vital life-saving and life-supporting abilities to victims of tragic incidents. However, coordination amid several levels of government and agencies in the public (or private) sectors is complicated by uncertainty, disorder and urgency that characterise emergencies (Curnin et al., 2015). Coordination can be described as assimilating various distinct events into a cohesive arrangement. Several studies focusing on coordination theories have been done to tackle this problem. Nevertheless, coordination is epitomised by accentuating integration to obtain a unified, rational and combined set of actions. Even with these precautions, attaining amalgamation in the middle of the mix-up and mayhem that typify most emergency situations still remains a challenge. Wolbers et al. (2018) proposed a fragmentation perspective to direct coordination in the management of crises. Through a qualitative study involving 40 different emergency management endeavours in the Netherlands, it was noted that incident commanders and other officers applied three main strategies to handle disjointedness and uncertainty during emergencies: working around protocols, handing over duties and segregating skills. Through these practices, fragmentation becomes an effective tool in achieving coordination. This observation suggested that each CD department experienced a different set of problems, which affected the overall meaning during pairwise comparison of departments.

One barrier factor showed a significant difference in job position BAR9 (Gold commander presence in operation sector that may create conflict and confusion). The results showed much-needed evidence of the presence of Gold commanders in the operations sector, which may create conflict and confusion between job positions and barrier factors. Opinions may conflict and vary in the operation areas because of the presence of Gold commanders in one area. However, if the presence of Gold commanders in the operation rooms requires several decisions, the effort exerted in emergency responses will be uncoordinated. The observed significant difference for barrier BAR9 and job position was because of the ascribed roles of each incident command officer. As explained before, the Gold commander takes overall charge of the organisation's wherewithal remotely in a small room. Here, they also communicate distantly with the Silver and Bronze commanders who are present onsite. Police departments all over the world develop their chains of command such that there are numerous similarities to the military. As an officer advances in rank, they take on additional duties and responsibilities, which makes for more well-organised procedures. Upholding a chain of command also ensures that there is discipline to avoid disastrous events such as injuries and casualties. Members of lower ranks are accustomed to respecting their superiors. Consequently, some duties and responsibilities are only meant for officers in lower ranks. The presence of a Gold commander at the site of an incident may bring confusion because the junior officers may be at conflict whether to proceed with the rescue operations or pay attention to their superior.

Two barrier factors showed a significant difference in academic qualification. They included BAR7 (Lack of coordination and information sharing between commanders), and BAR10 (Incident command system is new). The lack of coordination associated with academic qualifications may lead to poor orientation and limited support from the CDGC leadership. Insufficient or poorly executed collaboration, coordination, and communication through information sharing have been identified as pertinent barriers to incident command systems (Van Niekerk et al., 2015), which emphasise the importance of this factor. Responding to emergencies often necessitates collaborative efforts of participants from numerous precincts and levels of government. However, the aims of federal organisations often vary from those of other agencies with respect to the prevailing emergency. The significant difference that was seen between barrier BAR7 and level of education was a common phenomenon in all incident command systems. Coordination and information sharing are prevalent problems at various organisation levels. This observation meant that the level of education did not alter this barrier in any way, signifying that coordination issues cut across people of all levels of education.

The significant difference observed between barrier BAR10 and level of education could be explained by the influence of educational training on one's perception of an incident command. Higher levels of training expose an individual to different settings thus cultivating open-mindedness and flexibility (Taylor, 2017). Consequently, such an individual can easily adapt to various situations within a short time and act appropriately. Furthermore, unexpected events always threaten human communities, which emphasises the need for preparedness. In the same way, commanders are unfamiliar with new incident command systems and tend to see it as a barrier, especially if new procedures are involved. In the pairwise comparison, the significant differences for BAR10 between higher diploma and bachelor as well as between higher diploma and high school were due to the perceived education gaps between the different levels of education. With reference to the gaps identified previously in the qualitative results, it is evident that the acquisition of sufficient knowledge about the incident command system requires extensive training rather than only high academic qualifications. Indeed, scientifically equipped CDGC personnel still need professional training because the system is new and requires professional knowledge. Certain civil defence departments expect police officers to fulfil continuing education and certification requirements as a condition of their employment.

Significantly, the proposed framework has a higher number of dimensions and factors, which provides adequate details to facilitate the implementation and evaluation of the framework. Furthermore, the separation of the dimensions provides sufficient detail to address specific factors that affect the overall effectiveness, rather than consolidating them as is the case in the conceptual framework (Shooshtari et al., 2017).

The proposed framework captures many factors that are either missing or unclear in the conceptual framework. These details can be used to keep track of the operations of the incident command system in the UAE. The comprehensiveness of the barrier factors can also be evaluated to improve the operations of the UAE command system. Consequently, the UAE's proposed framework is a management tool, with a series of principles that when put into practice assemble an adequate instrument to coordinate the integrated performance of multiple operations in different situations. Notably, it is important to highlight here that the UAE framework is much more than just an organisational chart demonstrating the functions of each section, as the current structure of the conceptual framework is not completely compatible with its functions, factors, and types of activities provided by each section. This research has proposed a framework that imposes its own logic on the organisation's strategy, organisation, and culture. Thus, the implementation of the framework could force the CDGC agency to adapt or adopt this new framework with the aim of supporting its organisational goals. The changes shown in the UAE's improved framework may significantly affect organisational structures, policies, processes, and employees. As a result, the fourth research question is answered and the proposed framework can assist the UAE's CDGC agency to improve their emergency response capabilities as indicated by the strengths of the framework.

7.12 UAE Incident Command System Framework Validation Process

This research derives its significance from the importance of emergency response. The UAE, just as many other countries, faces emergency and hazard events such as sandstorms, flooding, earthquakes, tsunamis, tropical storms, and fire, which have resulted in the major destruction of property (Kumar, 2013, NCEMA, 2014c). This increases the need for the UAE's CDGC agency to have a framework, which incorporates the emergency response command. As previously mentioned, although the emergency response command is being practiced in the UAE, there is no literature or detailed framework about its implementation.

This study has focused on the perceptions and opinions of the commanders regarding basic implementation factors of the command structure, barriers being faced during the implementation, important influential organisational and individual factors and possible solutions for the enhancement and improvement of the emergency response activities in the CDGC agency across the country. The researcher's involvement of the Gold and Silver commanders in the field of emergency response has helped identify credible and viable factors to be included in the framework.

This study is an attempt to fill a literary gap in the field of emergency response in the UAE, specifically for implementation of the command structure in the CDGC agency. The exploratory sequential mixed method approach findings have provided comparative narratives about the views and perceptions of the Gold, Silver and Bronze commanders for the implementation of the GSB structure in the CDGC agency. The framework validation section is designed and developed to successfully achieve the sixth research objective of the study, which is focused on validating the key factors that may affect the successful implementation of the command structure during different types of incidents in the UAE. Furthermore, the framework is supposed to provide comprehensive outputs and guidelines for the commanders of three levels, so that actions can be taken according to the proposed recommendations for the improvement of the command structure implementation and handling of emergency incidents.

The qualitative study conducted in the first phase of the research (Chapter 5), helped to explore and identify factors affecting the successful implementation of the command structure in the CDGC agency. In addition, the quantitative study conducted in the second phase of the research (Chapter 6) helped to confirm the framework for the successful implementation of the command structure. Data collected was extracted using the exploratory sequential mixed method research approach, and the results provided a base for development of the command framework. According to Voss et al. (2002), a case study research should be followed up by survey-based research to examine and validate previous theory based results and avoid sharing the same weaknesses. In validating the results from the first qualitative phase, the researcher has sought to develop a reliable and valid scale of theoretical themes based on the quantitative results. In the next sections, a summary of validation process is illustrated.

The quality factors of the incident command system framework were examined using an expert survey. The incident command framework was sent to an expert's panel in the CDGC agency in the UAE for validation through a questionnaire survey. The experts' survey allows information from specialists in a specific field to be gained. The expert's panel for the validation process is selected through purposive sampling. According to Gray (2014), the purposive sampling is used when the participants being investigated are chosen because they can provide important feedback on the subject, that could not be gained from other sampling techniques. A sample size can only be considered sufficient for the provision of feedback for validation if the sample possesses the knowledge and experience for specific roles and responsibilities within the same industry (Beecham et al., 2005).

After that, the quality factors used in this research study are adapted from the one defined by (Moody and Shanks, 2003, Moody, 2003). The definitions of the quality factors are:

1. Simplicity: Framework contains minimum possible factors and is simple to use;
2. Completeness: the framework is covering all the required factors;
3. Flexibility: the ease at which the framework can cope with business and/or regulatory changes;
4. Understandability and Acceptable: the ease at which the concepts and structure of the framework is easily understood;
5. Implement ability and Usefulness: the ease with which the framework can be implemented.

In order to validate the UAE incident command system framework, a non-probability sampling technique of purposive sampling has been used. As mentioned previously in section 4.11.2 in chapter 4, this technique is chosen when participants being investigated are chosen because they can participate in research by providing important knowledge that could not be gained from another sampling. Furthermore, choosing a different sample size from what was chosen in the qualitative and quantitative phases for this particular validation stage, should raise the level of confidence and decrease the possibility of data response bias, which helps in the collection of a valid framework without the data bias.

Hence, a five-point Likert scale survey was used to measure the perceptions and opinions of the experts about the accuracy and validity of the framework (Boone and Boone, 2012). The five-point Likert scale survey ranged from strongly disagree = 1 to strongly agree = 5, which was helpful in gathering specific information or facts about the incident command system framework. The survey was administered to a small sample size of (n= 11) experts of the CDGC agency in the UAE. In this survey, the experts were asked to answer questions on the framework quality factors of simplicity, completeness, flexibility, understanding of ability, acceptance, usefulness and implementation ability. The UAE incident command system framework was designed based on a hierarchical framework in Figure 7.1 (See Appendix J UAE incident command system framework validation survey). The hierarchical framework is better at presenting all the possibilities and various factors within CDGC departments affecting the success of the command system.

7.13 The Framework Validation Results

During the stage of data collection from the experts to validate the framework of the incident command structure, the researcher had to take into consideration that all the participants were new to the research project. Therefore, the researcher had to contact the participants at the validation stage in order to ensure that they had a comprehensive understanding of the research aim and findings. Having done that, the survey link was sent through the participants' emails and this was followed up by an explanation through a phone call on the framework based on its quality factor criteria.

The questionnaire data was analysed using descriptive statistics and employed as the main method of data analysis validation. The IBM SPSS v23 offered the opportunity to create descriptive statistics using graphs and an exploration of the data (Pallant, 2013). Therefore, descriptive statistics were adopted, as this approach was useful when the focus of the survey was to understand the opinions and values of the experts in the CDGC agency, and the descriptive statistics provided a summary of presentation in tables about the participant sample size. This approach helped to gain an understanding of the experts' values and opinions regarding the incident command system framework and how the survey would be answered to validate this framework.

In addition, the experts were chosen as a different sample size due to an increase in the level of confidence and a decrease in the possibility of data response bias, which helps when collecting a valid framework without the data being biased. Furthermore, choosing the experts was also based on their years of experience, with more than 11 years and above in the area. Table 7.3 below presents demographic statistics of the experts' level of experience in the CDGC agency, along with their occupation sector and background they are assigned to.

Consequently, the survey was distributed purposively from a total of eleven (n=11) experts in five main sectors. The five main sectors were namely; Emergency Operations Management (n=4), Fire-fighters and Rescue Management (n=2), Public Safety and Civil Protection (n=1), Resource and Support Services (n=2) Strategic Management and Development of Performance (n=2). All of the responses from the experts were answered through a survey link, and in this case the response rate was 100%. The Table 7.3 below demonstrates descriptive statistics of the participants, in terms of the years of experience and occupation sectors and background.

Table 7.3: The Descriptive Statistics of the Demographics of the Respondents

Characteristics	Frequency	(%)
Years of experience		
11-15 years	2	18.2
16-20 years	3	27.3
21-25 years	4	36.4
More than 25 years	2	18.2

Occupation sectors & Background		
Emergency Operations Management	4	36.4
Fire-fighters and Rescue Management	2	18.2
Public Safety and Civil Protection	1	9.1
Resource and Support Services	2	18.2
Strategic Management and Development of Performance	2	18.2
Total	11	100

In order to achieve the last objective of this research, as indicated previously, a five-point Likert scale survey was used in order to validate the framework. In this survey, the experts were asked to answer questions on the framework quality factors of simplicity, completeness, flexibility, understanding of ability, acceptable, usefulness and implement ability. Figure 7.3 below shows the results which were conducted from 11 experts.

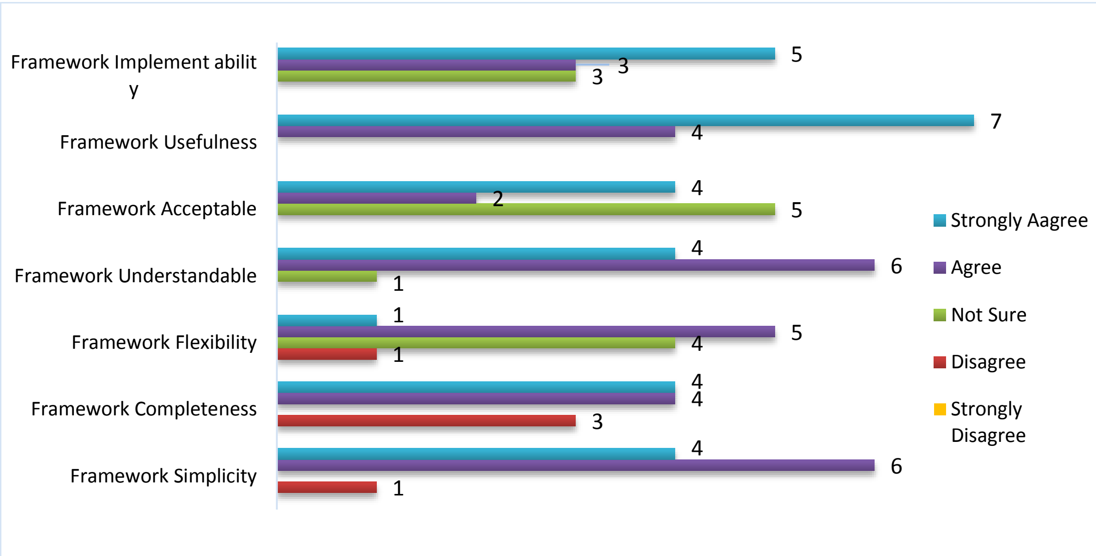


Figure 7.3: Results from Validation Questionnaire

7.13.1 Framework Simplicity

This first quality factor demonstrates the simplicity of the incident command framework and how this framework supports the incident command management. The survey results in Figure 7.3 above indicate that out of the 11 respondents, 36.4% (n=4) responded to the framework being simple as strongly agreed, while 54.5% (n=6) responded as agreed and 9.1%

(n=1) responded as disagree. It is important to note that none responded to the options of disagreed and strongly disagreed. Therefore, it can be concluded that the participants' opinions (agreed and strongly agreed) about the framework simplicity can be upheld because the proportion of respondents that agreed and strongly agreed were 90.9% of the total sample. Thus, the findings of this result help to confirm that the framework is simple enough to support the incident command management in the CDGC agency.

7.13.2 Framework Completeness

The second quality factor illustrates that the incident command system framework content is complete and has captured all the factors faced during the incident response. The survey results in the Figure 7.3 above indicate that out of the total sample of 11 experts, those who strongly agreed that the framework is complete were 36.4% (n=4). Similarly 36.4% (n=4) also agreed that the framework is complete. On the other hand, 27.3% (n=3) participants were in disagreement that the framework content is complete. It is important to note that none responded as unsure or strongly disagreed. Therefore, it can be concluded that the participants' opinions (agreed and strongly agreed) about whether the "UAE incident command system framework has captured all the factors faced during the incident response" can be upheld because the proportion of respondents that agreed and strongly agreed were 72.72% of the total sample, which confirms that the content of the framework for the respondents has captured all the factors faced during the incident response.

7.13.3 Framework Flexibility

The third quality factor assessed whether the framework is flexible enough to adapt to any change in incident response. From the Figure 7.3 above the results revealed that out of 11 respondents, 45.5% (n=5) respondents agreed to the UAE incident command system framework being flexible, while 9.1% (n=1) respondent strongly agreed that the framework is flexible. However, 36.4% (n=4) of the participants were not sure if the framework is flexible enough to adapt to any change in incident response. Accordingly, these findings suggest that 54.6% strongly agreed and agreed that the framework content is complete. Thus, the findings for this quality factor confirm that the components of the framework are flexible enough to adapt to any change in incident response.

7.13.4 Framework Understandable

The fourth quality factor was designed to address a question of whether the framework content and structure are easy to understand (Understandable). The results indicated in the Figure 7.3 above revealed that out of 11 participants, 54.5% (n=6) agreed that the framework is understandable, and it is apparent from this figure that the participants strongly agreed 36.4% (n=4), while 9.1% (n=1) was not sure if the UAE incident command system framework content and structure are easy to understand. Therefore, it can be concluded that the participants' opinions (agreed and strongly agreed) about the framework content and structure is understandable and easy to understand was confirmed because the proportion of respondents that agreed and strongly agreed were 90.91% of the total sample. The evidence from this data suggests that the contents and structure of the framework are easy to understand.

7.13.5 Framework Acceptable

The fifth quality factor was designed to answer the fifth quality factor question which was "do you have confidence that the emergency response professionals will accept the incident command system framework?" It can be evidenced from the Figure 7.3 above that out of 11 participants, 18.2% (n=2) agreed the framework is acceptable, and 36.6% (n=4) strongly agreed, while 45.5% (n=5) were not sure if the emergency response professionals would accept the framework. Furthermore, no participant disagreed, and strongly disagreed that the emergency response professionals would accept the framework. Therefore, it can be concluded from the participants' opinions (agreed and strongly agreed) that they have confidence that the emergency response professionals would accept the framework. This was confirmed because the proportion of respondents that agreed and strongly agreed were 54.8% of the total sample. Thus, the results from this figure indicate that the framework content is acceptable. These findings confirm that the participants have confidence that the emergency response professionals would accept the framework.

7.13.6 Framework Usefulness

The sixth quality factor was designed to answer the sixth question which is "do you think that the framework components are useful for emergency response professionals?". From the Figure 7.3 above the results revealed that out of 11 participants, 36.4% (n=4) agreed the framework is useful, and 63.6% (n=7) strongly agreed that the incident command system framework components are useful for emergency response professionals. Furthermore, no participants disagreed, strongly disagreed or were not sure the framework components are useful to emergency response professionals. Therefore, it can be concluded that the participants' opinions (agreed and strongly agreed) about the usefulness of the framework components to emergency response professionals was confirmed because the proportion of respondents that agreed and strongly agreed were 100% of the total sample.

7.13.7 Framework Implement ability

The final quality factor was designed to address the final question for the incident command system framework, which was whether the participants have confidence that the framework can be implemented in their working environment in the CDGC agency (implementation ability). According to the results in the Figure 7.3 above, they revealed that out of 11 participants, 27.3% (n=3) agreed the incident command system framework could be implemented in the CDGC agency, and 45.5% (n=5) strongly agreed, while 27.3% (n=3) were not sure if the framework components can be adopted and implemented in their working environment. Furthermore, no participants disagreed or strongly disagreed on the question. Therefore, it can be concluded that the participants' opinions (agreed and strongly agreed) on the adoption and implementation of the UAE incident command system framework in their working environment in the CDGC agency was confirmed because the proportion of respondents that agreed and strongly agreed were 72.72% of the total sample.

7.14 Chapter Summary

The main aim of this chapter was the achievement of the six objective and research question number four of this study though the validation of the UAE incident command system framework. The framework was originally designed through the literature review and the results achieved through the qualitative data analysis and findings. In the quantitative data analysis and findings, many scales of reliability and validity were achieved. A total of 42 factors which represented all five dimensions of the framework from the qualitative data were tested through the KWt, and therefore a total of 20 factors were statistically showed up significant in the quantitative chapter six. The research readdressed seven proposals to improve the management of emergency in the UAE. These proposals cover the barrier factors and where based on the primary data and the empirical results. At the beginning of chapter eight, the approach on developing the framework and discussion of each factor within each section was conducted and triangulated between the qualitative findings, quantitative findings, documentation, and literature review.

Then, the UAE improved incident command system framework was confirmed and it consisted of five sections, within a total of 42 factors, which were; implementation factors for the incident command structure; organisational factors influencing the system implementation; individual factors influencing the system implementation; barriers faced in the command structure and drivers of the incident command structure. The 42 factors are presented within these five sections and the survey of participants was conducted for the validation process of the framework. This chapter determined that the UAE incident command framework for the CDGC agency includes the benefits of: simplicity; completeness; flexibility, being understandable; acceptable; and it has usefulness and implement ability. It can be concluded that the framework is reliable and valid for its generalisation of findings for similar emergency response agencies.

CHAPTER 8 COCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

In consideration of achieving the research aim and objectives, this chapter intends to discuss the research outcomes and contributions, in order to propose a framework for successful incident command implementation, particularly in the CDGC agency and generally for other emergency response agencies in the UAE. This chapter is divided into six main sections, and the first section discusses the achievement of the research aim and objectives. The second section explains its contribution to theory and practice. The third section details the research implications drawn from through research progress. Fourthly, the limitations and scope of the research are discussed. Fifthly, the recommendations for improving emergency response operations are discussed. Finally, the final section discusses recommendations for future research.

8.2 Achievement the Research Aim and Objectives

In accordance with the achievement of the research aim, the purpose of the study was to develop a framework for the incident command structure in the UAE's CDGC agency. Accordingly, the aim of the study has been achieved through the accomplishment of the main research objectives. Thus, the research objective findings are elaborated in the following sections.

8.2.1 Objective 1: To identify and evaluate the current emergency management practice in the UAE's emergency agencies.

In order to improve understanding of the concept of emergency response in the UAE, an overview of the types of typical or possible hazards were highlighted. As without a clear understanding of the risks and dangers, it could become difficult to recognise their categorisation and principles. Thus, with the aim of achieving this objective, an intensive literature review was conducted, which focused on emergency management in the UAE. This partially helped in achieving the first research question, which is *"What are the best practices* *of incident command systems recognised by emergency agencies in the UAE and in developed countries?"* With the background information building a foundation on which to present a proper ground for the synthesis of the first objective and connects its elements. After that, a justification for selection of the response phase as a research focus out of the remaining four emergency management phases of (mitigation, preparedness, response, and recovery) was conducted. The literature review in section 2.4 in chapter 2, also elaborated on the types of natural hazards in the UAE context, as well as what the main emergency agency is and who is responsible for the minimisation of the negative impacts of these hazards.

Chapter two recognised several gaps identified by previous researchers, as well as drawing on insight gathered from the author's experience in the field and communications with the chief commanders in the CDGC agency in the UAE. Notably, this absence of specific literature with regards to the UAE necessitated a search for theoretical knowledge at a global level. Frequently, the author also found that the application of the incident command system in the CDGC was not effectively implemented. To address these concerns the author carried out an appropriate level of investigations through available CDGC documents to highlight the possible misunderstanding. Accordingly, in order to achieve this objective, the CDGC agency was selected as a holistic single case study, due to it working in the role of public guardianship by assuring safety and offering protection of national wealth across all of the Emirates during disasters and emergencies. As mentioned previously, the CDGC agency is responsible for emergency management and saving people's lives, whilst protecting properties, through operational command and control of organisations and public services such as the police and fire services.

8.2.2 Objective 2: To investigate and analyse the critical factors and principles of practices, of effective and efficient incident command systems in developed countries.

In light of achieving the second objective, a critical review from the literature on the incident command systems implemented internationally was undertaken. Therefore, an examination of the emergency response command structure in developed countries such as the UK (Gold, Silver and Bronze) GSB, the USA incident command system (ICS), and further international command structures, provided an approach for the investigation of the current incident command structure implemented in the CDGC agency in the UAE. The findings from the literature review revealed that each command structure implemented in the UK and the USA has it is own hierarchy structure and functions; however, the concepts are the same in both command structures.

In addition, the chapter findings revealed that the history and reasons for adapting both command structures have some similarities. As despite the years of implementing the two structures, key factors and challenges that affect their functioning still occur. However, it was evident that several efforts have been made over the years through the examination of both command structures and the factors affecting their implementation, to improve emergency operation responses and minimise the negative outcomes of incidents. Based on a review of the literature, all of the factors affecting the incident command structures were illustrated and summarised in chapter three. This helped in achieving the entire first research question; *''What are the best practices of incident command systems recognised by emergency agencies in the UAE and in developed countries?''*

The importance of the incident command system was recognised and therefore the UK GSB structure was adopted in the CDGC agency as a comprehensive incident command structure for effective emergency and incident response in the UAE. Although the CDGC agency has adapted the incident command structure, a gap in the knowledge was identified when reviewing the literature, because there was no visible evidence that examinations and investigations had been conducted about the incident command system in the UAE, except for some articles in the local UAE newspapers. Accordingly, this lack of research helped the researcher to take the chance and further investigate and explore the natural adaptation of the incident command system in the CDGC agency in the UAE. Thus, a review of documentary sources was carried out to investigate and analyse the critical factors and principles of practices of effective and efficient incident command systems in developed countries. This review focused on two areas, which were: a) theoretical developments and research, carried out in the UAE on effective and successful incident command system practices; and b) documents on international experiences systematised in the field of emergency response management. Subsequently, a brief comparison between the UK and the USA's incident command factors was conducted and the rationale for the identification of these elements was also justified. The interdisciplinary nature of the methodology allowed a transcendence of the simple aggregation of concepts and practices to contribute to a comprehensive synthesis of knowledge on emergency response management practices in the UAE. The aim of drawing upon the gaps in emergency response management and the incident command systems to build synthesis and infer relations among sources and management practices in the UAE and developed countries.

8.2.3 Objective 3: To develop a conceptual framework based on the main elements that contribute to the development of resilience focused on the best practices of incident command systems in developed countries.

The research presented the need to develop a conceptual framework based on the best practices drawn from different operations, to respond to emergencies in the context of the UAE. The common disciplines, elements, roles, responsibilities, and system specifications were detailed to describe the core commitments of the conceptual framework. For the development of a framework for the CDGC agency, and for emergency response in general, and the GSB and ICS incident command systems in particular, it was essential to investigate the current incident command structures used internationally, as well as the identification of key fundamental factors that affect the incident command systems. In consideration of achieving this objective, an intensive literature review was carried out, regarding reasons for the adoption of the incident command structures; key factors affecting the command structures, whether organisational or individual; barriers facing the command structure implementation; and drivers of its implementation. Once all of these factors were identified, a conceptual framework of the study was drawn, and the use of several incident command systems across the research literature helped this study to develop it. Moreover, section 3.10 in chapter 3 illustrated some of the principal factors of the conceptual framework and discussed how the different themes were linked in order to offer an explanation and evaluation of the incident command system adapted in the CDGC agency in the UAE. Of utmost importance was the development of a clear and easily understandable conceptual framework that could be used to investigate and appraise the command structure.

8.2.4 Objective 4: To critically analyse the identified factors of incident command system implementation within the emergency agencies, with respect to the CDGC in the UAE.

The fourth objective provided the extent to which the incident command structure within the CDGC agency was investigated. This objective was addressed through a detailed synthesis analysis, to reach key fundamental factors that have affected the incident command structure implementation. The key factors of the current implementation of the incident command, and its initial deployment, challenges and benefits were carried forward through semi-structured interviews in the first qualitative stage of the exploratory sequential mixed method design approach. The semi-structured interviews were conducted with 15 Gold, Silver and SFA commanders involved in emergency response operations at the CDGC agency, from all seven emirates in the UAE.

According to the qualitative findings, several themes and factors were identified within the main sections of the conceptual framework. Notably, the studies identified five sections for effective implementation of the incident command. These sections are; implementation factors for the incident command system ; organisational factors affecting the command system, individual factors affecting the command system, barriers facing the command after it is implementation, and finally drivers of the incident command system implementation. A thematic analysis was conducted to further analyse the five main sections in the qualitative chapter five. From the thematic analysis, a total of 42 factors within all sections were identified. Thus, the details of the findings have helped to fill in the gaps in the subject by determining the main elements and factors that enhance successful implementation of the incident command system in the CDGC agency. Furthermore, the qualitative findings have helped the study to answer the second research question of *"What are the current key fundamental factors that affect the implementation of the incident command system within the CDGC in the UAE?"*

8.2.5 Objective 5: To critically evaluate a unified incident command system for improving the UAE's incident command system performance during emergence response.

This objective was concerned with the examination of essential key factors that influence the effective implementation of the incident command system framework in the CDGC agency. The qualitative findings in chapter five enhanced the design of the questionnaire survey in the second stage of data collection. Although the qualitative study provides in depth information about the command structure, it was necessary to have breadth information from a large sample size; therefore the quantitative study was conducted with 153 Bronze commanders. The sequential mixed method approach helped to improve the research triangulation, reliability and validity. According to the KWt analysis and quantitative findings, which were used to examine the relations between all factors within each section of the incident command framework, significant differences were identified in the following factors: implementation, organisational, individual, barriers and drivers. Firstly, differences in the overall implementation factors were found in the variable; 'avoid unauthorised intervention in command'. Secondly, significant differences in the overall organisational factors were identified in the variable; 'rigorous regulations of incident command'. Thirdly, differences in the overall individual factors were recognised in the variable; 'situational awareness during incident response'. Fourthly, the CD departments differed in their barrier factors, indicating four barriers, which were; 'lack of expertise due to resignations and retirements', 'lack of coordination and information sharing between commanders', 'overlaps and conflicts in command views' and a 'lack of commander qualifications'. Finally, considerable differences in theoverall driver factors were encountered in two variables, namely; 'coordination and information sharing was transmitted between commander levels' and 'incident command system successfully achieved its goals and benefits'.

Thereafter, the KWt was used to validate and confirm the entire factors in each section. A total of 42 factors combining the incident command system framework were validated. In general, in chapter six the findings from the quantitative chapter were discussed according to each factor and themes. Thus, the development of the framework resulted in five main sections confirmed from the quantitative findings (Chapter 6). Therefore, the fifth objective was achieved successfully through specifically quantitative findings, and generally from the discussion of the qualitative in chapter five, and the results were used to answer the third research question *"How the major factors influence the effective implementation of the incident command system within the CDGC agency in the UAE?"*.

8.2.6 Objective 6: To develop and evaluate the proposed UAE incident command system that will facilitate the improvement of the management of emergencies.

The study achieved this objective successfully in the validation section, which is the ultimate section of chapter seven. The incident command system framework was validated utilising 11 expert's value responses through purposive sampling techniques. The participants' perceptions were recorded through a questionnaire survey. With the results indicating that these sections represent 42 factors in the framework. Therefore, the incident command system framework is reliable and valid for the generalisation of findings in similar emergency response agencies. Hence, the sixth objective was achieved successfully through specifically qualitative and quantitative findings, and generally from the discussion and development of the framework in chapter seven, and the results were used to answer the fourth research question *"What is the greater role that can be played by the UAE proposed incident command system framework to assist the CDGC agency in different emergency response?"*

Based on the primary data of both the qualitative and quantitative findings, it was possible to develop a unified incident command system framework for improving the UAE's CDGC performance during emergency response. This framework obtained the common seven barrier factors, which stress the lack of commanders' qualification, overlaps and conflicts in command, lack and losing of expertise, lack of coordination/ information sharing, gold commander presence in operation scene, lack of coordination/ information sharing and incident command system is new. In general, in chapter seven the findings from the qualitative and quantitative chapters were discussed according to each factor and themes. The general literature review also supported both findings in the emergency response subject and in particular from specific literature related to the incident command systems. Thus, the development of the UAE framework resulted in five main sections established from the qualitative findings (Chapter 5), quantitative findings (Chapter 6) and the literature review (Chapter 2 and 3).

8.3 Research Contribution to Knowledge

The development of a framework for the implementation of the incident command system in the UAEs' CDGC agency was the main aim of this research. The major contribution of this research is the creation of the UAE's proposed incident command system framework built on previous knowledge and research findings. This model will solve problems in emergency management and constitutes high interest to individuals, organisations, and the government. While attempting to build this new framework, the author followed descriptive stages and carried out theory-based observations, as well as the categorisation of incident command system variables and associations. A phenomenal knowledge gap was observed and used as the foundation for the research, which enabled the identification of the associations attributed to each variable (Christensen, 2006). This framework provides some significant guidance when it comes to emergency response operations between emergency agencies and authorities. It offers an improvement strategy that could be used to improve the emergency response operations undertaken by Gold, Silver and Bronze commanders. The principal contribution to knowledge is the improvement of emergency response in the UAE. In addition, further contributions to theory and practice are presented as follows:

8.3.1 Contribution to Theory

The study contributes to theory and provides an in depth understanding of the incident command system that has not previously been published in emergency response literature in the UAE. It identified the main framework for the incident command system through the study journey timeframe. The framework has provided a comprehensive understanding for the implementation factors of the incident command system, which are; organisational factors, individual factors, barrier and driver factors associated with the command structure, in the CDGC agency (See Figure 7.1). This provides professionals and academics a unique understanding of some major challenges that would remain undiscovered. However, this also requires more inclusive investigation.

The research undertaken has added significant data to the existing knowledge using a single case study and the methodology described in detail in chapter four. With a review of the existing literature on emergency response management, adding information on the variables and constructed concepts, as a part of the explanation of the problem of the research. Notably, it has discovered a new approach to analysing the data gaps relevant to the implementation of the UAE's incident command system. With the outcomes offering a unique study, which adds significance knowledge to this area of study, the convergence of emergency response actions will take place between the poorer and richer countries to maintain security and peace. As these countries seek to cope with the complex results of emergencies, they will tend to rely on effective emergency management systems, not rigid ones. Consequently, as noted by Alexander (2008) this framework will contribute towards a positive trend not only in its country of origin but, also outside the UAE, where it could foster cooperation and coordination with other countries in terms of emergency response to hazards.

Furthermore, according to the literature review, as it was noticed that there was a lack of academic research into the emergency response as applied to the UAE, this study contributes to theory in generalising the research findings. The exploratory sequential mixed methods design helped the researcher to conduct in-depth information through semi-structured interviews and in breadth information through a questionnaire survey. These two major data collection approaches enhanced the research to provide a comprehensive analysis of data results. The integration of both quantitative and qualitative data increases the strengths and decreases the weaknesses of each data type and vice versa. Moreover, triangulation of the data collection was also achieved. Although the research was conducted in the CDGC as an emergency response agency in the UAE, the research results of the findings can be generalised in a similar context, in particular, for other emergency response services.

8.3.2 Contribution to Practice

This research has contributed to practice in emergency response, particularly on the subject of incident command structures, which are used internationally. This research has also identified emergency response key factors and addressed the implementation factors, organisational factors, individual factors, barrier and driver factors associated with the incident command structure. An Investigation into how the incident command system is used in the CDGC agency in the UAE has provided in depth knowledge and breadth information relating the command structure.

Another valuable and practical contribution for the use of the research outcomes, that are pertinent to the UAE's incident command framework, is the possibility to practice change in the procedures carried out by the CDGC commanders when dealing with emergencies. The value of this research for CDGC practitioners and students lies in the exchange of knowledge and practices, which enhance awareness and understanding. Among the important findings demonstrated in the practice of the incident command system are the results of the KWt, which identified significant results concerning the following factors firstly the lack of commander qualifications p =.043, overlaps and conflicts in command p =.033, lack and loss of expertise p =.008, lack of coordination/information sharing p =.022 between CD departments and barrier factors. Secondly, Gold commander presence in operation scene p =.041 between job position and barrier factors. Thirdly ,lack of coordination/information sharing p =.018, incident command system is new p =.001 between academic qualification and barrier factors.

The study observed that commanders play a crucial function in the handling of tragedies because their obligation is to direct and manage responses. Therefore, they should have the appropriate qualifications to lead the entire incidence command team. The empirical results also showed that overlaps and conflicts in command views' are usually evident in apparent mission mismatches among federal, state, and local participants, which lower the effectiveness of incident command teams. One of the interesting findings was that the attrition of experts often leaves gaps in the incident command system, which may be difficult to fill due to insufficient expertise. There is a need to ensure adequate expertise in CDGC by recruiting more personnel to replace specialists who have left these stations.

Precisely, the role and performance of commanders before, during, and after emergencies are linked to the experience. knowledge, and skills gained in their academic lives. That is, well-educated commanders are likely to be goal-oriented and better informed about emergency response activities. Their professional experience in coordination and communication enables CDGC commanders to execute the planned producers and shape each unit’s understanding of the situation. However, coordination is an important element of the command and control process. Indeed, commanders who lack coordination skills may fail to fill many of the gaps. Moreover, coordination skills do not usually accompany academic qualifications; instead, they are acquired by experience. Academicians are defined by professionals who usually know what is to be done based on rational maturation and scientific understanding. The knowledge and skills acquired during his or her academic life are likely to become part of a commander’s personality, which are apparent in the ways in which he or she coordinates operations and shares information. The relationship between academic qualifications and the ability to facilitate incident management corresponds to the skills and scientific capabilities of academicians in implementing policies and procedures. Thus, “qualitative knowledge” suggests that academically qualified commanders are familiar with incident command system protocols and management practices in this area of operations.

This study suggests that job position should comply with the objectives, strategies, organisational tactics, and required resources. The quantitative results indicated that these regulations tightly control the individuals, organisations, and agencies involved in emergency response activities. However, based on these results, it is suggested that incident command regulations should be enforced among job positions so that orders are executed in accordance with the SOPs. Consequently, based on the results of the qualitative data analysis, the Gold commanders’ lack of understanding of leadership responsibilities may cause all efforts to fail or lead to confusion in the roles of lower commanders. In general, the presence of two or more general commanders in the operation area should be based on agreed tactics.

Inter-organisational coordination is a factor that profoundly enhances the incident command activities and contributes to the organisation's effectiveness. Additionally, this coordination may result in a kind of "virtual organisation". Obviously, the involvement of the CDGC with local, regional, and national alliances will lead all allied parties to act beyond traditional organisational boundaries. Based on the qualitative results, because of different types of hazards, coordination and information sharing between allies are necessities. In this new era, traditional concepts of emergency response tactics are abandoned or questioned. Moreover, the concept of barrier is changing to reflect the challenges inherent in the new environment into opportunities. Therefore, information sharing between commanders should be conducted based on the strategic foresight of the organisation. Linked with this concept, commanders must share information to anticipate future emergencies and make plans to handle them.

The relationship between barrier factors and academic qualification in terms of incident command system is new suggests that commanders be recruited based on the completion of the UK certificate regulations. The MOI offers scholarships that tailored to improve the effectiveness and efficiency of the CDGC.

By providing a new framework, the research provides structured activities for UAE emergency response agencies. In addition, as Buck et al. (2006) advocated, the terminology, operational concepts, system procedures, technical aspects and proper tactics will facilitate incident command operations. According to Deming (2000) the PDCA cycle is a method of managing processes or systems. It is the way to achieve the goals assigned to the products of enterprise system. It is design to be used as a dynamic model in the spirit of contentious quality improvement and a new process of change. As a result, the integration of the function of the new framework and structure will enable organisations and commanders to share varied domains of knowledge and experiences to mitigate hazards.

This has the potential to enhance the response capabilities of the UAE emergency agencies such as the CDGC agency and police forces, and also provide guidance for other countries that implement similar emergency command structures. The improved UAE incident command system framework assigns CD qualified commanders in different functions and levels of responsibilities to respond to emergencies. It also suggests a specific organisation structure that is established according to the management needs. From a practical contribution perceptive, the incident command system framework provides the MOI, NCEMA, and CDGC with detailed factors for the current incident command structure that could help to improve emergency operations in the UAE.

8.4 Implications of the Study

This research on the incident command system in the UAE context was inspired by the experience of the author, who offered a unique insight into the subject. Although, the international debate on incident command systems is not new in the literature. The significance of the research idea lies beyond the fact that the incident command system in the UAE started as a mere conception, which lacked operational efficiency. Afterwards, this efficiency was gained by comparing and benchmarking standard operational procedures of the system with the standard operational procedures of developed countries. Accordingly, the formation of an incident command system has contributed to an increase in emergency management knowledge in the local context. This research sought to capture the representative views of the CDGC practitioners regarding emergency response, with the intention being to equip them with understanding and awareness.

In terms of theory, this framework is configured as a platform to develop the function of the incident command system and allow practitioners to use existing information for planning, reporting and structure requirements. An assessment supported the literature review and strengthened the research synthesis, which was pertinent to emergency response management and can be used to conduct future research.

In the field of practice, the system implementation, operation, and evaluation are still vague for practitioners, resulting in drawbacks at management and operational levels. For this reason, the study provided a core element that highlighted the barrier factors associated with the UAE's incident command system and treated them logically and methodologically; thus, the results of the study will provide the CDGC organisation and practitioners with a deeper knowledge and an insight that is required to deal with emergencies effectively. The study also provided a novel awareness into the factors that affect the incident command system within the emergency response activities. Moreover, the study evaluated the relationships between the dependent variables in the incident command system framework (implementation, organisational, individual, barriers, and drivers), then examined whether the independent variables (the CDGC departments, job position and academic qualification) were directly related to the system's effectiveness.

The study raises a critical question as to whether it allows for the comprehension of a complex system. An understanding of the complex system suggests that system applications will always be subject to interpretation in terms of time and space, this is because the response to emergencies usually differs according to the magnitude of incidents and the changeable nature of hazard dynamics. In addition to that, system applications also require level of education, increase training to improve the knowledge level of incident commanders and a clear distinction of roles among various job position, particularly between section managers and station managers.

The UAE proposed incident command system framework is not complex in its composition, and the interactions between levels of commanders and factors are easily understood by the CDGC practitioners. Furthermore, the MOI in the UAE provides the CDGC departments with SOPs to encourage novel applications of the framework. In the view of system complexity, it is viewed that the theoretical design of the proposed system differs from the way it is applied (Bergström et al., 2016). This depends on how the CDGC first respondent perceives the principles of command and control practices and uses their knowledge and experience to make decisions relating to the emergencies. Consequently, the findings of this research correspond with the notion that theory is hard to put into practice. Thus, the application of the findings of this research adds new areas of knowledge that if practised can add value to emergency management effectiveness, based on the examination of the levels of command structure and the roles and responsibilities of commanders qualitatively and quantitatively.

Indeed, the results of this study provide a solid basis for future research to identify the nature of each weighted factor in the study and to address its significance and the strategies for improvement. The proposed UAE framework aims to enhance the coordination and cooperation between commanders and provide the extent to which the commanders influence each other at the operational level. Through this result, the research offers an opportunity for future researchers to examine the influence of high level on low level commanders through real incidents or exercises (Groenendaal and Helsloot, 2016). The influence of high level commanders on low level commanders was examined in terms of Gold attendance at the scene during the emergency response, although scientific knowledge in this field is rather limited.

In addition, the study aimed to achieve the rational of the research and identify the relationships between the dependent and independent variables, which are considered unique to the context of the UAE. More importantly, an improved incident command system framework for the UAE was developed based on the barreir factors which were significantly used as oppertunies to improve the emergency response managmeent at both the management and operational levels.

Apart from the structural and functional perspective of the proposed framework, this study can be used as a reference guide for the UAE's CDGC commanders, academics and the NCEMA organisation, as a professional learning document. During the response to an incident, it is not reasonable to learn a new language or technical jargon from other agencies. Specifically, when the organisations involved in many of the agencies, do not have a language that is common to all, thereby, it is very likely that confusion and misunderstanding will occur. One of the main reasons for an improved incident command system framework was to provide practitioners with common terminology that would ensure that multi-agency responses could be rapidly integrated, forming a coordinated, goal-focused team.

The final implication drawn from the research results details how these findings can be significant for policy. Regarding policy, the results can be used to enforce new guidelines and laws to optimise and codify guided procedures for emergency response stakeholders. The research findings offer implications for the policy dimension as they have created opportunities for the policy to change its mandate of the incident command system procedures. Launder and

Perry (2014) identify how factors associated with incident management evolve and how they are used to maintain the safety of practitioners. In view of this, the suggested framework stresses the effectiveness and resilience of the command structure and functions at different commanding levels, to enhance safety for the CDGC employees. First, the research has shown how the incident command system can be synthesised to develop a suggested incident command system framework, which clarifies new factors to deal with emergencies effectively. The framework developed in this research is an essential tool for overcoming emergencies; it ensures the accuracy of the command and control structure and improves the coordination of the resources and communications. It is an evolving and systematic method of coordinating and controlling a wide variety of key activities, resources, and organisations from a central command. Gaps in each of the factors in the conceptual framework were identified as contributing factors for the development of the UAE proposed incident command system framework, thereby, the CDGC in the UAE can consider these factors in the context of emergency response management and, thus, use the findings of this research to train CDGC personnel. Second, the suggested framework provides new structural solutions; therefore it would be advisable for the CDGC agency to redesign and rewrite the policy of the command structure of the incident command system, so as to accurately reflect the known behavioural solutions, which have been identified in emergency response management.

8.5 Limitations of the Study

Although the aim and objectives of this study were reached, it is noted that research limitations are part of the research process. The limitations of the research should be specified in order to provide a clear understanding of the work was achieved. The subsequent section illustrates the limitations of this study as follows:

1. According to the literature review, there was a lack of research on the subject of incident command systems using the incident command system in the UAE. This has made reviewing the literature more challenging. Hence the research focused on exploring the incident command response structures such as the UK GSB and the US ICS structure to identify some key elements of both.

2. The investigation is limited geographically to the confines of the borders of the UAE and conducted with regards to the CDGC agency in the seven Emirates. Therefore, the scope of a single case study is limited to the UAE's CDGC and the sample is restricted to the exploration of the main reasons, challenges and factors that may help the effective implementation of the command levels of response to emergencies. At the Gold and the Silver level, this was carried out by conducting semi-structured interviews at the first phase, and at the Bronze level by conducting questionnaire surveys to examine the perceptions and values of the Bronze commander towards the incident command system framework implementation. Then critically evaluating the existing command structure with best practice approaches.
3. Some of the documents were restricted, and the researcher was only able to check them during the semi-structured interview.
4. This research has conducted an exploratory sequential mixed methods design approach in order to bridge the gap between qualitative and quantitative approaches and to make the generalisation for other content more possible. Therefore, in the quantitative stage, because the PhD study has a limit time, reaching the required sample size from Bronze commanders was challenging and time consuming. The researcher had to follow and contact the human resources in the CDGC several times to collect the responses from Bronze participants.
5. Another limitation was the difficulty encountered when attempting to interview the Gold, Silver, and Bronze samples, where the researcher faced travel issues due to the varied locations.
6. The UAE proposed incident command framework is limited only to emergency agencies. Non-government organisations are thus not included in the utilisation or implementation of the framework. This constitutes another limitation.
7. In order to select adequate data collection analysis techniques such as Nvivo v11 (qualitative technique) and SPSS v23 (quantitative technique), the researcher had to gain knowledge about both data analyses techniques from different sources. This was carried out through the participation of external courses outside the campus of the

University of Salford, and based on some sessions available on YouTube. In addition, the researcher had to register on paid online courses for both software. As the training programmes, Nvivo and SPSS were lacking at the University of Salford.

8.6 Recommendations for Improving Emergency Response Operations

A variety of recommendations were sought through this research. Basically, the recommendations were categorised into two main groups, firstly recommendations to improve emergency response operations within emergency response agencies, secondly recommendations for future research. Based on the research findings, this section summarises the recommendations for consideration within the subject:

1. To address delays or inefficiencies that are related to factor 3 (avoiding unauthorised intervention in command), a set of priorities should be designed to enhance efficiency during responses to major incidents. A proposed system is the Major Incident Medical Management and Support (MIMMS) system, which has been implemented in the UK (Lowes and Cosgrove, 2016).
2. An amalgamated and competency-based teaching style that makes use of a blend of exercises and lectures can be used to enhance intercultural and interdisciplinary assimilation.
3. Emergency management courses should be standardised to encourage intercultural and inter-agency performance in all phases of the emergency management cycle.
4. A specified set of standards and evaluation measures can be attained via unanimity, instruction and training in various units. The use of scenario-based training should be emphasised to present realistic situations (Khorram-Manesh et al., 2015).
5. Incident commanders and response teams should understand the context of events and envisage likely occurrences to respond successfully to a disaster. This feat can be attained by enhancing the quality of information frameworks to support the access, development and dissemination of information.
6. Critical information should be defined in a way that considers the diverse modes of communication and different types of information. Furthermore, the information

quality facet should be able to support a wide range of information, including geographic facts, which are crucial in emergency management.

7. Additional investigations are needed to determine the precise differences in the commander qualifications in CDGC where significant differences were observed.
8. There is a need to ensure adequate expertise in CDGC by recruiting more personnel to replace specialists who have left these stations.
9. CD departments with low levels of coordination and information sharing should strive to emulate other departments that performed well with respect to these attributes.
10. The CD departments should adopt behaviours that encourage common structures to understand inter-team capabilities and information needs. This process enhances information dissemination and can reduce the efforts required for information processing.
11. The level of education should be considered when appointing incident commanders. A higher diploma can be set as the minimum education requirement for higher ranks in the incident command system.
12. There should be increased training to improve the knowledge levels of incident commanders to make them suitable candidates for nomination to different commander positions. The criteria for nominations of the three levels of command should be changed. As the process needs to be clearer and optimally based on the four levels of command qualifications set out by the Office of Qualifications and Examination Regulations in the UK.
13. It has been highlighted in the study that, as the younger lower levels of commanders will progress through the system to higher levels in the future, there is a need for them to be supported and trained through qualifications and formation. More officers should be encouraged to pursue education and attain a bachelor's degree.
14. All incident commands should consider implementing policies that enhance the dissemination of information and harmonisation regardless of the level of education of the commanders.

15. IBM intelligent operations centre for emergency management should be deployed to check operational efficiency, integrate data visualisation, prepare plans for growth, share information, analyse and assess performance and coordinate actions.
16. There should be a clear distinction of roles among various job positions, particularly between the section manager and station manager as well as between shift chief and duty officer.
17. The UAE government should encourage further research in the field of emergency response management, to enrich the subject with UAE-based literature.

8.7 Recommendations for Future Research

In this section the recommendations for future research are discussed as follows:

1. The research findings on the current incident command structure in the CDGC agency were conducted through an exploratory sequential mixed methods design (qualitative then quantitative), which could provide a first step for other researchers to adopt the second type of mixed methods design approach, which is an explanatory sequential mixed methods design (quantitative then qualitative). In order to explain and examine the incident command system framework factors in other emergency response agencies such as the police, or even another governmental sector such as medical services in the UAE.
2. Future research should consider the results and findings as a basis for future investigations in this field. The study assumptions resulted from an exploratory investigation and could not be retrieved directly from official CDGC documents; thus the applicability of the incident command framework is a decision that should be supported by everlasting scalability and readiness of the framework.
3. Practically, the framework is intended to be deployed by government emergency agencies. Perhaps, the findings of this study constitute a good background for non-governmental organisations to conduct future research, in this sense the non-governmental organisations will have a shared interest in the governmental organisations, encouraging operation as one entity.

4. Researchers could benefit from the implementation of the five sectional framework to investigate and compare the research findings in other countries, which have similar cultural values such as the Middle East and Gulf Cooperation Council (GCC) countries.

8.8 Chapter Summary

Natural hazards are events that have two important characteristics. The first is the result of a serious disruption to the normal functioning of a community or society, affecting their daily lives. The second is to exceed the capacity of an affected community or society, so that it is unable to cope with the situation using its resources, which may increase both environmental and health losses and damages. This research on incident command systems in the context of the UAE's CDGC, not only provides solutions to some challenges experienced by the CDGC commanders who respond to many of the incidents but has also developed a framework that is effectively focused on the improvement of emergency response activities. The new framework has expanded on essential factors through the integration of the current structure and its functions of the incident command system framework in the CDGC agency. By doing so, emergency agencies in the UAE can be more effective and efficient in dealing with varied incidents.

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APPENDIX A Silver Command Training Course

Cabinet Office

UNITED ARAB EMIRATES
THE SUPREME COUNCIL FOR NATIONAL SECURITY
National Emergency Crisis and Disasters Management Authority

الإمارات العربية المتحدة

This certificate is awarded to

Saif AbdulGhafour Alawadhi

On successful completion of

Silver Command Training

Delivered by the

UK Cabinet Office Emergency Planning College

On

8 - 12 November 2015

This certificate confirms completion of:

- **Learning requirements towards the Licentiateship of the City and Guilds Institute (LCGI) in Integrated Emergency Management; a senior award of the City and Guilds of London Institute**
- **25 hours of the instruction component of the IAEM CEM Programme**

Maj Gen MA Michael Charlton-Weedy CBE DL
Director UK Resilience Training

National Emergency Crisis and Disasters Management Authority

University of Portsmouth

CPD MEMBER
The CPD Certification Service

IAEM

epc

APPENDIX B The ICS Structure

1. Incident Command (IC)

The Incident Command (IC) has the authority of whole management of the incident. Therefore, the command function may be categorised in two general ways, single incident commander and unified commander (FEMA, 2008b, Walsh et al., 2012):

Single Incident Commander

If an incident happens within a single authority, a single incident commander will be selected, with overall responsibilities of incident management. Then, the Incident Commander (IC) will activate Incident Action Plan (IAP), which will set all the objectives of that practical emergency (FEMA, 2008a). The IC is the highest ranking position in the ICS model. This position required all responsibilities for all activities have been taken in the incident, including strategic development, decisions making, resources organisation, commanding all four sections in the incident (Bigley and Roberts, 2001). Furthermore, the IC has to ensure that each incident has a safety officer who is trained to assess the situation, identify hazardous and implement safety plans (Homeland Security, 2008). The chain of command relies on the role of IC. The IC is an information position that involves responsibilities for the overall response strategy, managing available resources and people during emergency events. The ranking officer who arrived first on scene may establish the role of incident commander, adapting all roles of the ICS roles, passing the role of IC to higher ranking officer who arrived later (Jiang et al., 2004). For instance some responsibilities of IC include:

- Establishing command and developing an appropriate organisational structure;
- Developing and implementing the incident action plan;
- Preserving life and property;
- Managing resources;
- Supporting effective communications with other multi agencies;
- Ensuring public safety;
- Authorising information release to the media

Unified Command (UC)

The second type of command option is Unified Command (UC). This category allows all different agencies authorisation responsibility for managing all strategic planning for emergency responding (Homeland Security, 2013). It enables agencies from different geographic and functional responsibility guidelines to cooperate and interact effectively (FEMA, 2008b). In the UC each agency maintain their own authority, responsibilities and accountability (FEMA, 2008a). The composition of the UC structure depends on the type of an emergency and the geographic location (FEMA, 2008b).

2. Command Staff (CS)

The Command Staff (CS) includes three main command staff functions can be established by the IC (Walsh et al., 2012):

***Safety Officer*: is responsible for evaluating safety hazards and protects the responders.

***Public Information Officer*:** is responsible of contacting with the media and the public, providing all the incident accurate information.

***Liaison officer*:** is responsible of coordinating efforts with other agencies (Shaluf and Ahmadun, 2003).

3. General Staff (GS)

The General Staff (GS) has the responsibility to function the incident command structure (FEMA, 2008b). The GS structure based on four major functions: planning, operations, logistics and finance/administration, these functions may apply from a routine emergency to a disaster response (Bigley and Roberts, 2001, Buck et al., 2006, Rosca and Wang, 2007, Moynihan, 2008a). In small emergencies, those four major function can be handled by individual IC, however in major emergencies those four major function may be separated within the agency (Wang et al., 2008). Each section is managed by section chief who will be in a contact with the IC. Therefore, the model is considered to change up or down according to the nature and size of the emergency (O'Neill, 2005). The functions are further explained below (Perry, 2003, Shaluf and Ahmadun, 2003, Anderson et al., 2004, Walsh et al., 2012, Herrmann, 2007, Moynihan, 2008b)

- ***Operations Section*:** requires collecting, evaluating information about the action plan to achieve the model's objectives (Bigley and Roberts, 2001), and this is the important function of the ICS that all other sections support it. Hence, without all other section operations cannot succeed (O'Neill, 2005).
- ***Planning Section*:** when a complex incident accrued, the planning section can be activated by the IC (Sutingco, 2006) . An important responsibility of this section is to advice the IC and other section with future needs and vital actions (O'Neill, 2005).
- ***Logistics Section*:** provides all services and facilities to enhance ICS staffs (Bigley and Roberts, 2001). It includes a communication unit that has the responsibility of maintaining contact between the ICS staff and other agencies. Also an information system unit includes all necessary technology information to be provided to emergency staffs. A medical unit provides medical care for the emergency responders. Furthermore, a food unit helps to provide food and water to emergency units. Finally, a supply unit enhances the emergency employees with an extra assistance by managing employees' shortage (Sutingco, 2006).
- ***Finance/Administration Section*:** provides an accounting and costs analysis (Bigley and Roberts, 2001, Moeller, 2006).

APPENDIX C Research Methods in the Literature

1. Research Methods in the GSB Model

This section employs the literature focussing on the UK GSB model to identify the following: (1) approaches to research methodology; (2) strategies concerning research choices; and (3) data collection and analysis techniques. Some research includes only quantitative and qualitative methods, along with a small number of mixed methods. The following sections outline examples of a number of different studies.

1. Flin and Slaven (1996) undertook a quantitative survey using a five-point Likert-type scale, focussing on the relationship between the incident emergency command and personal ability. The study employed a sample of 154 managers. However, no further details were produced in the article.
2. (Flin et al., 2007) also undertook a further study in Scotland, in the UK, focussing on two main studies assessing operational situations for decision-making employed by police officers. This was based on mono-method quantitative research choice (i.e. a questionnaire survey). In total, 135 police officers participated in both studies. Twenty-three police officers participated in the first study, in which the data was analysed using a statistical technique correlating in with SPSS, while in the second study a questionnaire survey was undertaken with 112 participants from two Scottish police forces.
3. Eyerman and Strom (2008) undertook an exploratory case study of the multi-agency response to the London bombings of July 2005, using semi-structured interviews with a total of twenty-two participants, and employing qualitative data analysis.
4. Seyedin et al., 2013An online study employing an exploratory sequential mixed method design. Participants at bronze, silver and gold level were selected by means of purposive and snowball sampling techniques. They were then questioned concerning identification competencies within a multi-agency response to emergencies, including: (1) chemical; (2) biological; (3) radiological; (4) nuclear; and (5) explosive. The study was conducted by means of email at all stages. During the first stage, a total of twenty-one of the commanders responded to open ended questions with qualitative data, with content analysis subsequently undertaken by means of the Nvivo software package. A total of fourteen commanders participated in the second stage, which employed quantitative survey questionnaires using a five-point Likert scale designed using tree nodes obtained from qualitative data analysis. Finally, descriptive statistics were employed for data analysis (Linney et al., 2011).
5. Wilson and Gosiewska (2014) employed research methodology to measure the impact of emergency training intervention for the UK's multi-agency gold command. This consisted of a positivist approach, employing an exploratory sequential mixed methods design. Semi-structured interviews were conducted with thirty silver commanders with experience of attending the MAGIC training programme, with further semi-structured interviews conducted randomly with course delegates, while ten gold commanders completed questionnaires during the second stage (Wilson and Gosiewska, 2014).
6. Kirby et al. (2014) undertook a case study with the police sector, focussing on an incident of spree killing. Qualitative methodology was used by adapting semi-structured interviews with three command staff, while fifteen questions were asked of eleven police staff who had participated in dealing with the incident.

7. Mishra (2014) undertook a qualitative approach using semi-structured interviews with a sample of twenty tactical commanders from a number of UK emergency agencies (e.g. police, fire and ambulance), in order to establish the factors impacting on team decision making.
8. (Owen et al., 2016) evaluated emergency management and the challenges of strategic gold level performance in Austria, employing a sequential explanatory mixed method design. During the first phase, a survey was distributed to participants at strategic level, i.e. those working in agencies responsible for responding to natural and man-made hazards. The sample included seventy-six participants, with thirty-eight participants representing a validate response rate of 50%. During the second phase, interviews were undertaken with an identical sample size. The interviews were undertaken both face-to-face and by means of the telephone. The study coded the transcripts, developing thematic from coding the transcripts (Owen et al., 2016).

2. Research Methods in the ICS Model

Similarly to the GSB model, this section illustrates the research methods from the literature applied in the USA ICS model.

1. Lutz and Lindell (2008) undertook an exploratory single case study to examine the degree to which the use of ICS influenced the performance of Texas emergency centres during Hurricane Rita. This was achieved by collecting data by means of questionnaires, with descriptive statistics employed as the data analysis technique
2. Moynihan (2008a) also employed a single case study strategy to examine the use of ICS in the response to the outbreak of disease in California. The research design consisted of an exploratory mixed method, with interviews undertaken with thirteen senior managers during the first phase, while the second stage consisted of a questionnaire survey of 2,400 participants. The interviews and survey were analysed using content analysis, employing qualitative software that enabled both inductive and deductive coding
3. (Lam et al., 2010) conducted a study in Taiwan, focussing on the opinions of Taiwan residents concerning ICS. This study employed a mixed method design, with a combination of a qualitative focus group with quantitative structured interviews and a structured survey using a random sample. Exploratory factor analysis statistical calculations were conducted with SPSS to evaluate the construct validity, with the selected factors having an eigenvalue more than 1, and the factor loading more than 0.4.
4. A triangulation approach was conducted from the literature review, and explanatory mixed method designs using surveys, interviews and workshops were found to have been conducted by Australia's senior emergency managers, focussing on addressing challenges facing the strategic emergency management in Australia (Bosomworth et al., 2017). A total of thirty-four participants were interviewed, all of whom were senior managers with experience of the emergency services.

APPENDIX D Research Participant Consent Form

Title of Project: Developing an Incident Command System Framework for Natural Hazards in the United Arab Emirates (UAE):

RGEC Ref No:

Name of Researcher: Saif Alawadhi- PhD Student

School of Build Environment – University of Salford

E-mail: s.a.m.a.alawadhi@edu.salford.ac.uk

Please tick the appropriate boxes	**Yes**	**No**	**NA**
1. I confirm that I have read and understood the project information sheet for the above study dated DD/MM/YYYY			
2. I have been given the opportunity to ask questions (face to face, via telephone and email)			
3. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.			
4. I understand that my taking part is voluntary; I can withdraw from the study at any time and I do not have to give any reasons for why I no longer want to take part.			
5. I understand my personal details such as phone number and address will not be revealed to people outside the project.			
6. I understand that my words may be quoted in publications, reports, web pages, and other research outputs but my name will not be used unless I requested it above.			

Name of Participant Date Signature

________________________ ______________ ____________________

Name of Researcher Date Signature

APPENDIX E **Ethical Approval Letter**

University of Salford MANCHESTER

Research, Innovation and Academic Engagement Ethical Approval Panel
Research Centres Support Team
G0.3 Joule House
University of Salford

T +44(0)161 295 5278

19 April 2016

Saif Abdul Ghafour Alawadhi

Dear Saif Abdul Ghafour

RE: ETHICS APPLICATION ST 15-73 – A Critical Evaluation of Gold, Silver and Bronze (GSB)

Incident Command Applications in the Wider Emergency Management Framework in the United Arab Emirates (UAE)

Based on the information you provided, I am pleased to inform you that your application **ST 15-73** has been approved.

If there are any changes to the project and/ or its methodology, please inform the Panel as soon as possible by contacting S&T-ResearchEthics@salford.ac.uk

Yours sincerely,

Prof Mohammed Arif
Chair of the Science & Technology Research Ethics Panel
Professor of Sustainability and Process Management,
School of Built Environment
University of Salford
Maxwell Building, The Crescent
Greater Manchester, UK M5 4WT
Phone: + 44 161 295 6829
Email: m.arif@salford.ac.uk

APPENDIX F Participants Invitation Letter

Dear Sir,

My name is Saif Alawadhi and I am currently doing my PhD on disaster and emergency management at the School of the Built Environment, The University of Salford, Manchester, UK.

I am conducting the research study to develop a framework for the application of the Gold, Silver and Bronze (GSB) system in the emergency services in the UAE. The research will focus upon identifying challenges, obstacles and factors that seem to influence how the GSB model works in practice in the UAE's in the emergency services in Civil Defence General Command (CDGC) in managing disasters and emergencies. The findings of the study will be used to draw recommendation that for effective implementation to improve the application of GSB in the CDGC.

If you agreed to take part in this research, you will be contacted by me personally bearing in mind that the data will be collected in two phases. The interview involves answering a set of questions provided via a questionnaire form.

I can promise you that I will take all the required ethical concerns into consideration. You may decide to stop being a part of the research study at any time without explanation. In addition, the data I will collect will not contain any personal information. No one will link the data you provided to the identifying information you supplied. Any other ethical issues related to the research philosophy are considered by the researcher and the University of Salford. The Ethics Committee of University of Salford has granted ethical approval for this study.

Your response is truly important to the success of this study. I would like to assure you that your response will be **`Strictly Confidential'** and will be used for academic purposes only.

If you decide to participate please contact me if you are happy to take part in this research and interview. If you have any questions or concerns about the study, please contact me. My e-mail is: s.a.m.a.alawadhi@edu.salford.ac.uk

Your attention to this matter is greatly appreciated.

Best regards,

Saif Alawadhi

PhD Candidate

APPENDIX G Semi-structured Interview Questions

Introduction

Firstly, thank you for giving me the opportunity to interview you and for taking time out of your busy schedule to participate in this study. This interview is part of a PhD study being conducted on emergency response at the School of the Built Environment, The University of Salford, Manchester, United Kingdom.

Developing an Incident Command System Framework for Natural Hazards in the United Arab Emirates (UAE):

Your responses are important in enabling me to obtain as full an understanding as possible of this topical issue. The main aim of this research is to explore and investigate the Gold, Silver and Bronze (GSB) emergency response command model during natural hazards in the in Civil Defense General Command (CDGC) as a case study. The collected information will remain confidential and will be used for the sole purpose of this study. You will notice that you are not asked to include your name or address anywhere on the interview. The subsequent reports and research papers written based on this study will be structured in such a way that no individual can be identified. No one will link the data you provided to the identifying information you supplied. Your response is truly important to the success of this study. I would like to assure you that your response will be **`Strictly Confidential'** and will be used for academic purposes only. Further, you may decide to stop being a part of the research study at any time without explanation.

If you agree, I would like to record this interview, to allow me to go back and listen to it in more detail at the interview analysis stage. In addition, please feel free to let me know if there are particular instances where you would want me to temporarily switch of the recorder.

Thank you in advance for participating in this study. If you have any queries, please do not hesitate to contact me.

Saif Alawadhi

School of the Built Environment

University of Salford

Salford, M5 4WT

UK

Email: s.a.m.a.alawadhi@edu.salford.ac.uk

Section 1: Background and Demographic

Background and Demographic			
Gold: G	Silver: S	Interviewee Code	
Date:		Time: from…………to………(……….minutes)	
Current rank:			
Current Job Position:			

Department:	
Years of experience in CDGC:	
Highest Education Qualification:	

Semi-structured Interviews

Section 1: GSB implementation Factors

1. On what bases the emergency response GSB model is implemented in CDGC?
2. Can you please share with me what the process of implementation of GSB in your department has been?
   I. When was GSB implemented in your department?
3. What were the main reasons for implementing the GSB model for command and control during emergency response in CDGC?
4. What are the main activation levels of the GSB model at the CDGC?
5. Could you please explain to me what roles and responsibilities are taken by the three layers (Gold/Silver/Bronze)?
6. Do you have any training and qualification programmes for commanders on GSB model? Are there relevant experts in your department?
7. How incidents are treated by the GSB? How commands is implemented between the three levels?
   a. Gold………….
   b. Silver………
   c. Bronze…………

- How communication is managed during incidents?

8. Does your department follow the Standard Operation Procedures (SOPs) in dealing with the incident? What are the benefits of these applications?

Section 2: GSB Key Factors

9. Could you please tell me the level of commanders involved in emergency response within your organisation?
   I. How are commanders nominated?
   II. What attributes are considered for commanders' nomination? (I.e. rank, position, qualifications, experiences, skills and ability, others…..
   III. In your experience, is there clarity about who is in charge in the case of an emergency of different kinds and sizes, is there any confusion about who would be a commander?
10. In your opinion, what key requirements and factors the organisation should provide to achieve the best application of the GSB model?
11. What do you consider to be key skills and factors for a commander to have in order to succeed in achieving better GSB implementation?
12. From your experience, is there any professional certification qualification for commanders in the GSB model? (If yes, what is the qualification)? (If no, why not and would it be necessary?)

Section 3: GSB Barriers Factors

13. When and why the GSB model, fails to achieve it is objectives?

14. Do you think that implementing GSB in your organisation will face any challenges? If yes what are the main challenges and difficulties that affect negatively the GSB model? If no please give reasons.
Section 4 : GSB Driver Factors
15. What are the main advantages and benefits of the GSB model? 16. Would you say that the GSB model has achieved it is goals and benefits? If yes/no please explain why? 17. How do you assess the performance of the GSB model? Have you ever had any incidents in which: a. The GSB model provided partial solutions why and when? b. The GSB model provided complete solutions? 18. How would you find the response of the GSB model to natural hazard if compared with what was in place before? 19. What are the types of natural hazards occurring in the UAE?
Section 5: Recommendations for effective GSB implementation
20. The GSB model was originally developed in UK. To what extent do you think it can be successfully applied in the UAE? What modifications would be necessary to best adapt it to the UAE? 21. How can the GSB model minimize or eliminate the challenges during natural hazards? You suggested some changes. What is needed for these changes to occur? 22. What are your recommendations and solutions to enhance better implementation of the GSB model?

APPENDIX H Interview and Questionnaire Translation Form

AL MAWRID FOR LEGAL TRANSLATION
LEGAL TRANSLATOR
Mohammad Taleb Sayed Suleiman
English - Arabic
Licensed By Ministry of Justice - UAE - Under No. 178

Al Ain - Oud Al Toba - U.A.E.
P.O.Box : 18403
Mobile : 050 - 4494731
Tel: 03 - 7377371
E-mail : talebsyd@yahoo.com

المورد للترجمة القانونية
المترجم القانوني
محمد طالب السيد سليمان
انجليزي - عربي
مجاز من وزارة العدل - أ.ع.م. - تحت رقم ١٧٨
العين - عود التوبة - فوق أسواق الجزيرة للتخفيضات - أ.ع.م.
ص.ب : ١٨٤٠٣
متحرك : ٠٥٠٤٤٩٤٧٣١
هاتف / ٠٣٧٣٧٧٣٧١
البريد الالكتروني : talebsyd@yahoo.com

United Arab Emirates
Ministry of Interior
Civil Defense G.H. Q
General Administration of Resources & Support Service

No. 11531-20/5/486
Date : 28/9/2016

List of Distribution (B)

Dear Sir,

Subject : Academic Research

We are pleased to extend our greeting and appreciation , and kindly ask you to facilitate the mission of Major *SAIF ABDUL GHAFOUR AL-AWADHI* , No. (3219) ,who is a member of the Special Security Forces Command , to meet the General Director or his Deputy (Gold / Silver Commander) , since the aforesaid is working on an academic research (Ph. D Thesis) entitled " Exploration of the Command and Control Model , Gold , Silver Bronze Commander to Improve Emergency Response During Natural Hazards in the UAE . "

For contact Tel .No. 050-9993251-050-6272121

With our high esteem

Acting Director General of Resources & Support Services
Salem Mohammed Al Naqbi
This is generated via the electronic Correspondence System
"CC : SAIF ABDUL GHAFOUR AL-AWADHI

APPENDIX I Questionnaires Design

Research overview:

This survey is a part of on-going PhD research project which aims to develop a framework for Gold, Silver and Bronze (GSB) incident command model to improve emergency response during natural hazards in the United Arab Emirates (UAE): An exploratory case study. Thus, this survey focuses on investigating the **incident command system implementation in Civil Defense General Command (CDGC)**.

Questionnaire instructions:

Please select the most appropriate answer for each questions in the spaces provided based on your experience.All questionnaires marked with an asterisk (*) are required

It is important for this research study that all questions are answered. The answers from your questionnaire will be used as the main data set to achieve particular research objectives. The survey should only take 10 minutes.

Please remember that the information you provide will be used for the purpose of this study and will be treated in **strictest confidence**.

For more information and if you have any further concerns please do not hesitate to contact me.

Saif Alawadhi

School of the Built Environment

Maxwell Building

University of Salford

Salford, M5 4WT

UK

Email: s.a.m.a.alawadhi@edu.salford.ac.uk

Section 1: Background Information

Please encircle the letter which best represents your answer

1. Gender
   A. Male
   B. Female
2. Do you work in one of the Civil Defense General Command departments?
   A. Yes
   B. No
3. Do you consider yourself involved in emergency and incident response?
   C. Always
   D. Most of the time
   E. Rarely
   F. Never
4. What civil defense department are you assigned to?
   A. CD1
   B. CD2
   C. CD3
   D. CD4
   E. CD5
   F. CD6

G. CD7

5. What is your current occupation?
   A. Officer
   B. Non-commissioned officer
6. What is your job position?
   A. Section manager
   B. Branch manager
   C. Station manager
   D. Duty officer
   E. Shift chief
   F. Fire-fighter
   G. Other please specify
7. How many years of experience do you have in the civil defense department?
   A. 1-5 years
   B. 6-10 years
   C. 11-15 years
   D. 16-20 years
   E. 21-25 years
   F. More than 25 years
8. Please indicate what is your highest academic qualification?
   A. High school
   B. Diploma
   C. Bachelor
   D. Higher diploma
   E. Master
   F. PhD

Section 2: incident command system Implementation

Please indicate the extent to which you agree or disagree with the following statements regarding the reasons of GSB implementation. 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2= Disagree, 1 = strongly Disagree

GSB Implementation Factors	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
1. Organise incident response.					
2. Minimize random decision making and confusion					
3. Avoid unauthorized intervention in command of commanders					
4. Organise commanders' roles and responsibilities.					
5. Improve structural organisation in emergency					
6. Better coordination across different commanders levels					
7. Improve incident response based on international best practices (SOPs)					

8. Minimize negative outcomes such as loss of lives, property, and accidents.					

Section 3: Impact of Key Fundamental Factors on the incident command system

Please indicate the level of impact with each of these key factors in the GSB model. Please place a cross (x) to the boxes below for your response. 5 = Very high, 4 = High, 3 = Moderate, 2= Low, 1 = Very low

Organisation Factors	Very High	High	Moderate	Low	Very low
	5	4	3	2	1
1. Commanders' nomination is based on job description position, ranks, experiences					
2. Training and exercising is necessary at different levels of command.					
3. Logistic support and financial support					
4. Having model experts					
5. Rigorous regulations of GSB					
6. Systematically grading level of commanders.					

Individual Factors	Very High	High	Moderate	Low	Very Low
	5	4	3	2	1
1. Improvement of knowledge and experience to understand the GSB model.					
2. Training and exercising is needed to improve professional capabilities					
3. Individual characteristics such as self-confidence, discipline and desire, not being afraid of responsibility, can work under pressure.					

4. Coordination and information sharing for proper functioning of the model.					
5. Effective in decision making.					
6. Commitment to Apply GSB					
7. Situational awareness during incidents					
8. Cooperation of commanders in following an ordered sequence.					

Section 4: Barriers and Obstacles Facing incident command system

Do you agree or disagree on the following statements about the challenges affecting the implementation of the GSB model? 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2= Disagree, 1 = Strongly Disagree

Obstacles Factors	Strongly Agree	Agree	Neutral	disagree	Strongly disagree
	5	4	3	2	1
1. Lack of knowledge and complete understanding of the GSB					
2. Lack of commanders' qualifications.					
3. Lack of training and exercising					
4. Overlaps and conflicts in command views					
5. Lack of Acceptance and Desire from commanders to adopt GSB.					
6. Lack and Lose of Expertise in the GSB model due to resignations, retirements or transfer.					
7. Lack of Coordination and Information Sharing between commanders.					
8. Lack of follow up and GSB evaluation					
9. Gold Commander Presences in operation sector that may create					

conflict and confusion with silver and bronze commanders.					
10. Concept of GSB is still new					
11. No nomination standard for commanders					

Section 5: Driver Factors of incident command system

Do you agree or disagree on the following statements about the advantages and benefits of the implementation of the GSB model? 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2= Disagree, 1 = Strongly Disagree

Driver Factors	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
1. The GSB defined clear roles and responsibilities of all commanders participating in the emergency response.					
2. Incidents are treated with clarity in command far beyond random actions.					
3. Improve outcomes and commanders performance					
4. Coordination and Information was transmitted and conveyed in time in easy way between three levels of commanders.					
5. The GSB facilitates incident management.					
6. GSB assures the safety of employees and the better accomplishment of tasks and avoids committing errors.					
7. Clearly defined decision making.					

8. The GSB allows evaluation and assessment of the quality of incident response.					
9. GSB model successfully achieved its goals and benefits					

APPENDIX J Gold, Silver and Bronze (GSB) Framework Validation

Dear Sir/Madam

An invitation to validate the Gold, Silver and Bronze (GSB) Incident Command System Framework to Improve Emergency Response in the Civil Defense General Command (CDGC).

This survey is a part of on-going PhD research project which aims to validate a framework for Gold, Silver and Bronze (GSB) incident command model to improve emergency response during natural hazards in the United Arab Emirates (UAE). Thus, the incident command system framework is developed as result of the research process. An exploratory sequential mixed methods research was carried out for this purpose, which consisted of the semi-structured interviews (from gold and silver commanders) and questionnaire survey (from bronze commanders). The resulted framework consists of the five main sections with their respective factors which are identified by mixed method research results.

The validation of the framework is an important process in achieving the aim of this research. Therefore, your responses are highly important to enable the researcher in finalizing the incident command system framework. Therefore, a survey has been designed to gather your views and perceptions regarding the framework. Your prompt feedback will be highly appreciated.

Questionnaire Instructions:

- Please select the most appropriate answer as per your knowledge and experience for each question within the space provided
- It is important for this research study that all questions are answered. The answers from your questionnaire will be used as the main data set for the achievement of basic research aim.
- Your identity will remain completely anonymous and will not be revealed during the process of the research and beyond.
- The information you provide will solely be used for the purpose of this study and will be treated as strictly confidential. Furthermore, your responses will remain completely anonymous.

For more information and in case of any concerns please do not hesitate to contact me (researcher) or Dr Chika Udeaja (supervisor of research study) at c.e.udeaja@salford.ac.uk.

Thank you very much for your precious time taken to complete this survey.

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Dr Chika Udeaja (Supervisor)

Email: c.e.udeaja@salford.ac.uk

Section 1: Information and Background

Please encircle the letter which best represents your answer

1. Please specify your level of experience in emergency response operations?

A. Less than 10 years
B. 11-15 years
C. 16-20 years
D. 21-25 years
E. More than 25 years

2. Please indicate what is your occupation sectors and background are you assigned to?
   A. Operations Management
   B. Fire-fighters and Rescue Management
   C. Public Safety and Civil Protection
   D. Resource and Support Services
   E. Strategic Management and Development of Performance

Section 2: incident Command System Framework Validation

From the framework for the Incident Command System Framework to Improve Emergency Response in the Civil Defence General Command (CDGC) illustrated in the Figure 1 bellow and with the brief description provided. Please indicate to what extent do you agree or disagree on the following statements with regards the framework validation? 5 = Strongly Agree, 4 = Agree, 3 = Not sure, 2= Disagree, 1 = Strongly Disagree

Incident Command System Framework Validation	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
	1	2	3	4	5
1. Do you believe that the framework is simple enough to support the incident command management? (Simplicity)					
2. Do you believe that the framework has captured all the factors faced during the incident response? (Completeness)					
3. Do you believe that framework is flexible enough to adapt to any change in incident response? (Flexibility)					
4. Do you believe that framework content and structure understandable are easy to understand? (Understandable)					
5. Do you have confident that the emergency response professionals will accept the GSB framework? (Acceptable)					
6. Do you think that framework components are useful for the emergency response professionals? (Usefulness)					
7. Do you have confident that framework can be adopted and implemented in your working environment in CDGC? (Implement ability)					