<u>DBA Thesis</u>

An investigative study into operational leadership's disaster recovery (DR) planning at Dubai Civil Defence (DCD).

Essa Almutawa

October 2024

A thesis submitted to the University of Gloucestershire in accordance with the requirements of the degree of DBA in the School of Business, Computing and Social Sciences

Declaration

I declare that the content of this thesis is my own work. I further declare that this thesis was created in accordance with the regulations and guidelines of University of Gloucestershire. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Signed: Essa Almutawa

Date: March 2025

<u>Acknowledgements</u>

Abstract

While the theme of disaster recovery planning has been arguably extensively researched, in the Middle East and from a Dubai Civil Defence perspective, there is limited research to date. Academic studies have ranged from those conducted in North America, Europe, and Asia, which have provided a rich source of information, but in the UAE, and particularly Dubai, this region has been largely neglected. However, with this locality growing rapidly economically together with a rise in population, combined with the increased number of reported natural and man-made unplanned events occurring, the importance of robust disaster recovery protocols has increasingly become more paramount. Reflecting this, this professional doctorate has accessed the key instigators in the Dubai Civil Defence to understand the entities disaster recovery protocols then compare the outcomes with existing practices drawn from academia. The main study used an interpretivist methodology of multi-methods in the form of semi-structured individual interviews, to investigate the experiences and perceptions of 6 key instigators of the disaster recovery planning processes from an operational perspective and 3 cross-functional group discussions. The interviews were informed by the current academic debate and included the various recovery techniques and models which could be used including the Balanced Scorecard. The findings of the study were gathered until saturation was reached and then interpreted using a thematic approach. The study's first key finding is the acknowledgement that there is theoretical and empirical evidence to indicate that the Dubai Civil Defence tends to devise their operational recovery plans dependent on the departmental needs and are created only by the leadership team. There was however the acknowledgement amongst the leadership team of the benefit of expanding the recovery planning process beyond their remit, and that the process was limited due to the current practice of being operationally and departmentally centric. The second key finding of the study is that some of the critical success factors (CFSs) and key performance indicators (KPIs) used were being misused or misunderstood. There was a recognition that this could result in being less effective in responding to the outcome of the unplanned or unexpected event. The final key finding was that there was no overarching framework being used, and that the focus was primarily operational. The disaster recovery instigators acknowledged that a more holistic framework or methodology, such as the Balanced Scorecard, would be beneficial for the Dubai Civil Defence recovery strategy. In conclusion, this study provides a deep and rich conceptual insight, knowledge and understanding for the Dubai Civil Defence to follow, including the usage of the Balanced Scorecard. The first contribution of the study includes the usage of the Balanced Scorecard, so that strategic and operational objectives are aligned, which is presented in this study in the form of a new construct. The second contribution relates to the need to ensure that the CFSs and KPIs are effectively used, but also for academia to understand the relevance of new qualitative KPIs. The final contribution is associated with the need for greater inclusion in the disaster recovery planning protocol beyond the leadership teams.

Keywords: disaster recovery planning, Balanced Scorecard, civil defence

Table of Contents

List of Figures

List of Tables

List of Abbreviations / Acronyms

BCP – Business Continuity Plan

BS – Balanced Scorecard

CSF – Critical Success Factor

DCD – Dubai Civil Defense

DR – Disaster Recovery

DRP – Disaster Recovery Plan

PDCA – Plan Do Check Act

RAG – Red Amber Green

RPO – Recovery Point Objective

RTO – Recovery Time Objective

TOE – Technology Organization Environment

Chapter One
Introduction

1.1 Introduction

This research study is to investigate and understand the perceptions and challenges involved in operational leadership's disaster recovery planning process at the Dubai Civil Defence (DCD). To achieve this, the study will provide a comprehensive literature review which will be used to inform the main study. The rationale for the study is that to-date there has been no research conducted in the DCD, and being a professional doctorate, this gap was recognised from a practitioner's and professional perspective as needing to be addressed. This is important, as the Civil Defence is responsible for the restoration of services in Dubai, by providing immediate emergency response, while also protecting the public through restoring vital services and facilities that may have been disrupted, destroyed, or damaged by a disaster. Therefore, the objectives of the Dubai Civil Defence are to save lives, minimize loss of property, to maintain continuity of production and to protect the community, while ensuring essential services are available. During a disaster, the civil defence in any country plays a vital role in supporting the defence forces, mobilizing citizens, and helping civil administration (Chadderton, 2015). The concept of civil defence in Dubai over the years has shifted from management of limiting damage occurring, to also include responses to threats of natural and man-made disasters (Alshamsi, 2017). The concepts related to critical success factors (CSFs) and key performance indicators (KPIs) is central to the effective disaster recovery efforts in civil defence. Through understanding CSFs, the essential characteristics therefore will become the mechanism for effective disaster recovery to be instigated including around preparedness planning through to the coordination of internal and external recovery procedures and activities. Resource availability with communication efficiency and community engagement are seen as key CSFs which form the foundation for creating and evaluating an effective disaster recovery strategy. These CSFs would then be assessed with related KPIs to indicate the success of each success factor. However, in understanding this, most of the current research has been predominately quantitative centric to assess how well civil defence is performing in its disaster recovery activities. However, the focus of this study is to explore the qualitative aspects that align with the CSFs outlined above.

Reflecting this remit and profile, this chapter will present the background to the study, the context together with the purpose of the project. The identification of the research problem will also be set out as to the significance of the research project and the central theme, which will then inform the aim and objectives. Finally, the structure of the thesis is outlined.

1.2 Background to the study

Any civil defence programme tends to be based on the probability and the likelihood of an event that can disrupt normal activities (Arnell, 2022). Based on this, strategies can be put in place to respond to the outcome or consequence if and when it occurs. Therefore, a civil defence programme needs to be created to address

and meet the consequences of an unforeseen or unplanned event through preparedness, readiness, and vigilance (Sena & Kifle, 2006). The planning process in the civil defence is therefore seen as important in times of a disaster to ensure that the community's services and facilities are maintained. To achieve this, the civil defence depends upon the planning and implementing strategies in conjunction with the cooperation and participation of stakeholders. For a civil defence organisation to be effective therefore needs to ensure that in the event of a disaster, loss of life and property is minimised, while restoring civil services and facilities to an agreed timescale (Bullock et al., 2013).

But the planning process can be complex as a disaster can be classified into two types: natural and man-made. Natural disasters tend to be beyond human control that cannot be prevented, but precautions to either minimise or lessen their effects to the community can be planned for. In contrast, man-made disasters, are more manageable, and can be eliminated if correctly identified and reacted too. Reflecting this, a 'disaster' can be defined as an unexpected event, causing a potential loss of life and damage to property (Ayaz, 2010). To address these negative outcomes to the community, disaster recovery is about how to predict, prevent, mitigate, and then recover from a disaster (Davis, 2006).

Responsible for proactively predicting, preventing, mitigating, and then recovering from a disaster in the Emirate of Dubai, is the Dubai Civil Defence (DCD), which has the mission and vision of protecting lives, property, and the environment, with the objective to provide a fast professional service in response to a disaster, through the efficient investment of human, and physical resources, together with associated financial investment (DCD, 2024). The DCD therefore plays a vital role in Dubai, especially in the field of industrial and commercial safety and security. As an organisation, the DCD also assists in participating in rescue missions, together with recovering, and restoring essential services and facilities. Therefore, the objective of the DCD is to protect lives, private and public property whereby ensuring that the external environment is safe, while maintaining transportation, and vital communication links. In achieving this, the DCD provides preventive awareness programs, scientific information, and accurate news to the general public and the business community, together with other government departments (DGDCD, 2023).

1.3 Focus of the research study

In the context of this professional doctorate, this study is focused on the Dubai Civil Defence (DCD) and how the operational leadership conduct their disaster recovery planning. With the phenomenal economic and population growth witnessed in the Emirate of Dubai in recent years, there is an increasing need to ensure that disaster planning is accurate, up-to-date and holistic. Much like other organizations, the civil defence including in Dubai, view disasters as potentially recurring events which have four distinct phases: mitigation, preparedness, response, and recovery, where each of these phases require accurate planning, testing and revision (AlShamsi, 2017). As the study is focused on disaster recovery or DR, there is a need for a disaster

recovery plan (DRP), which requires a planning process for implementing a solution in the form of documentation which includes policies and/or processes designed to assist the organization in executing recovery processes in response to a disaster to protect lives and property. Therefore, the focus of this study is centred on understanding the Dubai Civil Defence disaster recovery planning processes and strategies to determine the key facets compared to other civil defence approaches.

1.4 Purpose of the study

As a professional doctorate, this study is based on investigating and providing a new critical insight which can enable the Emirate to restore its essential services and facilities to the Dubai community. The central theme of this study is to understand how the leadership in the Dubai Civil Defence instigates the disaster recovery planning process and practices. As DRP serves as a portfolio of policies, tools, and processes used to recover or continue operations after a natural or human-made disaster occurs, the question is whether the DCD follows or adopts the conventional approach or takes an alternative strategy. Therefore, the purpose of the study is to understand the planning process, the strategies adopted and how the plans are implemented to determine the potential effectiveness of the existing approaches, which has yet to be researched.

1.5 Research problem

Based on above, the research problem identified in this study is whether the processes and strategies followed in the Dubai Civil Defence are aligned to existing disaster recovery practices, or has the Emirate adopted their own protocol. Part of this question is related to the recognition that Dubai Civil Defence as an entity has yet to be researched, therefore there is limited knowledge as to how the planning processes and strategies are informed and implemented in this locality. This is increasingly important to understand, as the region including Dubai, has emerged as a global economic hub. The rapid growth in the city has witness the location becoming a centre for international trade and residency for over 194 different nationalities, however, with the increased number of natural and manmade disasters occurring globally, effective disaster planning is increasingly becoming more important (Al Ghasyah et al., 2020).

1.6 Research aim and objectives

The aim of the study is *to critically investigate the experiences of operational leadership in the Dubai Civil Defence (DCD) as to the critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plans to respond to unforeseen adverse events and disasters, by drawing on their operational artefacts*.

To achieve this aim, the following research objectives were created, which were aligned to the structure of the study. The first research objective is aligned to the literature review, the second objective to the methodology, and the third objective to the outcome of the findings.

Research objective one: To critically examine the current DCD disaster recovery plan, main critical success factors (CSFs) and key performance indicators (KPIs) which are used in the event of an unforeseen disaster.

Research objective two: To critically analyse the operational planning of the DCD and execution stages using main critical success factors (CSFs) and key performance indicators (KPIs) when responding to the unforeseen events that are disastrous.

Research objective three: To critically evaluate by comparing the current DCD's operational disaster recovery plans and associated business artefacts with other approaches, to provide a theoretical model as to the critical success factors (CSFs) and key performance indicators (KPIs) which the Dubai Civil Defence could consider when improving the current disaster recovery plans in the event of future disasters.

1.7 Relationship between DCD and the Emirate of Dubai

DCD has played a key role within the Emirate of Dubai, serving as the primary agency responsible for fire safety, emergency response, and disaster management. The relationship of DCD with the Emirate of Dubai has included:

1. Public safety and fire prevention under the legal and regulatory framework set out by the Government of Dubai to ensure that safety standards are maintained across all the governmental structures in the Emirate. To achieve this, the DCD collaborates with the Dubai municipality and other government entities to establish and update building codes, fire safety standards, and evacuation guidelines to protect public safety in the Emirate.

2. Disaster management and emergency response to fires, chemical spills, building collapses, and other emergencies are incorporated into the disaster recovery plans, including the provision of having well-trained personnel to provide immediate response, minimize damage, and protect lives. By coordinating with local entities such as the Dubai police, Dubai Health Authority, and the Dubai municipality, to ensure a cohesive and efficient emergency response.

3. To provide training to ensure that residents, occupants, building staff, including fire wardens and security personnel can effectively respond to emergencies and reduce potential risks.

4. Provide public education through community engagement with public awareness campaigns for residents and businesses on fire prevention, emergency preparedness, and evacuation procedures.

5. Instigate inspections and licensing as a regulatory authority to conduct regular inspections and issue safety certificates for establishments to meet stringent safety standards and rigorous checks to ensure compliance with safety regulations.

6. Actively engage with new innovations and technology solutions to provide smart fire safety systems by deploying technologies like AI and Internet of Things or IoT to enhance fire detection and provide rapid

response. This may include the use of drones and robots for undertaking rescue activities and enabling firefighters to overcome the challenges of modern advanced building infrastructure.

7. Provide legislative guidance and policies which informs urban planning, building regulations, and safety standards, which can directly influence decisions being made on the Dubai's infrastructure and public safety.

8. Ensure compliance and accountability for a safer environment for all residents which is aligned with the goals of the Dubai Government.

It should be noted, from the context of this study, Point Two related to disaster management and emergency response is the focus of the project, however the other points do have relevance.

1.8 Structure of thesis

The thesis is structured into seven chapters, with each chapter having an introduction and conclusion.

Chapter One – this introduction chapter has presented the background of the research topic including the context of the study, together with the purpose of the project. The chapter has also included the presentation of the research aim, the objectives together with the context of the overall project.

Chapter Two – the literature review will provide an overview of the current academic debate as to the background to the concept of civil defence, and what is disaster recovery management. In presenting this debate, a detailed review of the fundamental attributes associated with the disaster recovery and planning processes will be set out as to the key attributes needed. This will include the relevance and the role of senior management and leadership. The chapter will also include how disaster recovery planning goals need to be aligned to the organisational objectives, and the involvement of senior management and leadership throughout the entire recovery planning and implementation stages. Next the chapter will review the maintenance of disaster recovery plans, how activities and services are prioritized, then how these strategies can be tested and rehearsed, through to the important attributes associated with these plans and documentation when instigating them.

Leading from this, the chapter will set out different disaster recovery planning frameworks including the Technology Organization Environment (TOE) framework, and the Balanced Scorecard. Finally, the theme of key performance indicators (KPIs) such as recovery time objective (RTO) and recovery point objective (RPO) metrics, and critical success factors (CSFs), will be reviewed. This will include those important attributes associated with critical success factors and key performance indicators. Finally, the chapter will conclude with a theoretical framework, together with the research questions, which will inform the main study.

Chapter Three – the methodology chapter will present how the interpretivist approach was adopted, which was aligned to the researcher's ontology, epistemology, and axiology positionality. The chapter will set out

the research design including the outcome of the pilot study and how it informed the main project. The participants' profile, interview protocol, the emerging themes from the main study and coding strategy will then be set out and justified. Finally, the chapter will present how the main study's data was collected using a qualitative multi-method strategy with the individual interviews being analysed together with the group discussions to ensure the study was reliable and authentic. The study also conformed to the University's research ethical guidelines, while also recognising the potential methodological limitations of the project.

Chapter Four – the findings chapter will present the outcome from the interview data drawn from three core departments: finance, IT, and operations, as to their roles, responsibilities, and duties in relation to disaster recovery. The core components of each of the team's current disaster recovery plans will then be presented together with the processes and protocols used in the Dubai Civil defence, which include the operational artefacts used. Based on this, the chapter will then focus on each of the existing disaster recovery planning models used before presenting the key performance indicators (KPIs) which have been adopted to measure and evaluate the disaster recovery process. Finally, the chapter will present the findings related to the critical success factors used.

Chapter Five – is related to the discussion associated with the findings (chapter four) and the current academic debate as presented in chapter two. The chapter will include the debate associated with the fundamental attributes associated with the disaster recovery and planning processes. This debate will include a focus on the main attributes linked to the disaster recovery planning process such as the strategies used to develop the disaster recovery plans and documentation needed, and the importance of training of the disaster recovery teams. Leading from this, the key performance indicators and critical success factors will be presented together with the usage of frameworks such as the Plan-Do-Check-Act (PDCA) approach and the business continuity planning strategy, before presenting the relevance of the Balanced Scorecard.

Chapter Six – being a professional doctorate, this chapter draws on the interview data, the existing theory, and the core components of the Balanced Scorecard to create a new framework dedicated to the DCD. This includes how the three stages: pre, during and after a disaster can be developed to provide an effective recovery strategy. In presenting this, the critical activities from general and operational perspectives are set out and then aligned to the three recovery stages. Leading from this, the new model for the DCD will then illustrate how the concept can be applied before presenting the associated CSFs and KPIs needed to clearly establish the recovery criteria and then used to assess the recovery progress. The outcome of the study is then presented to three groups of experts to discuss the recommendations.

Chapter Seven – the conclusion chapter revisits and sets out how the aim and objectives of the study were achieved. The chapter will also present the key academic and professional contributions including the need

for greater involvement in the disaster recovery planning process throughout the organization. Part of the contribution also includes the emergence of new strategic and operational activities, together with the unique critical success factors and key performance indicators which does differ from the existing knowledge and understanding. Finally, the chapter will present how important the Balanced Scorecard could be for the Dubai Civil Defence, before setting out the limitations of the study, and future research.

1.9 Chapter conclusion

This chapter has presented the background and relevance for investigating the operational leadership's DR planning process at the Dubai Civil Defence. From the background of the study, and the identified uniqueness of the project, the aim and research objectives have been set out, which will inform the remaining study. Finally, an outline of the thesis' structure has been presented, signposting how the project is structured.

Chapter Two
Literature Review

2.1 Chapter Introduction

In answering the central aim of the study *as to investigating the experiences of operational leadership in the Dubai Civil Defense (DCD) as to the critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plans as a response to unforeseen adverse events by drawing on existing operational artefacts*. To achieve this, the chapter is focused on addressing the first research objective: *to critically identify the current literature and research as to what components are needed to be considered in the development and then implementation of a disaster recovery plan*.

To answer this objective, this chapter is divided into twelve distinct sections, commencing with the rationale and format of the literature review before presenting the background to civil defence as an organisational entity and its role in disaster recovery processes. The chapter will then explore as to what constitutes a disaster, before setting out the background to disaster recovery management, and the components associated with disaster recovery plans, including the important attributes of the protocol, like senior management support. The literature review will then present the debate as to potential business and recovery frameworks, including the Plan-Do-Check-Act or PDCA approach, before introducing the technology, organisation and environment model referred to as TOE and then the Balanced Scorecard, both of whom are recognised as suitable disaster recovery frameworks. Leading from this, the chapter will set out the means to measure the effectiveness of the disaster recovery protocols through the usage of key performance indicators (KPIs) which are based on targets or goals captured in critical success factors (CFSs). To provide a critical insight into these two recognised models, that of TOE and the Balanced Scorecard, a comparison will be provided as to how key performance indicators (KPIs) and critical success factors (CFSs) can be effectively integrated. Finally, the chapter will present a summary of the current debate together with a conceptual framework, which will be used to inform the main study. The format of the literature review is presented below in Figure, the following Figure 2.1.
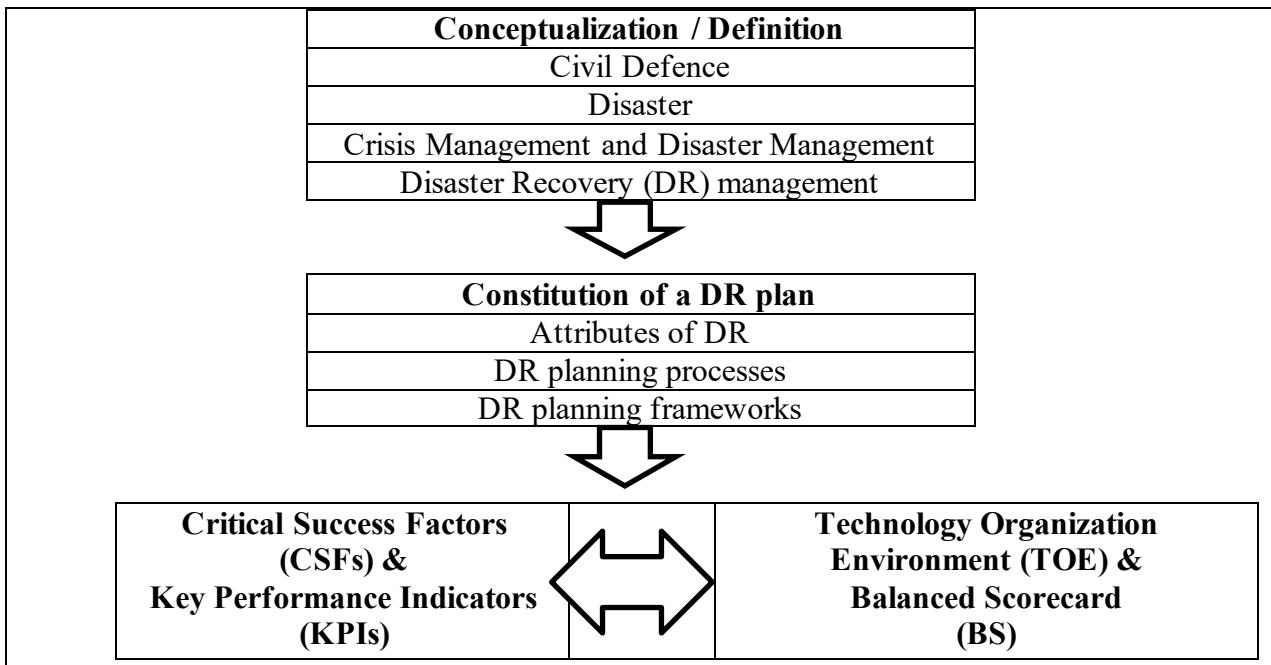
Figure 2.1: Flow diagram of the literature review's process (Author's construction)

2.2 Overview of the literature review

In conducting a literature review and the associated searches, one of the key questions for a researcher is the need to choose which strategy should be followed, as in selecting whether a traditional narrative or a systematic review should be adopted. Irrespective of which approach is used, a literature review is based on critically mapping out, evaluating, and then reviewing existing literature to develop a research framework which can be used to inform the research questions (Tranfield et al., 2003), but the style and approach of a systematic and narrative review are different.

A narrative approach is seen as the traditional method to conduct a literature review which is often associated with business and related research studies. It should be noted, that even though a narrative review does not set out to review the methodology and search protocols used, the methodology is still recognised as a suitable approach. When a traditional or narrative literature review is conducted correctly, the approach can provide a critical analysis of recent publications and up-to-date knowledge related to the theme(s) being researched (Cipriani & Geddes, 2003). Using a narrative or traditional strategy can assist in researching a wide range of academic themes, but it needs to be recognised that this approach often provides a comprehensive and general focused insight as to the debate being studied. However, this strategy does not provide a clear justification as to how decisions are made, particularly around the literature's relevance and validity (Collins & Fauser, 2005), which for this study was important as most of the research is related to information technology and project management. Furthermore, a narrative review tends to be more intuitive based on the researcher's preferences and strategies, (Johnson & Johnson, 1989), but does enable the process to cover broader questions compared to a systematic review. As an approach, the narrative review enables the specific selection of key texts and then facilitates a deeper focus in a specific field of interest, which for this study is related to disaster

19

recovery. The narrative approach can also lead to questioning of the assumptions and ideas behind the themes in greater depth, as the focus is on the subject area as opposed to the methodology used to gather the literature.

Finally, a narrative literature review does have certain limitations, which include potentially missing out on themes which could lead to a limited review of existing literature and becoming too narrow as opposed to presenting depth and criticality (Cook, Greengold, Ellrodt, & Weingarten, 1997). To address this last limitation has led to the emergence of the systematic approach, which for Tranfield et al. (2003) can enable the review process to be more systematic, transparent, and reproducible, by conducting the review process in a hierarchical way.

In contrast to the traditional / narrative approach, a systematic review was originally used in medical research but has gradually become more common in management studies. This acceptance in the field of management provides transparency in the literature review process, and the processes followed is reproducible (Tranfield et al., 2003). Through following a systematic approach, the concept requires careful planning which is then executed throughout the entire literature research process (Collins & Fauser, 2005). This careful planning includes the usage of keywords, definition of sources, then documents the number of 'hits' and the frequency of outcomes, the search period, listing of relevant literature and quality of the results which are then rated, and finally documents those sources which are irrelevant or excluded.

While this approach is more logical and systematic, the strategy does have several major disadvantages which can affect the results for searching existing literature, which can influence ultimately the outcomes and conclusions of the research project (Bryman & Bell, 2007). One of the key areas of contention is that the systematic literature review is more representative of a quantitative study, as it reports on the frequency of the results, which does not reflect the methodology of this qualitative research project. Furthermore, by focusing only on one type or kind of evidence, which can lead to important literature remaining undiscovered (Dixon-Woods et al., 2005).

Reflecting on above, the literature review for this study was conducted using a narrative / traditional approach. For this study, there was a need to avoid the potential risk of using inappropriate keywords searches, and then missing important academic knowledge, or going off on a tangent, which was very highly likely, as the predominant area of existing research was around information technology and project management. With a systematic approach there is also a need to conduct the searches following a set format which cannot be changed afterwards. To address the potential weakness of the traditional approach, the study adopted certain elements of the systematic review including a planned approach and not simply following a random strategy (Tranfield et al., 2003; Collins & Fauser, 2005), therefore this literature review was carefully planned to ensure that a broad search area of current literature was covered.

2.3 Background to the concept of civil defence in Dubai

Before preceding it is necessary to contextualize and understand the essence of this professional doctorate, as to how the civil defense in Dubai, responds to a disaster and then recovers from an unexpected or unplanned event. As a concept, *civil defense* is related to how a society can act and respond to unexpected events occurring and restoring the services and amenities to normality. These activities include the preparedness to act and provide non-combatant assistance through offering rapid help in the event of a disaster caused by a natural or man-made event to the society or a country's infrastructure (Ashrafi & AlKindi, 2022). This assistance could include searching, rescuing, fire-fighting, providing shelter and medical intervention, through to feeding the community, and re-establishing and restoring information technology and communication channels (Yeo, Knox & Hu, 2022). Therefore, civil defense can be considered as an entity which carries out activities when normal life has been disrupted, which often involves civil defense responders or teams who work in both government and the private sector. These team or responders' activities are designed to assist other agencies like the armed forces, medical services, fire-fighting, rescue teams, and the police to maintain social stability. From the context of this study, the Dubai civil defense has followed the guidelines laid out by the Secretariat of the International Civil Defense Organization (ICDO) which documented the fundamental components of civil defense as being:

a) the service provided is aimed at preventing disasters and mitigate its effects on the citizens, property, and environment.

b) while a disaster is a rare event that may have a risk to life, property, or the environment, the assistance and action undertaken by the civil defense service is designed to prevent, or mitigate the consequences of the disaster.

c) the civil defense services comprise of nominated and dedicated relief or recovery personnel or teams, equipment, and services (ICDO, 2000).

As a concept, civil defense tends to be the state's responsibility to protect the nation's citizens from military attacks through to responding to natural or man-made disasters (Bodas, Kirsch, & Peleg, 2020; Kaneberg, 2018). Therefore, civil defense activities tend to be focused on minimizing the effects of the disaster and disruption to civilians, which requires an immediate response, along with a rapid restoration of basic utilities and facilities which have been affected. However, the concept of civil defense has changed and evolved since its inception in the 1940s, to now include the need for the preparedness for a large range of potential disasters, both natural and man-made throughout all areas of society, (Pois & Oak, 2007), with many of the studies in the area of disaster recovery being focused on the information technology sector and project management.

In Dubai, the UAE Dubai civil defense was founded in 1976. As an organizational entity, the Dubai civil defense comes under the jurisdiction of the United Arab Emirates' Ministry of Interior General Command of Civil Defense Directorate general and is directly responsible to the Dubai Emirate's civil defense authority.

The Dubai Civil Defense (2020) sees the main objective of its responsibility to adhere too and meet the Federal Law No (23) 2006 guidelines, which sets out several responsibilities and duties to be performed. The law is firstly focused on protecting lives, properties, and national assets at times of peace or war, and needs to respond to a crisis and / or emergency situation in a rapid and timely manner.

To achieve this, the Dubai civil defense is responsible for predicting and prepare for crises and disasters through the establishment of emergency management centres and protocols, which includes making the various preparations needed to minimize or respond to any risks through ongoing disaster protection or recovery programs. Another important part of the Dubai civil defense responsibilities under the Federal Law No (23) 2006, is the guidance as to the formation of teams needed to respond and conduct relief operations to restore activities and services back to normality in those areas affected. This includes the preparation of evacuating and recovery plans, conducting preventive awareness programs and providing on-going training, the coordination of assistance and support activities with other governmental and private departments, if and when needed (DCD, 2020).

To fully understand the responsibilities of the Dubai civil defense in the context of a disaster or crisis, it is necessary to investigate what constitutes a disaster, before exploring various techniques and methods use to assess the effectiveness of recovering from an unexpected event. However, it should be noted that to date, there has been little research based on the UAE or in Dubai as to the disaster recovery processes followed as a means to recover and restore public services and amenities. To address this and provide a critical insight into the theme of disaster recovery, the next part of this chapter is dedicated at investigating this theme from a project management and information technology perspectives, as most of the current literature is centred on these two disciplines.

2.4 Background and defining what is a disaster.

A disaster can be defined as a situation which can overwhelm the local capacity to cope, which can lead to a request for local, national, or even international external assistance. The Emergency Disasters Database (2006) which is seen as an authority in disaster management, classifies a disaster being as a natural event or something which has its origins in human or a technological intervention. In qualifying this, the Emergency Disasters Database (2006) stated that the event to be classified as a *disaster*, needs to satisfy, or meet at least one of the following criteria:

- ten or more people reportedly killed;
- 100 people or more reportedly affected;
- a declaration of a state of emergency; or
- a call for international assistance.

In comparison to the Emergency Disasters Database (2006) definition, the United Nations (2006) classified natural disasters into two sub-groupings: *hydro-meteorological* and *geophysical* disasters. The hydro-meteorological disasters, includes floods and wave surges, storms, droughts, and related disasters such as extreme temperatures and forest/scrub fires; while geophysical disasters are earthquakes, tsunamis, volcanic eruptions; and biological disasters which also covers epidemics and insect infestations. As to technological disasters, the United Nations (2006) also provided three additional but separate categories: *industrial* accidents, *transport* accidents, and *miscellaneous* accidents, which can be seen as being related to man-made activities.

As a concept, disaster recovery is increasingly becoming vitally important for all organisations, as it is estimated that approximately 75 percent of the world's population reside or live in areas which are potentially affected by at least one natural disaster such as an earthquake, tropical cyclone, flooding, or droughts, which indicates that billions of the world's population are periodically affected by one of these natural occurring events. In the last two decades alone, more than 1.5 million people have been killed by natural disasters, and it is now acknowledged that these natural disasters occurrences are increasing, which have led to the need for proactive strategies to be put in place to address the risk of these events occurring. In addressing this, and responding to the outcome of the disaster relies on the efforts and capabilities through following an effective recovery management strategy.

From a business or organisational viewpoint, a disaster can be defined as an unexpected event which has the capacity for disrupting a business, corporation, or government (Ashrafi & Alkindi, 2022). Like a natural disaster, a business can be disrupted at any time, which can affect any part of the organisation, and has seen over the past twenty years an increased academic interest from an information technology perspective as an area of research (Ashrafi & AlKindi, 2022). However, the existing literature in the field of business disaster recovery also tends to group this theme with business continuity, business recovery, emergency management, and crisis management, and is often used and referred to interchangeably (Bakar, Yaacob, & Udin, 2015; Karim, 2011), which can be problematic. But for this study, disaster recovery planning strategies is the central focus of this research, with a specific emphasis placed on the recovery of activities, systems, and infrastructure components in the Dubai Civil Defence, and sees the theme of business continuity as encompassing a larger scope of activities, where certain business components and functions may be recovered immediately, or alternatively restored over an indefinite period of time (Hiller et al., 2015). Based on this, the concept of business continuity is therefore seen as being too broad, therefore out of the scope of this research project. Instead, this study contends that disaster recovery planning is focused on developing appropriate plans and pre-disaster activities, strategies, and processes to restore and resume key business operations to meet predefined acceptable criteria with an agreed time period (Chowdhury et al., 2017; Sahebjamnia et al., 2015). While these levels of acceptance or tolerance are pre-determined, what is unclear from the focus of this study,

is whether the Dubai Civil Defence has a wide-ranging disaster recovery plan, which are underpinned with comprehensive pre-determined levels of acceptance which are embedded into the strategic plans throughout the organisation. But before investigating the theory behind what constitutes an effective disaster recovery strategy, it is necessary to explore what is disaster recovery management.

2.5 Background to crisis management and disaster management

While the literature related to both the terms *crisis* and *disaster* are often presented as being interchangeable, yet there exist studies which do differentiate the two terms like Faulkner and Russell (2001) and Ritchie (2004) who describe disasters as being events that are external to an organization and over which it has no control, while a crisis is viewed as an event that have been caused by an internal organisational failure. Although the terms crisis and disaster are often used interchangeably by the media and to some extent within the academic literature, there remains some value in identifying the differences between the terms from a research perspective. The United Nations International Strategy for Disaster Reduction (UNISDR) published in 2009 a useful guide on disaster terminology. For the UNISDR, a disaster can be defined as a '…serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources' (UNISDR, 2009, p. 9). In the same publication, UNISDR defined disaster management as 'the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster' (UNISDR, 2009, pp. 10–11). From a civic perspective, and based on a definition suggested by Seeger et al. (1998, p. 232), a crisis can be described as a phenomenon that is '…specific, unexpected, and a non-routine event or series of events that [create] high levels of uncertainty and threat or perceived threat to an organisation's high priority goals' where the organisation is reliant on stakeholders from a supply and demand perspective, in meeting their obligations to the communities and individuals they serve.

In classifying what constitutes a crisis or an event which is deemed to be a disaster, Ritchie (2009) suggested a typology of crisis and disaster types which are based on specific types of events: those which are natural or physical disasters, political crisis including wars and local resistance, those which are economic centric, then malevolent events including espionage and terrorism, challenges associated with strikes, lawsuits and boycotts, the outcome of a mega-event such as an oil spill or nuclear accident, organisational misdeeds such as underpaying workers or violating building codes, then there is workplace violence including killing or injuring co-workers, and rumours such as the spreading of false information about a competitor. An alternative approach to classifying crisis and disaster events has also included: the scale of the impact which can range from being localised to have global ramifications, the elapsed time from the initial shock to resolution, the cost of the event including the initial loss, the rebuilding and future losses such as reputation, then the severity of the disaster ranging from minor to catastrophic, the unexpected consequences of seemingly unrelated

incidents that can ultimately lead to a crisis or a disaster, and the complexity where the impact of the disaster needs to be assessed over multiple criteria including time, cost and scale, and the potential for a specific type of event to escalate into other types of crisis or disaster. In strategic and adaptive disaster management, Tierney's (2014) work integrated social science with disaster management, to examine how risk and resilience are influenced by the prevailing social structures and processes. This approach of Tierney (2014) could help in considering the broader implications of DR planning beyond the immediate operational objectives and activities. Based on above, disaster management is comprised of four key stages: disaster risk mitigation, disaster readiness, disaster response, and disaster recovery, which will be reviewed in greater detail below.

2.5.1 Disaster Recovery management

As a concept, disaster recovery management for organisations and those responsible in instigating the various activities often consider business continuity and disaster recovery as being synonymously interlinked, but disaster recovery is specifically focused on the restoration of normal business or organisational activities (Chow & On Ha, 2009; Nelson, 2006) and therefore needs to be embedded into the strategic plans of an organisation. As a concept DR management is the resilience of the ability, or capacity to withstand, or quickly recover from an unexpected event through various mechanisms including flexibility, adaptability and adjustment both internally and externally (Cochrane, 2010). Prideaux and Beirman (2024) stated that DR can vary as to the range and scale from the perspective of the organisation, spatial and natural environment, the human aspect and time. The organisational perspective may range from a sole trader through to small to medium firms, national and international businesses and all levels of government. The spatial perspective is associated with the locality of the activity from being local, regional, national or international. The natural category is related to the ability of the ecosystem in the area to recover from the disaster such as a drought, changes in weather patterns due to climate change, and the ability to continue to function if human intervention leads to loss of business or resources such as water. From the human side, the resilience can be measured at the individual, group, community, or organisational levels as to the degree of influence on characteristics such as mental, emotional and behavioural flexibility, along with the ability to adapt to new ideas and access to resources such as employment, health services and housing. Finally, from a time perspective, this involves the recovery period of both human and ecological systems to be restored. Sharma et al. (2021) observed that the key features of DR strategies can include good relationships and coordination between all stakeholders, the ability to recognise risks and opportunities, the development of a network that facilitates proactive co-ordination and intervention activities in a timely manner leading to successful DR in the face of changing circumstances, and the ability adapt to change. These aspects and criteria should be assessed as to the availability of resources to build and retain resilience, which should incorporate the role of leadership and governance including policies that are internal to the organization, along with external commitments to the overall economy and society. This debate brings into perspective as to the importance of planning for, responding then recovering from a crisis and disaster, and the related considerations including the extent of

the damage, the impact on human life, the time taken for recovery and the geographic extent and ramifications of the event as to the allocation of resources. As the project considers DCD as an important aspect in this study, the research by Kapucu (2008) provided a rich insight into collaborative emergency management. This included the importance associated with the need for the organisation of a community response to achieve better public preparedness. In setting out this debate, Kapucu (2008) advocated cross-functional collaborative DR planning. In achieving this, the role of leadership in disaster management is vitally important as highlighted by Waugh and Streib (2006) who indicated that collaboration and leadership need to work effective emergency management. Waugh and Streib (2006) focused on leadership's role in emergency management within the public sector by providing an insight into the governance and cross-agency collaboration needed for disaster recovery, particularly as to the significant role of DCD operational leadership. As to the relevance of organizational resilience of DR in crisis management, Vogus and Sutcliffe (2007) introduced resilience as a concept within organizations, framing the activity it as a crucial aspect in disaster recovery planning. By understanding the concept of resilience, it can enable the DR planning process to move beyond simply providing operational metrics to include more qualitative insights and measures. Boin et al. (2016) extended the leadership role in disaster management in decision-making processes by exploring the role of public leaders in managing crises. The study of Boin et al. (2016) indicated how leadership could adapt crisis management principles to inform the disaster recovery planning particular for DCD activities. As to the preparedness for unexpected events and the associated responses, Tierney et al. (2001) emphasized the importance of having a plan which included the role of community engagement in disaster recovery. To illustrate this, Comfort (2007) formulated the 4C, which are: cognition, communication, coordination, and control in crisis management. For Comfort (2007) cognition, coordination and communication are needed across all agencies and within the community during the crisis, by setting out a clear and inclusive plan incorporating all stakeholders including the community and then controlling the activities when the event occurs.

However, this interconnected nature for many businesses and organisations have seen these implemented and integrated related recovery processes being embedded incorrectly, which can potentially dilute the effectiveness of these strategies (Ashrafi & AlKindi, 2022; Pinta, 2011), often due to misunderstanding of the purposes of the two concepts. In differentiating these constructs, for researchers including Ashrafi and AlKindi (2022) saw disaster recovery as having a wide scope of activities and processes, but again can be considered as a subset of business continuity planning. But for this study, disaster recovery planning needs to be seen as being independent, where the activities and strategies provides the procedures and instructions which an organisation should follow in the aftermath of a natural or a man-made disaster, with the specific focus on ensuring that there is stability and restoration of business operations and functions in a timely manner (Blokdijk, 2008). Chapman (2017) and Blokdijk (2008) considered the disaster recovery planning process as being part of the strategic plan whose purpose is to restore important services, amenities, information, and

data after the event of a disaster. However, interestingly for Bahmani and Zhang (2021), the current academic debate indicates that there is still limited research conducted which provides a clear and recognised framework as to how effective disaster recovery planning can be conducted, executed and managed (Bahmani & Zhang, 2021). Even though there are no recognised consensus as to an accepted framework for the management of these activities, there is however the acknowledgement that many organisations still lack an effective disaster recovery planning strategy even though these plans are often incorporated into the organisation's own systems and policies (Al-Zahrani et al., 2017). What does emerge from this viewpoint of Al-Zahrani et al. (2017), is whether this recognised weakness exists in the Dubai Civil Defence services, as there has been little research conducted in this region. Reflecting this, this study intends to identify what attributes are used in the Dubai Civil Defence, how effective the processes and strategies are, and what mechanisms are used to report and monitor recovery processes to enable the organisation to restore its most critical assets.

2.6 What constitutes a disaster recovery plan

In partly addressing this gap above, key authors including Moe and Pathranarakul (2006), have attempted to contextualise and categorize the concept of the planning process associated with disaster management. In contextualising and categorizing this concept, Moe and Pathranarakul (2006) recommended five generic phases, which constitutes the planning strategy and therefore needs to be included in the process:

(1) providing the means to predict a disaster;

(2) enabling a warning;

(3) providing emergency relief;

(4) rehabilitation; and

(5) reconstruction.

Figure 2.2: Five attributes of disaster recovery

(Source: Moe & Pathranarakul, 2006)

27

In contextualising these five phases as set out above in Figure 2.2, Moe and Pathranarakul (2006) stated that the first phase, which is classified as a *before*, is seen as being the planned or proactive phase. The planned stage involves the prediction of potential events occurring, therefore requires the mitigation and preparedness of activities in which a structured approach is adopted to enable the development of different criteria and measurements to be undertaken designed to limit the potential adverse impacts occurring, whether that is environmental or human/ technological based. These measurements are often predetermined in advance to ensure effective response to the impact, restoring the services and facilities in a timely manner through providing an effective early warning system. These measurements are often in the form of a series of key performance indicators, sometimes known as KPIs, which will be investigated later in greater depth in this chapter. The next stage is classified as *during*, as in the action needed to be taken during the event. The first stage of during, is the warning phase, which for Moe and Pathranarakul (2006) is the response and provision conducted in a timely manner, whereby providing effective information, through which the processes and strategies permit and enable the individual or the organisation to take a pro-active action to avoid or reduce the risk whereby providing an effective response. The other phase is the *emergency relief*, which for Moe and Pathranarakul (2006) is related to the need to include the strategies around the assistance or intervention required during or immediately after a disaster to provide an immediate response to meet basic needs or requirements, for example the restoration of electricity, water, or data to those affected. This response can be immediate, but can also be delivered in the short-term, or for a longer or protracted duration based on agreed levels of restoration responses. The next phase is the *after* stage, which includes rehabilitation, which consists of decisions and actions which need to be taken following the disaster, with a view to restoring or improving the pre-disaster activities following the event. This may include encouraging and facilitating necessary adjustments to reduce potential disasters and risk in the future. Finally, the *reconstruction* phase for Moe and Pathranarakul (2006), refers to the rebuilding and returning normality of services and amenities with the purpose to creating long-term sustainability. With Moe and Pathranarakul's (2006) model, the authors also highlighted that there are four essential activities, namely:

(1) mitigation;

(2) preparedness;

(3) response; and

(4) recovery.

This can be seen in Figure 2.3, which shows how the adoption, adaption and establishment of recovery activities and processes must begin in advance, then continues even after the disaster event occurs as to the response.
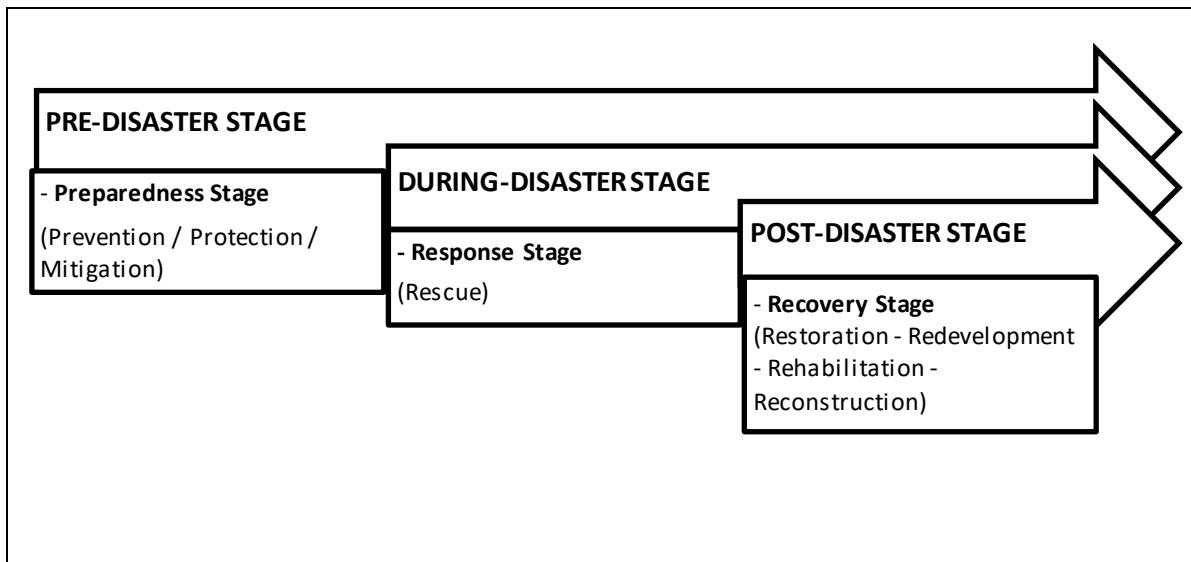
Figure 2.3: Stages of disaster recovery (Author's construction)

In explaining mitigation, Moe, Gehbauer, Senitz and Mueller (2007) later saw this theme as including structured and non-structured measurements which are undertaken to minimise or limit any adverse consequences of a hazard or an event occurring, including an early warning system established as an attempt to reduce the potential full impact of the event. The preparedness relates to the mechanisms which need to be in place to mitigate the event and the consequences of the disaster, while the response are the strategies which must be implemented. For Moe, Gehbauer, Senitz and Mueller (2007) and earlier with Moe and Pathranarakul (2006) the category of provision needs to be designed to assist or intervene during and immediately after the disaster. The final part, the recovery, involves the decisions and actions which need to be taken following the disaster with the purpose to restore or even improve the organisation, which may include how to reduce the effects of future disasters.

Finally, the proactive versus reactive approach, which is represented in Moe and Pathranarakul's (2006) model is the need for an integrated approach to enable the disaster management strategy and associated plan to provide both a proactive and reactive responses. A proactive approach requires the identification of risks, and then based on the risk identified, the activities of mitigation, preparedness, and responses which are based on predicting and providing an early warning. The reactive approach includes assessing the impact of the disaster, and the level of disruption based on what has occurred. The identification of a risk is crucial in the proactive approach, whereas the conducting and usage of an impact assessment is vital in the reactive strategy, and these approaches will be investigated further in the next section.

2.7 The fundamental attributes associated with the disaster recovery and planning processes

As mentioned above, often the disaster recovery planning process tends to be seen as a subset of business continuity management, but irrespective the central focus is on ensuring that the essential business functions and operations can be restored in a timely and agreed timescale (Hoong & Marthandan, 2014; Vuong, 2015). Karim (2011) while considering disaster recovery planning as being a subset of business continuity, did recognise that the concept of business continuity tends to be more focused on the procedures and instructions an organisation should follow after the occurrence of a natural or functional disruption, and is often associated with the information technology recovery protocols (Omar et al., 2011). In contextualising this difference, Omar et al. (2011) noted that disaster recovery planning tends to establish how an organisation can bring back its systems and services once they have been interrupted, and not simply focused on the protocols to follow.

As noted above, disaster recovery planning has become a priority for many organisations including in government entities, like the Dubai defence service. As without a disaster recovery planning strategy, there is the potential loss of reputation and market share if the organisation is commercial, decrease in customer service and business process failure, regulatory liability, and increased delays in resuming and restoring services and facilities (Sahebjamnia et al., 2015; Hillmann, & Guenther, 2021). Therefore, the main objective of the disaster recovery planning process is to protect the organisation, its resources and functions through reducing the impact of the disaster. To achieve this, there are several components which need to be present, including the commitment and support of senior management.

2.7.1 Senior management and leadership

To enable the restoration of services and activities, there is a need for senior management and leadership commitment and support, along with the alignment to the organisational objectives, which will be investigated in the next section. But an important aspect of disaster recovery is the commitment given by the organizational management team. The theme of organisational management can be seen as an overarching activity from which other attributes are grouped. For Tun, Gehbauer, Senitz and Mueller (2007), the recovery process to be effective needs to have senior management and leadership commitment and support to create and maintain a proactive responsive disaster environment. Therefore, for the effective execution of the plans from an organisational perspective, the leadership and management need to be proactively responsible for the allocation of resources, and provision of time and strategies to enable the organisation to be prepared (Nasiren, Abdullah & Asmoni, 2016; Bakar et al., 2019), as all actions are defined and initiated ultimately at a senior organisational level. In developing the plans from an organisational viewpoint, the process needs to involve the clarification of critical resources needed while also understanding the various capabilities within the organisation from a strategic perspective. The process also includes clearly defining in advance, a series of agreed targets or goals, referred to as critical success factors, and then the measurements to assess performance, through the usage of key performance indicators, including areas of tolerance, and restoration times for specific activities or services which need to be recovered (Meechang & Watanabe, 2022). It should

be noted that the restoration of an organisation and its activities tends to be based on these forms of goal setting and assessments.

An integral part of an operational disaster recovery strategy needs to set out the roles and responsibilities of its members (Rouhanizadeh, Kermanshachi, & Nipa, 2020). To achieve this, there is a need to establish a clear organizational structure and team responsibilities, which are critical for an effective execution of a disaster recovery plan (Curnin, & O'Hara, 2019), which is often instigated and then supported by the senior leadership team.

2.7.2 Alignment of disaster recovery planning goals with an organisation objectives

Senior management tend to be more committed to the disaster recovery planning processes if the objectives of the strategies are aligned with the organisational goals and objectives (Järveläinen, 2016; Wong et al., 1994). Haji (2016) and Chow (2000) emphasised that since the disaster recovery planning process is concerned with the entire organisation, it is essential to align the strategies with the scope, the objectives, mission, and vision of the organisation. Costello (2012) qualified this alignment to the strategic direction of the organisation, by emphasising that an effective disaster recovery plan must be linked to the critical business operational activities. To achieve this, often a disaster recovery planning committee is established with the sole purpose of coordinating the functional activities in the organisation (Rostami, Karlsson & Kolkowska; 2020; Cook, 2015; Blokdijk, 2008; Blokdijk & Menken, 2008; Chow, 2000) but then aligned to senior management and organisational priorities. The purpose of appointing this disaster recovery planning committee is to perform risk assessments and analysis in all functional areas throughout the organisation so that potential damage can be minimised and plans for an effective recovery strategy can be implemented (Cook, 2015; Hawkins & Maurer, 2010).

2.7.3 The disaster recovery planning maintenance

While Karim (2011) saw that strategic management as a vital aspect of disaster recovery planning, the author also recognised the need for conducting business risk analysis, which will be covered in the next section, but also providing adequate resources, and the involvement of the entire organisation / departments and teams. Linked to this, Karim (2011) and later Galbusera, Cardarilli, and Giannopoulos (2021) from a COVID-19 perspective also advocated that the disaster recovery processes, and documentation needed to be maintained and updated to ensure there is organisational preparedness. Interestingly, several authors, including Chow and Ha (2009), Cook (2015) and Haji (2016) while acknowledging the importance of the role of senior leadership, also highlighted the need for the establishment of disaster recovery committees and having operational staff involvement in the process. For these authors, the involvement of operational staff provided an insight which leadership and management may not possess or be aware of. The involvement of representatives or key staff

members from all functional areas throughout the organisation in the formal disaster recovery planning process is therefore essential for addressing and maintaining different departmental requirements, since those representatives tend to be more familiar with the functional aspects of the organisation, like changes in processes and activities as opposed to the leadership team who take a more strategic approach (Haji, 2016; Asgary et al., 2012; Chow & Ha, 2009; Sahebjamnia, Torabi, & Mansouri, 2015). Part of the process also involves ensuring that the disaster recovery plans are regularly reviewed, updated, evaluated, and maintained (Haji, 2016; Cook, 2015; Asgary et al., 2012; Chow & Ha, 2009; Sahebjamnia, Torabi, & Mansouri, 2015), to ensure that the strategies are relevant.

2.7.4 Risk assessment and business impact analysis

In updating the various recovery plans there is a need to conduct risk assessments and business impact analysis scenarios to assist the organisation in determining any possible disasters which might affect critical business functions. Therefore, it is essential for the recovery planning owners, whether that is the senior leadership team or the committee, to perform a risk assessment and impact analysis throughout the organisation's functional areas to identify critical business functions (Haji, 2016; Cook, 2015; Blokdijk, 2008; Wold, 2006; Yang, Yuan, & Huang, 2015). For Hawkins & Maurer (2010), the process of conducting a business impact analysis can enable the identification of critical functions within the organisation so that essential activities can be restored back immediately in the event of a disaster. This may include assessing which parts of the organisation are seen as critical business functions, and this process may also involve conducting cost analysis calculations, to determine the impact if the service is restored compared to the cost of needing to restore it in a predetermined later timeframe (Wold, 2006). Therefore, performing these risk assessments can be used to identify possible threats and potential impact to the organisation and services which are provided to the community or general public.

2.7.5 The prioritisation of activities and services

As noted above, not all services, activities and amenities in an organisation have equal importance, therefore it is necessary to assess and rank these aspects dependent on how much the organisation will be affected by the disruption when the disaster occurs and the impact to the community or stakeholders (Asgary et al., 2012; Chow & Ha, 2009; Blokdijk, 2008). Therefore, when the disaster recovery plan is being developed, critical services and activities have different levels of priority which need to be considered (Haji, 2016; Asgary et al., 2012; Costello, 2012; Blokdijk, 2008; Wold, 2006; Yang, Yuan, & Huang, 2015). From an information technology perspective, as much of the current research has focused on this area, there is often a need for the establishment of appropriate backup sites, with the inclusion of off-site storage, where the organisation can easily retrieve and restore the data services immediately after a disaster occurs (Haji, 2016; Meyer, 2018; Ashrafi, & AlKindi, 2022). But there are different IT recovery strategies available, dependent on how mission

critical the service is. This includes having a 'hot-site' where there are redundant systems, applications, and infrastructure that are identical to the actual or live production site, therefore there is an immediate restoration of services following a disaster. Alternatively, there is a 'warm-site' where the services can be restored after little configuration changes have been made (Peterson, 2009). The third option is known as a 'cold-site', which is typically an empty office with minimum infrastructure, resources and services in place (Peterson, 2009), therefore delaying the recovery time. Although IT related, the examples indicate the type of recovery strategies from identical services located remotely to a solution which takes time to activate and restore. But the type of recovery is dependent on the organization and stakeholders' priorities, as the solution is often finance or funding dependent.

2.7.6 Testing and practicing of the disaster recovery plans

The testing of disaster recovery plans is crucial to ensure that it is effective in the event of a disaster (Cook, 2015; Chow & Ha, 2009). The disaster recovery plan can become obsolete through changes in the organisation which can happen continuously, so the regular testing of disaster recovery plans is essential (Meyer, 2018; Ashrafi, & AlKindi, 2022). The main purpose of testing is to ensure that the disaster recovery plans are reliable and accurate, therefore periodic testing proves the capability of the organisation to recover. However, according to the State of Global Disaster Recovery Preparedness (2014), statistics show that 23% of respondents in this study had never end-to-end tested their disaster recovery plans, and 65% of those sampled did not pass the original testing criteria. These statistics indicate the shortfall of disaster recovery plan testing in organisations, even though periodic disaster recovery plan testing is considered to be very useful for training and to obtain invaluable information before a real disaster situation occurs (Meyer, 2018; Ashrafi, & AlKindi, 2022). The question which then emerges is whether the Dubai civil defense is regularly testing their plans, how frequently, then how accurate are the plans when tested?

In testing there are several programs which disaster recovery plans can use, such as the walk-through, the checklist, the simulation, parallel, and full interruption tests (Wold, 2006). But again, the question which emerges in relation to this study, is whether the Dubai civil defense conducts these forms of tests, how frequently and what mechanisms or protocols are used to assess the outcomes?

2.7.7 Disaster recovery plans and documentation

Although partly presented above, to be effective, disaster recovery plans need to be seen as being a living document which needs to be updated continuously as organisational processes and functions change (Haji, 2016; Blokdijk, 2008; Nelson, 2006). This need for constant updating of the plans is increasingly important as often in some departments such as information technology, these changes can be complex and mission critical (Chow, 2000). To ensure an efficient recovery from a disaster, it is vital to document roles, responsibilities, process accountability, and ownership, including those in senior and operational roles (Hoong

& Marthandan, 2014). The disaster recovery plans must also need to include all the resources and data required, and the actions to be taken to manage the recovery of critical functions in the event of an interruption to assist the organisation in the restoration of activities and processes (Snedaker, 2013), but also the methodologies to assess how effective the restoration of services and amenities can be achieved, which means that there is a need for agreed critical success factors to be established together with key performance indicators which measure the long-term effectiveness of the protocols. The importance of these two mechanisms will be presented later in this chapter.

2.7.8 Training of the disaster recovery team

When the implementation of the disaster recovery plans is ready, a training program is essential so that all staff are aware of their roles and responsibilities (Cook, 2015; Chow & Ha, 2009). Without the training of associated teams and personnel, the effectiveness of the disaster recovery plans will be compromised if any of the team are unaware of their roles and responsibilities (Meyer, 2018; Ashrafi, & AlKindi, 2022). Training can be provided to the teams through various educational methods, for example through in-house training, external consulting, a simulated walk-through activity, or even a simulation of a disaster scenario (Meyer, 2018; Ashrafi, & AlKindi, 2022). Furthermore, through training of the team can minimise the potential for operational errors during a real disaster (Chow & Ha, 2009), which can lead to further delays and impact on the stakeholders and community. Therefore, effective and proper training is essential to ensure that disaster recovery planning procedures are achieved as originally planned. Several studies (e.g., Moe, Gehbauer, Senitz & Mueller, 2007; Meechang & Watanabe, 2022; Chow and On Ha, 2009) have identified the need of suitable frameworks to assist in the planning, training and execution of the disaster recovery and business continuity strategies. However, as noted by Jarvelainen (2013) there still remains no one specific framework used for disaster recovery planning, training or assessment of the protocols, and that often businesses and organisations will be dependent on different concepts based on their specific needs. In concluding, Jarvelainen (2013) and later supported by Sahebjamnia et al. (2015) highlighted the need for one effective disaster recovery protocol to be used in an organisation, otherwise there is the potential problem of being unable to accurately assess the effectiveness of actions and activities when recovering from a disaster.

2.8 Disaster recovery planning frameworks

Based on above, the next section will focus on the possible frameworks which could be used in the development of crises and disaster plans. Often frameworks and strategies adopted while recognised as an important function in most organisations, tend to be based on the type of sector, or industry, for example, financial, engineering, telecommunications, banking, or even governmental (Wrobel, 2019). As a crisis event or an emergency can occur at any time in any organisation, therefore proper planning is needed to respond to unexpected catastrophic events. As mentioned earlier, successful crises and disaster recovery management strategies therefore need to be incorporated into the entire organisation from a strategic perspective, which are

then cascaded to all staff and departments, whereby making everyone aware of their roles and responsibilities. Furthermore, disaster recovery planning to be effective requires all the organisational departments to work together to reach the ultimate goal of having a successful and effective disaster recovery plan (Lockwood & SPHR, 2005). An effective disaster recovery plan therefore needs to have comprehensive documentation which covers all aspects of management, including the technical, operational, and regulatory components, while also setting out the roles and responsibilities, so that individuals know exactly what is needed and how to respond in the event of an emergency. Hannah et al. (2009) constructed a framework that examined leadership in extreme and high-risk contexts by providing a perspective on the unique demands and dynamics of leadership in disaster recovery situations, which could enrich the DCD's leadership-centric approach.

It should be noted that there are numerous approaches which can be adopted to manage the disaster recovery process, including following a business continuity strategy, Project Management Book Of Knowledge (PMBOK) from project management theory, and the Plan-Do-Check-Act or PDCA approach, which is like Moe and Pathranarakul's (2006) model. While the business continuity strategy and PMBOK methods have been presented earlier in this chapter, the PDCA approach is mainly focused on checking the outcome of the disaster activity, and then can be used for any changes that are needed in the existing plan to occur, enabling better recovery performance in the future. The PDCA process commences with the *plan* stage. This stage involves assessing risks, defining recovery objectives, and developing the strategies and procedures to determine and understand what is happening. The next stage, the *do* is the implementation phase which requires regular communication and to ensure that everyone in the recovery process is aligned and working towards the common goal of restoring services. With the *check* stage, there is the assessment and evaluation of the effectiveness of disaster recovery efforts by testing and evaluating recovery procedures to identify any gaps, weaknesses, or areas for improvement through testing the protocols to validate the plan's effectiveness. In the final phase, *act*, corrective actions and necessary adjustments are made to the plans. The act stage is also related to the modifications and reviewing of the disaster recovery plan that takes place after considering any lessons learnt or changes to the environment.

While the PDCA approach is useful, there is also the need for some form of framework which captures not only the operational activities but also the strategic aspects of a recovery planning process.
To emerge from the literature review are two key models which have been extensively used as theoretical frameworks associated with disaster recovery, namely technology, organization, and environment or the TOE framework, which was introduced by DePietro et al. (1990), and advocated by Ashrafi and AlKindi (2022) from an information services perspective, and the Balanced Scorecard, conceived by Kaplan and Norton (1992), and used effectively by Moe, Gehbaurer, Sentiz and Mueller (2007) to contextualise the recovery methods and strategies used in Thailand. Therefore, the next section will present two potential disaster

recovery frameworks, firstly by focusing on the concept referred to as TOE, before critiquing the Balanced Scorecard.

2.8.1 The Technology Organization Environment TOE framework

The TOE framework is based on identifying several important areas which need to be resolved which are grouped into three distinct categories: technology, organisation, which is related to management and operational activities, and the environment. However, it should be noted that this concept is primarily focused on disaster recovery from an information technology viewpoint, and potentially could have little relevance to other services and amenities, such as finance or operational activities. The 'environment context' of the TOE framework refers to the outside influences that affect the organisation such as stakeholders, government compliance and regulators, competitors, and customers. The next context, the 'organisation' of TOE relates to the characteristics and structure of the organisation, the methods and processes used or adopted, the decision-making protocols, and internal and external communication channels. Finally, the 'technology context' is the technology competency of the organisation, the implementation of the technology recovery solution, the availability of technical skills, and the available resources and technological infrastructure (Scott, 2007; Angeles, 2014). To illustrate how the TOE framework operates, Ashrafi and AlKindi (2022) provided an insight into how the framework and the associated critical success factors operate. For the technology context, and the associated critical success factors tend to be associated with the need for the establishment and maintenance of appropriate backup protocols, and the prioritisation of applications and services. The next category, organisation, this is closely aligned to management, including the need for senior management support and commitment, and the alignment of disaster recovery plans to the goals and objectives of the organisation. The other part of the TOE framework associated with the organisation, is the operational context, which involves the establishment of a disaster recovery committee, maintaining the plans, and the constant training of the disaster recovery teams. Finally, the last category, the environment, this includes the regulatory requirements which the organisation needs to follow, the conducting of business impact analysis and risk assessments, the writing of the disaster recovery documentation then testing of the plans. The next section below is dedicated to presenting the core features of the TOE framework in further detail by focusing on the disaster recovery aspects of the model in an organisational setting.

From an organisational perspective, leadership, management, and operational requirements need to be separately identified as to the roles and the requirements are often unique. From a management perspective, there is a need for strong support and commitment from the senior management team as to the importance of ensuring that the disaster recovery processes are managed correctly. Where there is a lack of support from senior management for the effectiveness of the disaster recovery process this can lead to reduction in recovery times and overall effectiveness (Nelson, 2006). Within the organisation, the management which includes senior and middle levels need to promote disaster recovery processes by establishing a proactive culture where

there is investment and resources made available. The disaster recovery planning process implementation is a strategic decision, since business availability, asset protection, legal compliance, and managing operational risks are all strategic matters. Therefore, it is vital to ensure that the goal of the disaster recovery plans align with the strategic goals of the organisation (DiMaria, 2014), together with adequate funding. Therefore, the extensive commitment of organisational resources and funds is considered essential to reduce the threat and minimise the hazard of catastrophic events occurring or being unable to respond effectively (Harrald, 2006). DR has however additional components which may be missing in these frameworks. For Alexander (2002) DR is not only IT or technology-centric, therefore advocated additional fundamental principles and a framework for emergency planning. To conceptualis this, Alexander (2002) indicated the need for adaptability which was dependent on the type of disaster and organizational structure, which may not be necessarily IT centric.

Therefore, based on the above, the following categories are important, senior management support and commitment, adequate funding for disaster recovery planning, and alignment of the disaster recovery planning with the objectives of the organisation. However, what is missing from the TOE framework's focus on the organisation, is how this can be initiated.

2.8.2 Balanced Scorecard framework

In contrast to the TOE framework, the Balanced Scorecard can provide a more holistic perspective of the entire organisation and its activities including from a financial, customer or community perspectives, internal operational activities and finally capturing innovation and learning practices, including how to improve the disaster recovery activities in the future. As an approach, the Balanced Scorecard was effectively used by Moe, Gehbaurer, Sentiz and Mueller (2007) to assess the effectiveness of disaster recovery planning by measuring five generic phases of managing a disaster, from the preparedness, early warning, providing initial and emergency response, the rehabilitation of the organisation or community, and finally restoring and recovering from the initial event. To illustrate this, the study of Moe, Gehbaurer, Sentiz and Mueller (2007) used the model in Thailand when responding to a real flood which occurred in the Hat Yai Municipality, however from a project management perspective.

The Balanced Scorecard approach was first devised by Kaplan and Norton (1992), to enable managers and leaders to look at various business activities from four distinct areas. Firstly, from a financial perspective, or from a business viewpoint addressing the question: 'how do we look to shareholders?', secondly, from a customer perspective, or 'how do customers see us?', thirdly, an internal perspective or 'what must we excel at?'; and finally, innovation and learning viewpoint, addressing the question 'can we continue to improve and create value?' In explaining the framework or model, except from a business performance viewpoint, Kaplan and Norton (2000) suggested that the best way to develop a strategy is from a top-down approach therefore

needs to be led by senior management and the leadership team, in which the activities and processes need to begin with a review of the mission statement of the organisation and core values, which is related to the ultimate goal or strategic destination of the business. The strategy adopted must define and set out the logic of how this goal will be attained, by firstly looking at the financial strategy by assessing how to provide value to shareholders. From a disaster recovery viewpoint, the Balanced Scorecard therefore would be focused on meeting the stakeholders' expectations of what services and amenities are needed to be recovered following a disaster in relation to the financial commitment needed to meet this expectation. From the financial perspective, Kaplan and Norton (2000) stated the Balanced Scorecard needs to clearly understand customers' values and needs, which is the second category. Again, from a disaster recovery perspective, the focus is on understanding the customer or community expectations as to what services and amenities are needed to be restored, and within which timeframe. The next category is the internal processes, which is related to the assessment of what strategies and plans are in place, and then determining how effective are these processes, indicating the need for a constant review and the testing of procedures and protocols. The fourth category is related to the core competencies and skills in the organisation and the need for a culture which provides a learning environment to support the disaster recovery strategy within the organisation and associated departments.

In illustrating the usage of the Balanced Scorecard in figure 2.4 below from a disaster recovery perspective, Moe, Gehbaurer, Sentiz and Mueller (2007) created the following figure to capture its usage:
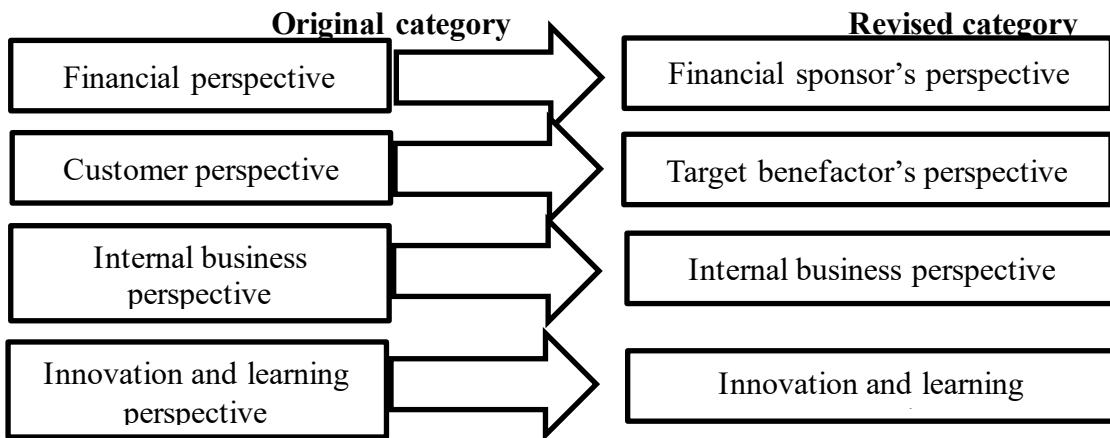
Figure 2.4: The Balanced Scorecard and disaster recovery (Author's construction)

As noted above, the Balanced Scorecard has been used by studies including that of Moe, Gehbaurer, Sentiz and Mueller (2007) to provide a construct but from a project management disaster recovery perspective to perform a health check of the response to an emergency. In the study of Moe, Gehbaurer, Sentiz and Mueller (2007), when management looked at these four business areas set out in the Balanced Scorecard, the executive team were able to be provided with an accurate representation of the entire organization by enabling the senior leadership to accurately respond to the disaster (Stewart, 2001). In concluding, Moe, Gehbaurer, Sentiz and Mueller (2007) identified that the Balanced Scorecard provided an accurate measurement of the response to the disaster, through the establishment of meaningful performance measurements or benchmarks, while also acting as a term of reference whereby enabling the establishment of measurements that are efficient and effective. To achieve this, Moe, Gehbaurer, Sentiz and Mueller (2007) noted that there was a need to have three standard types of measurements established. The first measurement was focused on the 'outcome' of the execution of the plan, next was 'action' which measured the performance, and finally, 'diagnostic', as to why the outcome or action measurement was at a particular level. In explaining the usage of the construct, Moe, Gehbaurer, Sentiz and Mueller (2007) noted that the measurement used in the four areas of the Balanced Scorecard needed to be modified to fit with the nature of the activity and stakeholders, in this case disaster recovery.

To illustrate this, from the stakeholder's perspective, in Moe, Gehbaurer, Sentiz and Mueller's (2007) study, the disaster management activities were financed by the Thai government, international donors, and through development agencies. But unlike the usage of the Balanced Scorecard in a business context, which tends to be focused on increasing shareholder value by focusing on two levels of strategy, revenue growth, and productivity (Kaplan & Norton, 2000), for Moe, Gehbaurer, Sentiz and Mueller (2007) the usage of the construct when applied to a disaster management context does not necessarily focus on revenue growth. Instead, the stakeholders should expect an increase in delivery of services around preparedness, mitigation, emergency relief, rehabilitation, and reconstruction within a specific budget, timeframe, and meeting quality

standards. As to the customer component of the Balanced Scorecard, this aspect is normally focused on four components: time, quality, performance and service, and costs (Kaplan & Norton, 1992), but in the context of a disaster recovery, the customer will become known as the community, and will seek a timely resolution to the crisis, while providing a quality but cost-effective preparedness, response, and the recovery activities following an unexpected event.

In relation to the internal business perspective, Kaplan and Norton (1992) argued that customer-based measures must be translated correctly into measurements of what the company must do internally to meet its customers' expectations. From a disaster recovery viewpoint, this is related to the effective use of knowledge, skills, tools, and techniques undertaken by those nominated in the organisation to respond to the crisis. To achieve this, Moe, Gehbaurer, Sentiz and Mueller (2007) recommended that the organization must carefully examine anything that will have an impact on the process of providing products and services regarding disaster preparedness, mitigation, emergency relief, rehabilitation, and reconstruction. Therefore, specific measurements are needed to evaluate the current level of each of the phases of the recovery process through predefined criteria.

The next phase of the Balanced Scorecard is the innovation and learning perspective. It is essential for an innovative and a creative culture is maintained and promoted, with the organisation to learn from lessons of the past to ensure that best practices are adopted throughout the organisation. Kaplan and Norton (2000) pointed out that organizations tend to invest in three capitals, namely human, information, and organizational capital, to produce the desired products and services. From a disaster recovery perspective in relation to the innovation and learning perspective, the focus is on the recovery and restoration of these services and products which requires the skills of the team to be up to date through providing adequate training. This training needs to include the staff acquiring the necessary knowledge and to be able to possess the core competencies through building a culture of learning and creativity.

To establish the Balanced Scorecard's measurements from a civil disaster recovery perspective, the strategies need to commence with the formulation of national policies to manage the disaster recovery. From these policies, the measurements of what is seen is acceptable as to long-term performance must be through the development of key performance indicators (KPIs), and more short-term or immediate responses to the crisis in the form of critical success factors (CFSs), which are set out in targets and goals, that must be translated into the plan's objectives. From the objectives, the Balanced Scorecard then requires the framework to be regularly updated with the identified key activities which need to be performed, which will include the identification of major outputs from a long-term and short-term perspectives, through the creation of key performance indicators and critical success factors.

Next for the Balanced Scorecard are that key individuals need to be identified along with their roles and responsibilities. To be effective, appropriate Balanced Scorecard measures need to be identified, designed, and agreed on, which can measure the performance of the recovery process which are aligned to one of the four dimensions of the construct and the organisation's disaster recovery strategy. In each phase of a disaster recovery plan, the actual performance is then measured against the selected indicators based on the four dimensions in the Balanced Scorecard. When the actual recovery occurs, if the performance is in line with the selected baseline or key performance indicators, then best practice is documented, whereas it the criteria is not met, then the dashboard can indicate where there are differences and lessons can be learnt. Finally, a perquisite of the Balanced Scorecard is the need for the entire organisation to be involved, therefore indicating the potential usage of a disaster recovery committee in the planning stage.

One of the key benefits to emerge from the usage of the Balanced Scorecard was the recognition that often leaders and managers need to be provided with complex information in a summarised format. With the Balanced Scorecard, this methodology can provide the means to produce disaster recovery reports in a concise format, while enabling various strategic criteria to be measured effectively through providing a comprehensive overview of the activities conducted. This usage is best illustrated by Moe, Gehbaurer, Sentiz and Mueller (2007), who found that during the Hat Yai Municipality flood disaster, the Balanced Scorecard enabled accurate analysis of performance against predefined measurements, using a traffic light or RAG rating. The green rating represented that project performance was meeting agreed criteria with the original recovery plans and met the stakeholders' expectations, the yellow indicated deficiencies in recovery performance which therefore needed to be monitored as the process continued, with corrective action potentially needing to be implemented in the future; while the red meant that serious deficiencies in the response to the crisis had occurred and needed immediate attention (Stewart, 2001). Therefore, to determine which aspects of the disaster recovery process were meeting the planned outcomes, there is a need to have agreed metrics and measurements. As noted above, these metrics can be short-term aligned to the critical success factors of the organisation, or based on long-term performance through the usage of key performance indicators. The next section will investigate the debate behind these two metrics, commencing with the key performance indicators before investigating the attributes associated with critical success factors.

2.9 Key Performance Indicators

Key performance indicators or KPIs are a well-established means to measure business performance (Parmenter, 2010). The concept is based on physical parameters that are usually known in the pre-design phase of the disaster recovery process, and are aimed at quantitatively evaluating the future activities and outcome of the planning process. To be effective the indicators must provide real-time reliable information about performance, which are usually designed and defined by the senior strategic leadership team or at a governmental level.

The methods of designing key performance indicators, includes identifying the most critical processes in the organization or departments. However, these critical processes need to be qualified and clearly set out, understood and agreed too, by the key stakeholders (Neely et al., 2000; Strecker et al., 2012; Frank et al., 2009; Popova & Sharpanskykh, 2010), otherwise a generalization or misunderstanding of the indicators can lead to the use of professional jargon being used whereby making the outcomes hard to understand, possibly having undefined or misleading criteria being used, and potentially miss important aspects of the recovery process, but there is also the risk that the key performance indicators used by one department does not correspond to another. As noted by Berler et al. (2005) key performance indicators often fail as they often do not represent the future performance but instead highlight or measure the actual performance problem. Therefore, there is a need to ensure that the method of devising and using key performance indicators must be established and their usage is fully understood and agreed too. To achieve this, Kueng (2000) recommended six essential properties to be followed. The first requirement for Keung (2000) was that the key performance indicator needs to be in a quantifiable format. Quantification means deriving a number or a conclusion from a set of defined criteria, and the indicator's outcome presented in a quantifiable and logical format (Andrews, 2002). Next, a key performance indicator needs to be sensitive, reflective, and responsive of change. Any variation in the key performance indicator measurement needs to be informed and reflective of what is being measured in the disaster recovery plan, therefore requiring constant updating. Next a key performance indicator should be linear, which means that the indicator can measure performance changes in line with the value of the variable or attribute being used to determine any pre-determined performance deviation or variance.

The key performance indicator should be reliable, as in that the algorithms used to calculate the performance needs to be free of any errors whereby accurately calculating the performance both in routine and unexpected circumstances, therefore ensuring that all relevant aspects related to future performance are captured. Finally, a key performance indicator needs to be efficient, in that it is intuitive, unambiguous, and easy to understand without any jargon, in order to avoid wasted effort or errors in their use and application, while also being cost-effective to produce then maintain / use. This cost-effective aspect implies that a key performance indicator should be created in the simplest way using existing metrics or indicators. Therefore, in summary, key performance indicators need to report back on the future performance or success of the disaster recovery process from both a strategic and operational perspectives as to the effectiveness of the underlying recovery protocols used. The method for devising and using key performance indicators should enable an understanding of the outcome or measurements produced, and their relationship to the future recovery process, which then needs to be fully understood by those using them.

In understanding the different key performance indicators which could be used, but from a disaster recovery and planning process, writers including Bahmani and Zhang (2021), advocated several areas which could be considered important to assess around the themes of resilient society which encompasses aspects like social connections, psychological and physiological support, and sustainability (Platt, 2018; Roosli & O'Keefe, 2013; Xu & Liu, 2018; Li et al., 2016). While informative, the research of Bahmani and Zhang (2021), together with Platt (2018), Roosli and O'Keefe (2013), Xu and Liu (2018), Li et al. (2016) indicated the usage of key performance indicators needed to be tailored to the needs of the organisation and the recovery process. These key performance indicators could also include assessing the effectiveness of training, through assessing the outcome of the training provision, the organisational response times in the event of a disaster, as seen with the information technology performance matrix (Ashrafi & AlKindi, 2022), the availability and efficiency of resource usage, through to the effectiveness of agency cooperation. However, while this list of potential key performance indicators is not exhaustive, the question which does emerge, is what key performance indicators exist in the Dubai Civil Defence, and how different are these from existing research.

2.9.1 Recovery time objective (RTO) and recovery point objective (RPO) metrics

Closely aligned to the theme of key performance indicators and critical success factors, which is often emphasised in relation to disaster recovery planning is how to assess and measure the effectiveness of responses through using metrics, such as with the recovery time objectives, which is also referred to as RTO, and the usage of recovery point objectives, denoted by RPO. Recovery time objectives can be defined as the acceptable period of time in which an organisation can recover services or processes (Gibb & Buchanan, 2006), therefore assess performance of recovery. This definition was expanded on by the State of Global Disaster Recovery Preparedness (2014) from an information technology perspective, seeing recovery time objectives as being the speed in which an organisation or business can recover its critical functions. In contrast, recovery point objectives or RPO refers to a point in time by which business activities including data, and processes, must be restored to ensure that critical business processes are fully functional (Meyer, 2018; Ashrafi, & AlKindi, 2022). Usually both recovery time and recovery point objectives are referred to as the maximum allowable downtime, sometimes called MADT, or the maximum tolerable period of disruption, known as the MTPD (Meyer, 2018; Ashrafi, & AlKindi, 2022). One classification method used to determine and define the maximum allowable downtime, can be seen as follows:

Time without system operations	*Level of criticality*
• Within 24 hours	Highly critical
• Between 1 to 5 working days	Critical
• More than 5 working days	Less critical

(Meyer, 2018; Ashrafi, & AlKindi, 2022)

2.10 Critical Success Factors

Unlike key performance indicators, critical success factors are more short-term operational aspirations, and not centred on performance per se. Critical success factors are the targets or goals set, which other indicators may measure the performance of achieving them. Daniel (1961) introduced the concept of critical success factors through the management of a crisis in the early 1960s, to describe the key topics that must be addressed to ensure an organisation is effective and efficient when responding to an unexpected event. Later Rockart (1979) presented this concept at an organizational and industrial perspective, arguing that critical success factors can be used to focus on certain aspects of a business in which the performance can be accurately judged or assessed.

As noted above, critical success factors are an important aspect associated with disaster recovery planning. Over the years, there have been several definitions related to this concept of providing a metric. These have included Rockart (1979) who defined the concept as being key areas of activity, which are absolutely necessary for a manager to meet or reach the intended goal or outcome. Ashrafi and AlKindi (2022) defined critical success factors as being targets which are set to be achieved satisfactorily and therefore needs to be completely understood, to ensure a successful and competitive performance by the organisation is achieved. Finally, Wali et al. (2003) defined critical success factors as essential areas which must be performed well to meet the objectives and goals of the organisation. In the context of this study, critical success factors are the most important attributes and requirements that an organisation must focus on to achieve its short-term recovery objectives. To understand what constitutes critical success factors, Chow (2000) from a project management perspective, saw senior management as being critical in setting out critical success factor targets through providing adequate funds and finance, along with ensuring that these aspirations are aligned to the goals and objectives of the organisation. As this section will show, there is a consensus as to the importance of senior management and leadership in relation to the effective usage of critical success factors.

To be effective apart from senior leadership support, these critical success factors need to be tailored to a particular activity in the organisation, whether that is determining current business performance or setting out an aspiration in the organisation. In contextualising and explaining the usage of critical success factors, writers including Meechang and Watanabe (2022) noted that there were fundamental dimensions which need to be in place, including agreed areas of focus, for example what needs to be recovered, and the criteria needed to assess the outcome, like time and cost associated with the recovery of services. While these components are acknowledged as important, it should be noted that research conducted around creating and executing effective recovery procedures and the usage of critical success factors, there has been limited research conducted around non-business entities such as libraries, museums, academic institutions, and even less from a governmental environment (El-Temtamy et al., 2016; Omar et al., 2011).

While there have been few studies that have reported empirical evidence to illustrate the effectiveness of disaster recovery planning and the usage of critical success factors, Chow (2000) did conduct an extensive literature review and identified 17 success factors for disaster recovery planning which was generated from a survey conducted in Hong Kong on banking representatives, together with those in the manufacturing, trading, and hotel industry sectors. The study of Chow (2000) while interesting, did not develop, or provide a framework to present the processes and activities of developing and implementing this methodology. In a later follow-up study, Chow and Ha (2009) identified 14 disaster recovery planning and critical success factors, but from an information services perspective. Again, while these critical success factors were informative, there was still a need to have a framework to group these targets and goals as a means to align these to the strategic direction of the organisation.

Another key author in the field of disaster recovery and critical success factors has been Meyer (2018) who investigated the critical success factors for implementing disaster recovery planning strategies, following the events of September 11, 2001. The study of Meyer (2018) found that the 17 critical success factors identified earlier by Chow (2000) were relevant but added three additional attributes. In the same study, Meyer (2018) then ranked the critical success factors as to their perceived relevance, then concluded that while some of the numerical metrics like recovery / restoration time measurements were important as a means to determine the outcome of the goal, the usage of business impact analysis, the maintenance of disaster recovery plans and periodical testing of processes and strategies were seen as being equally important. To emerge from the study was also the relevance and importance of training of recovery teams and the engagement of external consultants, which were rated as part of the top 5 critical success factors, along with the need for senior management support and the alignment of disaster recovery objectives with the organisation's goals.

In another study, Hoong and Marthandan (2014) from an information technology perspective based in the Malaysian financial industry identified critical dimensions associated with the disaster recovery planning process, and how the procedures can contribute to a successful restoration of services. Interestingly, the work of Hoong and Marthandan (2014) used the technology, organisation, and environment model, referred to as TOE (DePietro et al., 1990), to explore the adoption of disaster recovery planning processes, the study identified 8 critical dimensions or success factors which needed to be incorporated. These included the inclusion of senior management / leadership support; staff possessing the correct skills and competencies; the importance of understanding the business environment; establishing clear roles and responsibilities; setting out perceived business disaster benefits; and having defined IT availability and reliability criteria. Interestingly however, the study of Hoong and Marthandan (2014) was unable to effectively illustrate how the usage of the critical success factors could be implemented. Partly addressing this potential gap, in a study based in Abu Dhabi in the UAE's security exchange, Ashrafi and AlKindi (2022) while agreeing with Hoong and Marthandan (2014), that the critical success factors needed senior management support, the need for resources

to be clearly defined as to the utilisation in developing disaster recovery plans, setting out the criteria for ensuring that employees are prepared and aware of their duties and responsibilities, having a proactive approach to being critically aware of risks and threats, the need to establish and monitor the necessary controls and recovery strategies, and finally having a strategy to test the protocols, also indicated the need for a framework to be used to group these critical success factors. This perspective was supported by Bakar et al. (2015) who proposed a model to represent the impact of these factors on both the financial and non-financial performance of an organisation, which was similar to the Balanced Scorecard. In an earlier study, Jarvelainen (2013) developed and validated a framework for disaster recovery for information systems. The framework of Jarvelainen (2013) was again similar to the Balanced Scorecard, but the study did not provide a comprehensive representation as to how critical success factors could be adopted and applied in the event of a disaster. Finally, Haji (2016) also independently identified the following critical factors as essential for disaster recovery planning, which again listed the importance of senior management support, alignment of disaster recovery planning strategies with organisational goals, the need for disaster recovery procedures to be periodically tested, clear communication with between teams and departments, the usage of a standard recovery framework, and ongoing improvement of recovery strategy, but then identified the importance of a standard recovery framework, however the actual construct was not presented.

2.10.1 Important attributes associated with effective critical success factors

In expanding on this theme of the requirements of effective critical success factors, Moe and Patheanarakul (2006) studied this mechanism from a public sector perspective and identified the need to have firstly certain aspects to be clearly set out including governmental involvement. This should ensure that institutional arrangements are defined otherwise there would be unclear lines of authority and delays in the decision-making. The next consideration for Moe and Patheanarakul (2006) was related to the coordination and collaboration of activities in managing a disaster successfully. These collaborative activities amongst the key stakeholders, including government involvement, and the participation of community and external entities needed to be clearly established and then defined (Leungbootnak, Charoenngam, & Sunindijo, 2005). Interestingly, both Leungbootnak, Charoenngam, and Sunindijo (2005) and later by Moe and Patheanarakul (2006) neglected the importance of critical success factors related to public awareness and education when disaster recovery planning. This omission is particularly important in the context of this study, as community recovery planning is fundamental to civil defence, as public awareness and how the community responds is paramount.

The next theme was the inclusion of supportive laws and regulations, and ensuring that the various legislative requirements are enforced by the organisation in the plans, and that the various mandatory activities are followed (Tingsanchali, 2005). As with other authors including Moe and Patheanarakul (2006) effective management systems like communication channels need to be defined, then maintained, and managed so that

essential information among key stakeholders is provided. Next for Moe and Patheanarakul (2006) was ensuring the competencies of managers and team members, with the correct technical skills being identified during the planning, implementing, and managing disaster phases through providing adequate and suitable training, which means that there is a clear statement as to this requirement. Moe and Patheanarakul (2006) also stated the importance of including having clearly defined goals and commitments by key stakeholders with defined goal(s) and target(s) aligned with the purpose of the disaster recovery plans.

More recently, Meechang and Watanabe (2022) from an information technology disaster recovery viewpoint recommended a series of critical success factors, which could be used assist an organisation to recover rapidly from a crisis. In presenting this, Meechang and Watanabe (2022) identified four components which needed to be clearly defined: organisational management, motivation and skills, information sharing and interdependency. The first category of Meechang and Watanabe (2022) *organisational management* included the commitment and support needed by senior management, which was supported by other authors including Ashrafi and Alkindi (2022). For Meechang and Watanaba (2022) the senior leadership team provides the resources and enables the disaster recovery process to occur, which includes the authority to authorise, communicate activities while also ensuring that recovery strategies and processes can be executed. The next category was related to the organisational structure and the responsibility and participation of employees, which included the accountability and ownership of the various activities which need to occur. In explaining this category, Meechang and Watanaba (2022) recommended that duties and responsibilities are clearly set out, while also enabling team members to actively participate in the recovery process. As previously mentioned, and highlighted, the business impact analysis is an essential component in assessing internal and external activities to determine the potential impact of a disaster. The data generated can be used to inform and benchmark the ultimate plan and then the response to the event. The last category under the heading of organisation management was the maintenance of the overall plan. This critical success factor provides a means to establish a criterion to monitor, review and provide potential improvements to the strategy. In explaining this, Meechang and Watanaba (2022) contended management needs to be constantly reviewing and evaluating the plans as to the relevance and effectiveness, and this responsibility needs to be clearly set out as a criterion in achieving success.

The next category of Meechang and Watanaba (2022) is *motivation and skills*. The first heading under is motivation and skills is resources, which is related to the finances needed to recover the organization from the crisis, which of course needs to have stakeholder and senior management commitment and support. The financial commitment is needed to provide adequate resources, such as equipment and facilities, but also the need for ensuring that training and testing happens. However, the question which emerges is whether financial stability and budget allocation are also important critical success factors needing to be considered then adopted into the recovery planning process. Reflecting on the theme of training and testing, Meechang and Watanaba

(2022) noted the importance of education and training of the disaster recovery protocol, which includes providing proper training and communication to those identified as key disaster recovery specialists, but again missing was the need for public awareness and education initiatives to be included. Linked to motivation and learning is the culture of the organisation and whether the senior management are committed to this provision. Culture for Meechang and Watanaba (2022) needs of disaster recovery resilience and the ability to be innovative to be embedded into the organisational culture. In relation to *information sharing*, Meechang and Watanaba (2022) recognised the importance of information sharing amongst stakeholders, in terms of predicting, forecasting, and resolving the crisis. For Meechang and Watanaba (2022), the organisation needs to be able to have the necessary information to make informed decisions to restore services and amenities within the agreed timeframe. This sharing of information can only be achieved through effective communication channels, therefore all parties whether external or internal are communicated with accurately, and all those involved in the recovery plans are fully informed, which again needed to be explicitly set out in the critical success factors. The final category of Meechang and Watanaba (2022) is *interdependency*, which involved the coordination of stakeholder activities needed to restore the services and amenities through regulatory governmental support, as this entity ultimately prescribes the regulations and procedures to follow. Interdependency also included the meeting of business requirements and having the infrastructure and facilities designed to respond to the crisis in an effective way, again another critical success factor. What remains unclear is whether the TOE model or the Balanced Scorecard is more effective as a disaster recovery framework to group these mechanisms. The next section will attempt to address this.

2.11 A comparison of the TOE and the Balanced Scorecard in relation to critical success factors and key performance indicators

To be able to understand the connection as to the central attributes of critical success factors and key performance indicators in relation to disaster recovery, this section is dedicated in providing a summary of the commonly shared themes to emerge from the current literature. The section will also align the identified core attributes of critical success factors and key performance indicators in relation to using the TOE framework and the Balanced Scorecard. To achieve this, the categories used are related to those identified by Meechang and Watanaba (2022), and the criteria used is based on the four attributes: organisational management, motivation and skills, information sharing and interdependency.

This summary is presented below in Table 2.1, with the key factors listed, together with a summary description and relevance to disaster recovery planning, along with the associated authors, together with whether the TOE and / or Balanced Scorecard is aligned to these critical success factors and key performance indicators as recommended by writers including Meechang and Watanaba (2022), Chowdhury et al. (2020) and Meyer (2018).

Category	CFS	Description	Relevance	Authors	BSC CSF	TOE CSF	BSC KPIs	TOE KPIs
Organisational management	Senior management commitment and support	Management provides the strategy and resources.	Management has the authority to enable resources to be allocated and maintain communication	Nasiren, Abdullah and Asmoni (2016), Meyer (2018), Ashrafi and AlKindi (2022), Bakar et al. (2019).	Yes	Yes	Yes	Yes
	Organisational structure	The responsibility and participation of employee, including accountability and responsibility.	Determines the flow of information, employee involvement and encourage the plans to be instigated	Zhou, Huang and Zhang (2011)	Yes	Yes	Yes	Yes
	Business impact analysis	The method assesses internal and external factors to determine the disruption	Analysis of the data to restore the strategy	Montshiwa, Nagahira and Ishida (2016), Chow and Ha (2009)	Yes	Yes	No	No
	Maintenance of the plan	The monitoring, reviewing and improvement of the plan.	The disaster recovery is a living document to evaluate, review and update the plans	Blos et al. (2009)	Yes	Yes	Yes	Yes
Motivation and skills	Resources	The resources, including financial, to support the recovery	The need to recognise the importance of investing in	Nasiren, Abdullah and Asmoni (2016)	Yes	No	Yes	No

			disaster recovery planning, but also accountable					
	Education and training	The development of knowledge, skills and attitudes through training	Proper training to meet the objectives, then communicated throughout the organisation	Chow and Ha (2009)	Yes	Yes	Yes	No
	Culture	Create the environment as to expectations, mission, vision and goals	Embedded into the organisation as to the response to the disaster	Nasiren, Abdullah and Asmoni (2016)	Yes	No	Yes	No
	Awareness	Awareness of the individual's belief and priorities in the event of a disaster	Awareness of the participant's role and duties	Mansol, Alwi and Ismail (2014)	Yes	Yes	Yes	No
Information sharing	Information and knowledge sharing	In the event of a disaster information needs to be shared amongst stakeholders, such as forecasting, prediction and restoration.	Necessary information is needed during a disaster so that accurate decisions can be made to increase performance	Chowdhury et al. (2020)	Yes	Yes	Yes	No
	Effective communication	Implementation of a communication strategy to inform all stakeholders	The recovery plan to be communicated through out all levels of the	Patil and Kant (2014), Meyer and Torres (2019)	Yes	No	Yes	No

Interdependency			organisation and community					
Interdependency	Stakeholder coordination	All internal and externals parties / departments to work together	Need for cooperation for mutual beneficial outcomes, including minimise costs.	Talib, Hamid and Thoo (2015)	Yes	No	Yes	No
	Government support	Governmental support to provide facilities and requirements for recovery	Sets out the requirements and criteria of the recovery	Talib, Hamid and Thoo (2015)	Yes	Yes	Yes	Yes
	Meeting business requirements	The disaster recovery follows the requirements of the defined criteria	Sets out the requirements for the strategy and plan	Bakar et al. (2019)	Yes	No	Yes	No
	Infrastructure and facilities	Includes geographical, political and security requirements	Enable facilities to operate in an emergency	Yadav and Barve (2015)	Yes	No	Yes	No

Table 2.1 Critical success factors in relation to the Balanced Scorecard and the TOE framework

From the above table, the Balanced Scorecard has more relevance to capture the critical success factors and key performance indicators than the TOE framework, therefore the focus of this study will draw on the Balanced Scorecard when conducting the main study.

2.12 Chapter Conclusion

In conclusion, this chapter has presented a narrative or traditional literature review which has been based mainly in the field of information technology and project management. To emerge from the findings is firstly the limited research in the field of civil defence. The first theme to emerge was the fundamental attributes associated with disaster recovery including the importance of senior management support and the associated commitments like finance and resources (Meechang & Watanabe, 2022). To ensure that this support and commitment occurs, the disaster recovery plans need to be aligned to the strategic objectives and mission of the organisation. To achieve this, the second theme to emerge from the current literature was the usage of a model or a framework, like the Balanced Scorecard. For the recovery process and plan to be effective, there was also the recognition of ensuring the protocol is seen and treated as a live document, and that it is underpinned with accurate risk assessment and business impact analysis protocols. Through these processes being followed, the plans can then be accurately used to prioritise services and activities which need to be recovered based on predetermined priorities which are aligned to time and cost (Asgary et al., 2012; Bloksijk, 2008), which are then tested and rehearsed on a regular basis (Jarvelainen, 2013).

To ensure that the recovery process is effectively devised, designed and implemented there is a need for a suitable framework to be used. To emerge from the existing literature was the usage of the technology, operation and environment or the TOE construct and the Balanced Scorecard. The TOE model was found to be information technology disaster recovery focused and potentially could not be used effectively throughout the entire civil defence environment. In contrast, the Balanced Scorecard provided both a strategic and operational perspectives as to disaster recovery. In reaching this conclusion, the review identified several core critical success factors designed around meeting operational activities in response to a disaster, and key performance indicators, which assesses or measures the performance.

Finally, to capture the current debate the following conceptual framework, as shown in Figure 2.5 was developed to graphically represent the current knowledge and the three emerging research questions, which the main study will address.

To investigate the experiences of operational leadership in the Dubai Civil Defence (DCD) with critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plan in the event of unforeseen adverse events and disasters drawing on the operational artefacts

There are several important attributes: Support / commitment of senior leadership Alignment of goals and objectives Importance of risk assessment and business impact analysis Prioritisation of services Testing and updating	**The usage of critical success factors and key performance indicators** The need to monitor and assess throughout the organisation Real-time information Accurate means to measure	**Which model or framework can be used to meet the organisational goals?** Technology, operational and environment (TOE) which is information technology related Balanced Scorecard from a disaster recovery process from a natural
RQ 1 What are the components and activities essential in a disaster recovery plan for it to perform successfully in the event of possible disaster?	**RQ 2** How does the operational plan use CSFs and KPIs while responding to unforeseen disaster recovery planning?	**RQ 3** What is the suitability of an operational disaster recovery planning approach using CSFs and KPIs in a theoretical model to improve for a successful performance?

Figure 2.5: Conceptual framework (Author's own creation)

Chapter Three
Methodology

3.1 Introduction

As a professional doctorate, this study is based on investigating and providing a new critical insight which will then bring about potential change into a business environment. The central theme in this study was to understand the reality of how the leadership's disaster recovery planning process and practices are conducted in the Dubai Civil Defence. This area of interest therefore demands understanding as to what knowledge exists and then present how this understanding of disaster recovery has been gained and whether it matches existing knowledge. In gaining the necessary knowledge and understanding there is a critical need to be fully aware of the ontological and epistemological position of the researcher and the project, so that the correct methodology is adopted whereby the data is of the required quality, which can then be presented to achieve the aim of the research and add to the existing body of knowledge in the chosen field of professional research. This necessity was seen with writers including Gill and Johnson (2002, p. 491) who stated this is critical as '…the choice is [based on] the assumption of… the nature of knowledge and the methods through which that knowledge can be obtained'.

In presenting the methodology adopted in this study, this chapter will present the strategy used to conduct the research. The chapter will also set out the philosophical perspective adopted, and the methods used to conduct the study including a justification as to the choices made along with the potential limitations of the research. From the outset of the study, there was a realisation that the approach taken, has differences or tensions, as to what is reality for the researcher in their ontology. Based upon this, the study was reflective of the researcher, wanting to seek the perspectives and experiences of those responsible for the disaster recovery strategies amongst the leadership team in the Dubai Civil Defence.

Reflecting this intention, the study saw the world as being a series of experiences or perceptions which are the 'representations that are creations of individual minds' (Blaikie, 2007, p. 16) or those of the leadership in the Dubai Civil Defence, and not simply based on depending on independent truths which are external to the leaders being studied (Silverman, 2013). For this study, knowledge about reality can only be attained by seeking the experiences and perceptions of individual leaders, as only their experiences and perceptions can be used to construct a theoretical understanding of the challenges of creating and implementing a disaster recovery

strategy. To achieve this, the study used a 'bottom up' approach of conducting an inductive strategy, which enabled concepts and theories of real experiences to be generated from the leadership participants to be captured, so that the researcher can fully understand their perspectives and reasoning, rather than having pre-determined thoughts and ideas (Blaikie, 2007, p. 8). Therefore, this bottom-up or inductive strategy has enabled the accurate recording of individual leaders' perspectives being recalled through using their own words.

3.2 Research approaches

Blaikie (2007) identified that there are two key approaches which can be used as a potential research strategy, but needs to be matched and reflective of the intended research aim, research questions and the intended contribution or outcome of the project, while also reflecting the 'world-view' of the researcher. This term of world-view of the individual researcher is based on personal preferences or values, known as the axiology. The axiology represents the researcher's understanding of what exists in their own world or reality, and how knowledge can be attained, referred to as the epistemology. This study is based on gaining knowledge and understanding from directly engaging with the leadership team. For Blaikie (2007) there is also the need to understand the axiology, epistemology and ontology as this is fundamental for any research project including a professional doctorate research project. Again, these three aspects are seen as being important to inform the research strategy, as noted by Easterby-Smith et al. (2012) and Alvesson and Deetz (2000) who highlighted the core differences between quantitative and qualitative perspectives or paradigms, but also the implications to the outcomes and results generated, and what is intended to be gained. This is particularly important for a professional doctorate as the focus is on providing a business contribution.

3.2.1 The positivist approach

Although not followed in this study, a positivist approach tends to be aligned to a quantitative approach, with its background in natural sciences. The characteristics of a positivist study includes the need and intention to reduce all phenomena being studied to follow certain predefined scientific rules. This approach is often centred on creating a hypothesis generated through using a deductive strategy, which then either verifies or disproves an original assumption or understanding (Guba & Lincoln, 1998). For Bryman (2012, 2015) the characteristics of positivism include the necessity for a study to be objective and value-free, which requires the researcher to be removed or to be distant from the research. Therefore, to

adopt this approach of positivism, there is the potential to limit the research to be able to investigate only the actual or the perceived experiences of designing, creating and implementing disaster recovery plans in the Dubai Civil Defence.

As a positivist researcher tends to be focused on providing an objectivist perspective of what exists, the results and findings are often centred on the collection of numerical data, with the intention to provide a more generalised representation of the world which can then represent or be applied to the entire population. This perspective of positivism is based on known knowledge and theory, but for this study there were areas which lacked understanding which for Blumer (1956), is a limitation associated with this approach. Therefore, to gain this understanding, this study was not focused on providing a universal outcome, therefore providing a reliable and universal truth, but instead wanted to study the personal experiences and influences of the individual leadership in the Dubai Civil Defence. This study contends that individual's perceptions and experiences cannot be detached from their reality, but rather these aspects are interconnected. Schutz (1962) supported this by highlighting that a quantitative or positivist research due to its scientific nature can fail or neglect to distinguish individuals from their own experiences and realities. This viewpoint was supported by Guba and Lincoln (1994), who noted that a positivist is unable to generate findings that exist independently of some form of theoretical framework or from existing theory, particularly when researching real-world themes such as experience and perceptions (Guba & Lincoln, 1994). This for Sarantakos (2012, 1998) is where positivism has a limitation as the removal or exclusion of social reality would lead to the study simply testing an assumption rather than deep diving into the reality or experiences of those being studied.

3.2.2 The interpretivist approach

Unlike the positivist, the interpretivist approach is more aligned to subjective qualitative research, whereby social understanding and meaning is constructed from the interpretation of the leader. For an interpretivist the world view assumes and believes that social research must be generated by interaction, through either the research subjects / participants or between the researcher and the subject area. This means that the interpretivist tends to seek a more subjective meaning rather than objective understanding to the individuals being researched. By adopting an inductive approach, the research considers the interdependency of the researcher and subject being studied (Easterby-Smith et al. 1996). Part of this interdependency or active involvement of the researcher, for Easterby-Smith et al. (1996) is that recognition that the

researcher is unable to remain independent, detached or to be removed from the project as a positivist seeks, but instead is part of the process, which needs to be aligned to the intention and purpose of this study, and therefore needs to be recognised from the outset.

3.2.3 The adopted research approach.

In determining the most suitable research strategy to follow, Guba (1990), an authority in research argued that a single approach is often the most preferred option due to the potential clashes or differences associated with objective and subjective paradigms. However, while there are differences as noted above, which writers including Sale, Lohfeld and Brazil (2002) have highlighted the core variations between qualitative and quantitative strategies as being almost incompatible, which means that the two approaches cannot be combined, but this has been challenged by other authors including Bryman (2006, 2012). For Bryman (2006, 2012), together with Creswell (2013), and Robson (2011) there is the argument that these approaches do not operate in isolation, and the differences are not as distinct or different when under rigorous scrutiny. While this study has adopted an interpretivist paradigm, there was an awareness of the debate surrounding these differences, compatibility, or incompatibility of the two approaches. In understanding this, this study followed Bryman (2012, 2015) contention that these two research strategies of quantitative and qualitative must be fully explored and then justified, so that all limitations and strengths are recognised and acknowledged. To achieve this, the next section will present the fundamentals of adopting a quantitative approach, followed by the qualitative strategy which was ultimately adopted.

3.2.3.1 The quantitative approach

As mentioned above, the quantitative approach is closely aligned to a positivist deductive strategy. As a research approach, positivism argues and contends there is a single reality of truth that exists independently of the researcher. This single truth can be explained by following fixed laws, where the study adopts a value free method to ensure that the results are valid, an important aspect of the values or the axiology of the researcher (Bryman, 2012, 2015). With this focus on quantification and validity, the researcher must be able to understand the relationship between pre-determined factors or variables, and this may mean interpreting the findings mathematically or statistically, to then present the results to prove or disprove the original knowledge. To achieve this, the methodology and techniques needed to be carefully defined and recognised. A quantitative study will attempt often to seek to identify patterns that facilitate the prediction or control of future phenomena, which can be checked and repeated in

the future based on following the same study and controlling research variables (Guba & Lincoln, 1998; Miles & Huberman, 1994), which can be problematic when seeking individuals' experiences and perceptions, which are unknown until the study is conducted. Given these assumptions and characteristics, Guba and Lincoln (1998) and Miles and Huberman (1994), contended that a quantitative approach may not be appropriate or suitable for this real-world project, as the research is focused on understanding the experiences of creating, designing and implementing a disaster recovery plan in the Dubai Civil Defence.

3.2.3.2 The qualitative approach

Compared to the quantitative approach above, which is linked to positivism, a qualitative approach is more aligned to a social constructivist, and using an interpretivist paradigm, which was the methodology used in this study. The qualitative approach sees the social world as being a human construct and that reality can only be understood from the participant's perspectives of their social interaction or involvement in the disaster recovery processes (Bryman, 2012, 2015). As a qualitative study, the approach is based on developing rather than proving or confirming theory through using an inductive strategy. This inductive approach recognises the dynamic nature of the subject or leadership being studied, rather than seeing the participant or sample being a static object, independent of the researcher.

A qualitative approach can enable the study to determine the participant's perception to gain meaning, a critical insight and understanding as to how and why a phenomenon exists, which is important when understanding the leadership experiences to implementing a disaster recovery. Therefore, this approach can enable the leadership interviewees to put into their own words their meaning and perceptions towards disaster recovery, generating a richness in the data through personal accounts (Bryman, 2012, 2015). In seeking this deeper understanding, a qualitative approach tends to study a smaller number of participants, and therefore does not aim to establish generalised patterns, which is a central feature of positivism. The qualitative approach instead can enable the discovery of certain perceptions, attitudes or behaviours, so enabling a unique critical insight to be generated to provide a new perspective into the complexities of the challenges associated with implementing a disaster recovery planning process within the Dubai Civil Defence.

3.3. The Ontology and Epistemology of the Study

As previously mentioned, an understanding of a researcher's world view and how knowledge or reality is gained is fundamental for any research project, therefore the next section below will present firstly the ontology and then epistemology related to this study.

3.3.1 Ontology

Ontology is a branch of philosophy that is concerned with the nature of what exists (Crotty, 1998), as is focused on 'how you choose to define what is real,' while the epistemology is centred on 'how you form knowledge and establish criteria for evaluating it' (Hatch & Cunliffe, 2006, p. 12). Theories surrounding ontology tend to focus on the nature of reality of the theme being study, which are then reduced into two opposing categories: positivism / objectivism or constructivism / subjectivism views of the research and the world. Unlike the objective researchers or positivists, who see that knowledge is an independent measurement and therefore the reality is external, this study sees reality as being more subjective. Being a subjective study, the ontology position of the researcher is that if 'something exists only when you experience it and give it meaning' (Hatch & Cunliffe, 2006, p. 12). In this study, the focus is on the experiences of designing, creating, and implementing a departmental disaster recovery planning process in the Dubai Civil Defence, therefore the research needs to ensure that the participant's meaning, and experiences are captured accurately not ignored, and that there is recognition that the findings generated are not separate or static, but instead created by the individual leader.

3.3.2 Epistemology

As a theory, epistemology is how the individual gains and attains necessary knowledge of what exists in the world (Silverman, 2013; Blaikie, 2007). Therefore, the epistemology provides the philosophical grounding for deciding and establishing what kinds of knowledge exists, what is known, and then how knowledge can be judged as being adequate, correct and sufficiently robust (Crotty, 1998). In expanding on this theme of robustness, Crotty (1998) saw epistemology as being knowledge grounded in the theoretical perspective of the person or subject being studied. Crotty (1998) further adds that the epistemology sets out the means how the researcher sees reality of the world, which is informed by their understanding or knowledge of the findings. This study being a social constructivist, and interpretivist, that is interpreting social meaning, the epistemological approach relates to how knowledge can be created and understood only from the point of view of the individual who is being interviewed, which in

this case are Dubai Civil Defence leaders who possess first-hand experiences about the disaster recovery planning processes in their own departments.

3.4 Research design

Based on the ontology, epistemology and axiology, the research design involves the selection and choosing the perceived correct method or methods, before deciding on an operational framework which can enable the study to gather the data, achieve the aim of the project and ultimately the outcome or contribution to business practice. In achieving this, the study recognised that the focus is on only the leadership team in three departments in the Dubai Civil Defence, who were the owner or senior leader and then a junior leader or partner to provide an operational perspective. This therefore involved two phases based on using an interpretivist approach to capture the experiences and perceptions of both these two groups of leaders. To achieve this, both phases were informed initially by the current academic debate as presented in the previous chapter, the literature review, which was set out in the conceptual framework.

3.4.1 The Pilot Study's Participants' Profile

To ensure that the main study is sufficiently robust, that the aim was achieved and there was adequate data generated, a pilot study was conducted first. The pilot interview format was tested to include whether English was the best medium rather than Arabic. As an outcome of the pilot study, Arabic was seen as the best medium, whereby enabling the participant to talk freely in their native language. The challenge and dilemma of the project was the access to the leadership teams in the three departments, as to their availability and time, therefore a pilot needed to be organised beyond the key leadership team. To overcome this problem, the decision was made to pilot interview a leader and junior lead member from the human resource team. These two individuals provided the opportunity to test the format, questions, the transcription, and coding process, and to determine the duration of the main study. The pilot study tested the transcription of the interviews in Arabic, and also the coding, before being translated into English for the final research project.

Participant code	Current role	Years of experience	Experience	Responsible for
Test Pilot Participant 1	Senior Human Resource management	25	Extensive HRM experience HRM disaster recovery planning and instigating	Responsible to the design and implementation of the disaster recovery plan
Test Pilot Participant 2	Junior Human Resource Operational Lead	13	HRM experience	Implementing of the disaster recovery plan. Act as an advisor to the lead

Table 3.1 Participants profile for the pilot study

3.4.2 The Main Study's Participants' Profile

The main study focused on three key departments: finance, operations, and IT, and composed of six participants, the senior lead for each of the departments and a nominated junior lead member. The interviews consisted of a series of one-to-one semi-structured interviews conducted firstly with the senior leads, followed by the junior member from each team. Although only six participants were involved, the sample composition and size were based on the focus of obtaining the richest data possible (Lofland & Lofland, 1984; Creswell, 2012), whereby capturing the strategic and operational perspectives of the design, creation, and implementation of the disaster recovery plans. Attributes and characteristics such as gender and age were seen as not relevant, but instead the role of the leader was seen as being vitally important, along with their experience. Finally, the sample size was also reflected in the limited time of the participants and resources available, given that the interviews had to be transcribed in full, and then coded before translated into English (King, 1994, 2004; King et al. 2004).

The profiles are presented in Tables 3.2 and 3.3 which indicated the code allocated to the person being interviewed, their current position in the organization, together with the number of years in the role. The next column was their experience then the expertise and role in the disaster recovery process.

Participant code	Current role	Years of experience	Experience	Responsible for
Senior Operations Lead	Head of Operations	15	10 years in operations, 5 years as senior operations	Oversees all aspects of operations, including planning, scheduling, and execution.
Senior IT Lead	Head of IT	12	8 years in IT, 4 years as senior IT	Responsible for all IT infrastructure and systems.
Senior Finance Lead	Head of Finance	10	6 years in finance, 4 years as senior finance	Oversees all financial activities, including budgeting, forecasting, and reporting.

Table 3.2: Individual Interviews Senior Leaders profile for the main study

Participant code	Current role	Years of experience	Experience	Responsible for
Junior Operations Lead	Supervisor of Operations	5	2 years in operations, 3 years in junior operations	Assists the Senior Operations Lead with all aspects of operations.
Junior IT Lead	Supervisor of IT	4	2 years in IT, 2 years in junior IT	Assists the Senior IT Lead with all aspects of operational IT infrastructure and systems.
Junior Finance Lead	Supervisor of Finance	4	Only experienced in finance in junior finance role	Assists the Senior Finance Lead with all financial operational activities.

Table 3.3: Individual Interviews Junior Leaders profile for the main study

Following Table 3.4 sets out the group discussion profile of the participants

Group discussion No.	Particpant Code	Department or Function	Years of work experience	Roles and Responsibilites
FGD-1	Senior A	Public safety and fire prevention	22 years	Oversaw the coordination of emergency response teams, managed information flow during the incidents, and ensured emergency system functioned correctly. Conducted system checks and training.
	Junior A	Disaster management and	4 years	Handled emergency calls, dispatched units, assisted in incident management,

		emergency response		and ensured communication systems remained operational during the crisis.
	Senior B	HR training	20 years	Focused on HR planning, training development, and budgeting for emergency response. Ensuring personnel readiness and effective resource allocation.
	Junior B	Public engagement	3 years	Acted as a liaison between Civil Defense and the public. Prepared reports, ensured transparency, and supported operations during disasters.
	Senior C	Planning and policy	18 years	Developed disaster recovery strategies, coordinated policies across departments, and ensured resilience planning. Conducted and then implemented backup systems and risk assessments.
	Junior C	Resources deployment	2 years	Managed resource allocation, maintained equipment readiness, provided logistical support, and assisted with technology implementation for the disaster recovery processes.
FGD-2	Senior A	Operations department	16 years	Oversaw the daily operations, ensured continuity of emergency services, and supervised emergency response training. Managed operational efficiency and coordination activities.
	Senior B	Finance department	13 years	Managed financial planning for emergency operations, while overseeing budgeting for disaster recovery, and

				ensured efficient resource allocation.
	Senior C	IT department	15 years	Developed IT resilience plans, ensured cybersecurity during the disaster, and maintained system backups and redundancy protocols.
	Senior D	Strategy department	21 years	Focused on long-term disaster recovery strategies, aligned with policies with national frameworks, and ensured sustainable emergency preparedness.
	Senior E	Human resources department	12 years	Ensuring workforce readiness, managed training programs, and coordinated emergency staffing needs.
FGD-3	Junior A	Civil protection department	3 years	Supported disaster mitigation and preparedness initiatives, ensured public safety, and assisted in operational coordination.
	Junior B	Strategy department	5 years	Assisted in the development of strategic plans for disaster resilience, supported policy alignment, and evaluated risk management measures.
	Junior C	Preventative safety department	2 years	Implemented preventative fire and safety measures, conducted safety drills, and trained staff on risk mitigation strategies.
	Junior D	Monitoring and inspection department	6 years	Conducted safety inspections, ensured compliance with emergency protocols, and assisted in risk assessments.
	Junior E	Dubai Civil Defense academy	3 years	Assist in training programs for fire safety and emergency response, ensuring skill

			development for responders, and managed learning materials.
Junior F	Station affairs department	4 years	Coordinated station logistics, support of the emergency service operations, and ensuring resource availability for fire stations.

Table 3.4: Discussion Profile of the Participants

3.4.3 Outcome of the Pilot Interviews

As with any interpretive study, it is not suitable or even possible to pre-determine in detail the actual questions which will be asked, but instead possible outlining of themes which tend to be informed or influenced by the existing literature, which may then be used for the coding of the interview data. The decision was taken to use a series of open-ended questions, but the initial opening enquiry was informed from the literature and from the researcher's knowledge drawn from his professional experience. However, it was still recognised as to the importance of testing or piloting the interview format and questions prior to the commencement of the main study phase. This was designed to ensure that the study was sufficiently robust and addressed the purpose and aim of the project.

3.4.4 Outcome of the Pilot Study

The findings of the pilot study were collected and analysed from two reasons. The first reason was to determine the extent to which the research strategy and interview protocol were able to meet the aim and secondly, that the outcome would generate sufficient richness of data. The outcome of the pilot study enabled the final interview structure and questions to be designed to ensure that what was asked could be revised to gather more information and provide more critical insights into the recovery processes. To achieve this, the pilot enabled the recognition for the need for open questions, and that the flow of questions needed to be more logical commencing with the departmental profile and role of the two leads, before progressing to focus on the KPIs and CSFs. The pilot study also ensured that the power relationship between the participant and the researcher could be tested, and how this potential issue could be minimised even though those interviewed were senior departmental leaders. The purpose was to enable the participant to talk freely about the departmental disaster recovery process. Again, the use of Arabic as the language to conduct the interviews was also confirmed as being

suitable. The interviewees in the pilot study mentioned that they could explain and contextualise their experiences easier in Arabic compared to be in English. The use of Arabic also enabled the researcher to ensure that the content could be analysed and interpreted more accurately. The duration of the pilot interviews were approximately 45 minutes to one hour, as the interviewees were asked for feedback as to their perceptions of the interview process and then as to what they the thought was the central aim of the study was.

3.5 Outcome of the Main Study

The outcome of the main study is presented as its emerging themes and the interview questions in the following subsections, while the answers, analysis and findings are presented in the other next sections.

3.5.1 Emerging themes from the main study

For the main study, emerging from the literature review were the following central themes. The first theme was related to the principles, policies and practices of emergency operations as being essential in disaster recovery planning. Then there was the debate associated with the importance of providing training and development to those involved in the civil defence and collaborative operations disaster recovery processes. Linked to this was the emergence was to ensure that adequate resources were available in the implementing of the emergency operational management plans. This could also include the establishment of disaster recovery committees.

From the existing literature associated with disaster recovery and the operational performance was the need for identifying and establishing the effectiveness and efficiencies needed in the recovery plans, which are then ranked based on priorities. These priorities need to be incorporated in the plans and the communicated.

Leading from this was the existing debate associated with disaster recovery planning, and importance associated with community participation and stakeholder involvement. The literature review also highlighted the means to set critical success factors and indicators needed to assess recovery performance. Finally, was the leadership responsibility which needs to exist so that the plans and strategies are fully committed and supported.

For the main study, to emerge from the study's data collection and analysis were the following themes, the importance of senior leadership involvement and commitment throughout the planning stage, having adequate resources, plans which are devised from a departmental and organisational levels, the setting of goals through critical success factors and then the means to assess performance through key performance indicators. Finally, the associated importance of an overarching or encompassing framework which enables the Dubai Civil Defence to meet stakeholders' requirements during and after the planning stage.

As the main study progressed, the focus began to shift towards their current methodologies of disaster recovery, before investigating the existing usage of CSFs and KPIs. The duration of the interviews was between 45 to around 90 minutes, with the senior leadership team being re-interviewed whereby enabling the revisiting of the CSFs and KPIs, as there was need to clarify their specific usage.

3.5.2 The main study's interview questions

The following research questions were devised for the main study which were informed by the current academic debate and through the pilot study:

Q 1) What is the operational leadership involvement in the disaster recovery planning process?

Q 2) What are the responsibilities and roles of the operational leadership team in disaster recovery planning?

Q 3) What are the main operational objectives of the disaster recovery plans?

Q 4) What are the core components and resources needed for disaster recovery planning?

Q 5) What specific disaster recovery planning model/s or methodologies are used?

Q 6) What steps or procedures are followed in the disaster recovery planning process?

Q 8) Who is involved in the disaster recovery planning process?

Q 9) What critical success factors (CSFs) are set out in the disaster recovery planning process?

Q 10) What are the key performance indicators (KPIs) used to measure / evaluate the disaster recovery operational performance?

Q 11) What are the operational artefacts used in the disaster recovery planning process?

3.6 The analysis and coding of interview data

For all the interviews including the pilot and the main study were recorded, transcribed, and analysed in Arabic, but also coded manually. Although NVivo was considered but rejected as

the researcher wanted to deep dive into the data using the traditional coding method. The approach taken by this study enabled the researcher to be constantly checking and highlighting certain text by analysing and coding the interview data. Being a qualitative study and using semi-structured interviews there was a substantial amounts of interview data generated in the form of transcripts. Again, consideration was given to using NVivo, but the decision was made not to look at frequency of words, but the meaning behind the interview data.

To code the data, which was in Arabic, this study drew on the means to organise and analyse textual data, through using a content analysis framework (Braun & Clarke, 2006). The adoption of this data analysis and coding method of Braun and Clarke (2006), was supported by Clarke (2005) and King (2004), who highlighted the benefits of using a content analysis approach, which is not directly linked to any one specific methodology, but instead enables the researcher to code with more flexibility, compared to other methods like grounded theory which can be prescriptive and restrictive. For King (2004) and this study, using a content analysis enabled a flexibility of the coding structure, but also recognises that the study had some known knowledge as to themes which could be used to act as an initial structure to assist in organising the data, but then also the option to create new themes or categories, which could be created later as the process progressed. Through adopting a qualitative content analysis approach in this study, the method therefore provided a flexible means for analysing the text data (Cavanagh, 1997). Furthermore, this approach enabled the data generated from the interviews not just counting the number or frequency of words but to classify large amounts of rich interview data and perspectives into categories, whereby enabling the richness of the meaning to emerge (Downe-Wamboldt, 1992).

3.6.1 The coding strategy of the data

As covered above, various coding strategies were considered, including content analysis and grounded theory. While grounded theory needs to be recognised as providing a means to systematically generate theory from data which can be both inductive and deductive, there is the expectation that there are existing assumption or knowledge, which can be problematic as the study was informed by the current debate and professional knowledge. For grounded theory to work, Glaser and Strauss (1967) the originators of the concept indicated that when applying this strategy, there is the need for the researcher not to have any pre-assumptions, or to create codes or themes, therefore the coding is based on an open mind. If the researcher has a perceived or known knowledge or assumptions, then for Glaser and Strauss (1967) grounded

theory cannot be used. This study had already some themes generated from the literature review stage, and also the researcher's professional experience.

With the selection of using a qualitative content analysis coding and categorisation of the data strategy decided, the approach enabled the data to be systematically classified and put into a hierarchical order, which assisted the analytical process of coding and interpreting the meaning. In this study, the revision process included analysing the interview transcripts and then linking this to the existing knowledge, which resulted in changes to themes being grouped within the framework. As the process progressed, consideration was also given to the possibility of introducing new codes or altering or changing existing codes in the framework. There were some changes made as the themes emerged, but mainly the original format stayed the same, which also reflected the outcome of the pilot study.

Although the qualitative content analysis has several benefits, there are also associated limitations which needed to be recognised and acknowledged. These limitations included the how the coding was completed, as the process was at time sped up, which can lead to perceived familiarity with the materials with the interview transcript data potentially being overlooked or neglected. The current study recognised these potential limitations and to address this, the coding process was frequently rechecked, until the key themes and finally codes were established.

3.6.2 Manual coding of the data

As indicated previously, using NVivo was considered as a means to code and analyse the data. During the early stages of the coding and analysis process of the main study's data, NVivo was initially used but was found not to be suitable as the researcher wanted to see and handle the transcripts rather than through a screen. The decision was also made to reject NVivo, as to learn the software to any degree of proficiency required several months of practice, which became impractical due to time constraints. Also, during the pilot study and part of the main study the data had already been analysed manually in Arabic therefore the researcher decided to keep it consistent. Finally, the manual coding approach provided an opportunity to personally explore the interview data rather than through a software programme.

3.6.3 Coding the pilot study's data

The coding structure for the pilot study, which did inform the main study was initially based on ten central themes which emerged from the existing knowledge generated from the literature review. These themes were: the senior management and leadership teams commitment/ support, meeting policies and regulatory guidelines, training and development, adequate resources, performance monitoring, setting out critical success factors, stakeholder involvement, effective communication and ownership/ involvement in the disaster planning process.

To achieve this, the interview data was analysed on a line-by-line basis using the MS Word Read Aloud feature, taking notes and annotating the scripts along with the highlighting the actual transcripts. To emerge were the following themes which included: the necessity for senior management and leadership teams commitment/ support, reporting mechanisms including the means to assess meeting policies and regulatory requirements, the necessity of training and development, conducting scenarios and real-life rehearsals, updating disaster recovery documentation, having adequate resources, the mechanism to assess and monitor performance, how to set out achievable critical success factors, establishing and maintaining stakeholder involvement, creating and maintaining effective communication, and ownership/ involvement in the disaster planning process, including the usage of recovery committees .

During the coding process, themes were initially grouped under the above categories, together with a global 'other' category. Each category was then revisited to identify sub-themes which emerged from individual statements or themes which linked strongly with others. The final structure was as follows:

Initial Codes	Final Themes
Management / leadership Support	- Management and leadership teams' commitment/ support. - Ownership / involvement in the disaster planning process.
Resources	- Adequate resources.
Rehearsal	- Conducting scenarios and real-life rehearsals.
Training	- Training and development.
Documentation ownership	- Updating disaster recovery documentation.
Usage of key performance indicators	- Mechanisms to assess and monitor performance.
Usage of critical success factors	- Setting achievable critical success factors.
Stakeholder involvement	- Stakeholder involvement.
Communication	- Effective communication. - Reporting mechanisms and methodologies.

Frameworks or methodologies	- Overarching framework or methodologies, including the Balanced Scorecard

Table 3.5: Initial Codes and Final Themes

3.6.4 Coding strategy for the main study's data

As with the pilot study, the main study was conducted and then transcribed in Arabic before being manually, thematically analysed. The starting point for this analysis of the data which was based on the emerging themes generated from the pilot study together with the existing literature. These existing themes formed the original categories for the coding framework. Each interview transcript was analysed separately to identify specific themes. When new or additional themes emerged, then either a new code was created in an existing part of the structure or combined with an existing theme.

As the coding progressed for each stage, the original framework had numerous new additions, regroupings, and the refinement of groups, together with various cross-referencing stages occurring before the final structure was reached. Although this was time-consuming, it was beneficial for the researcher to become fully familiar with the data. While the final coding structure was eventually like the original themes generated in the pilot study, the process was interesting and potentially useful, to ensure that all relevant material that emerged was captured accurately.

3.6.5 Bilingual translation process of the main study's data

The interviews were conducted bilingually mostly in Arabic, with some English words being interdispersed. The outcome of this approach proved to be challenging as there were several technical terms that required an acccurate ranslation. To overcome this, a staged process was adopted as outlined below by using a manual translation strategy. The process commenced by reviewing the interview data in Arabic and English, by listening and analysing the verbal data. The Arabic data was repeatedly listened too from the audio recording to understand the context, tone, and perspectives. This linguistic analysis was completed to identify complex phrases, idioms, or cultural references that required special attention to fully understand the interviewees perspectives and experiences.

Next the first draft of the translation process was undertaken. This involved the initial literal translation being completed by converting the Arabic and English meaning with contextual adaptation, so that the structure and expressions could be fully understood. Wherever

applicable, cultural expressions and phrases were rephrased into English, ready for the inclusion into the findings chapter. The process then involved the refinement and editing of the transcripts, which included the adjustments being made to match the tone and style of the original Arabic text for ease of translating the interviews into English, particularly as to the correctness, clarity and consistency. The transcription process then involved the quality assurance and constant reviews of the bilingual Arabic and English text undertaken by the reviewer, to refine and provide minor revisions. Finally, the process involved proofreading and formatting the transcripts ready for analysis. The entire process is present below in Figure 3.1:

Stage 1
Listening and initial analysis of verbal data

Stage 2
First Draft Translation

Stage 3
Cultural Adaptation

Stage 4
Refinement and Editing

Stage 5
Quality Assurance and Review

Stage 6
Final Proofreading and Formatting
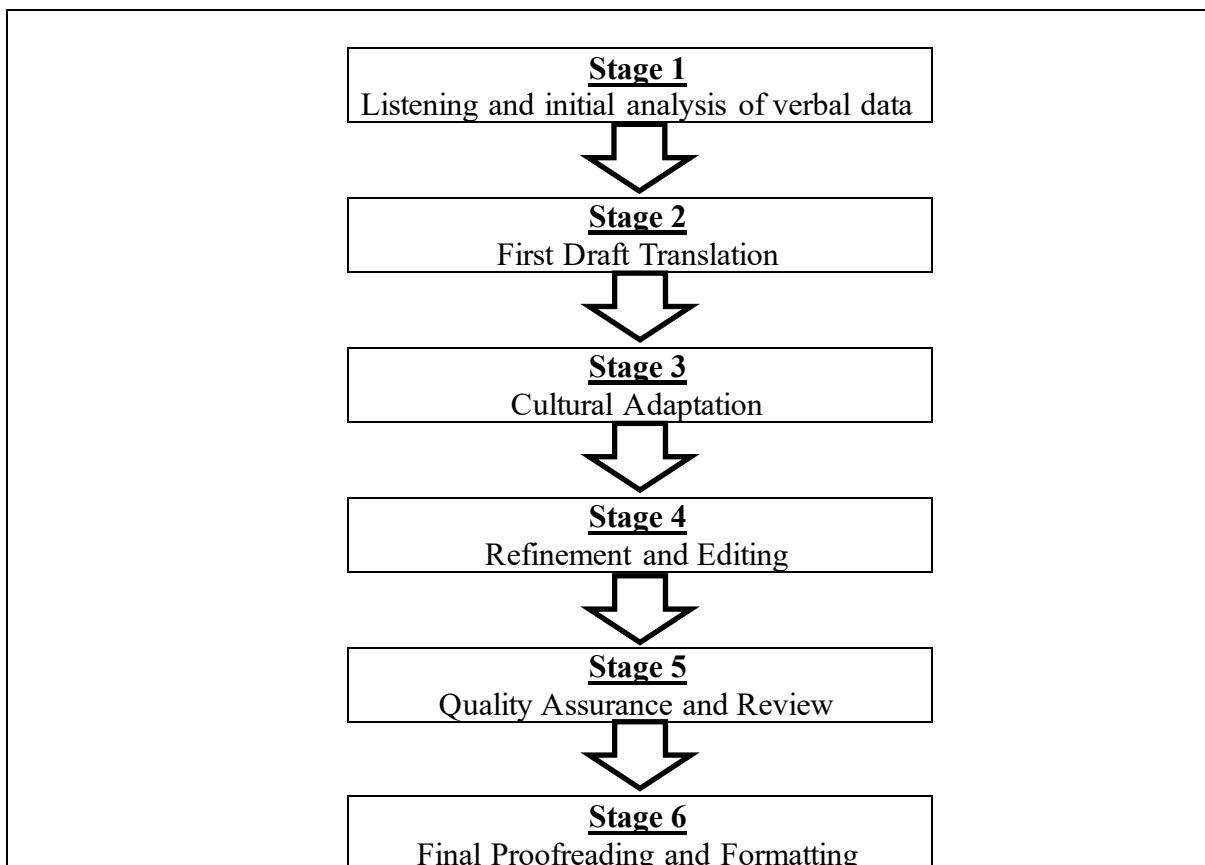
Figure 3.1: Bilingual Translation process of main study's interview data.

3.7 Qualitative multi-method strategy

A qualitative multi-method was used for the individual interviews and then focus group discussions. Each of approach will be separately presented as to the strategy adopted.

3.7.1 One-to-One Individual Interviews Method

The individual interviews were conducted to collect detailed personal accounts of the participants' thoughts, attitudes and experiences as to disaster recovery processes and strategies. This approach commenced with an individual one-to-one interview of leaders and a member of their management team with the intention to focus on the individual perspectives from a departmental viewpoint. This approach enabled and facilitated the participants to freely recall their experiences without the intervention or judgment of others (MacDonald, 2006). As each interview was conducted, the interviewee was treated independently, with the responses carefully listened too, and additional in-depth follow-up questions asked, if and when needed.

3.7.2 Expert Group Discussion Method

The group discussion method was adopted by the researcher to explore the outcome of the main study with a group of experts as to their shared perspectives (van Teijlingen & Pitchforth, 2006). The primary goal of this method was to use the interaction of the group of experts to generate data to determine the effectiveness of the study's recommendations and conclusions and potentially reveal new thinking or insights (Duggleby, 2005). This group interaction enabled the expert members to express and share their similarities and differences whereby providing rich information about a range of perspectives and experiences related to disaster recovery (Barbour, 2005), but the data generated is dependent on the group interaction and dynamics (Lehoux et al., 2006). Therefore, to be effective the group needed to be formed to reflect the intended outcome of the study, which needed to be experts in the field of disaster recovery in the Dubai Civil Defence and were prepared to share and disclose their perspectives (Kidd & Parshall, 2010; Hollander, 2004). Eventually, there were three expert discussion groups formed, with each group being made up of four to six qualified individuals to discuss the recommendations and conclusions of the first stage, which was facilitated by a moderator. The discussions were designed around addressing the findings related to answering the study's research questions.

Research Question One: What are the components and activities essential in a disaster recovery plan for it to perform successfully in the event of a possible disaster?

Research Question Two: How does the operational plan use CSFs and KPIs while responding to unforeseen disaster recovery planning?

Research Question Three: What is the suitability of an operational disaster recovery planning approach using CSFs and KPIs in a theoretical model to improve for a successful performance?

The participants' profile of the three groups were as follows:

Expert Discussion Group One: one of senior leader, and five junior participants.

Expert Discussion Group Two: six junior leaders only.

Expert Discussion Group Three: an equal number of senior (3) and junior leaders (3).

All participants were from the core cross functions within DCD's, based in the four key sectors: fire and rescue, safety and protection, resources and support services, and smart services including from IT, finance, HR, public relations, communications, operations, monitoring and inspection, strategy and future. These departments were located either in the central office or in remote stations across Dubai. All participants were involved were working either directly or remotely in back-end or front-line of disaster management's four key stages: disaster risk mitigation, disaster readiness, disaster response, or disaster recovery. Each of the group discussions had an average duration of between 3.5 to 4 hours and were recorded using Sonix software to transcribe the group interview, that automatically labelled for each participant. After transcribing, the Sonix software enabled the Arabic interview data to be translated into English.

3.7.3 Integration of the Individual and Group Discussions

Although individual one-to-one interviews and the group discussions were independent conducted, the data was combined to generate a richer and more robust qualitative insight (Rees et al., 2013; Taylor, 2015). This method therefore ensured that the data could be triangulated and confirm the outcome of the first phase, whereby enriching and providing a deeper perspective as to effective disaster recovery strategies and the usage of an overarching methodology, contributing to the credibility of the findings (Loiselle et al., 2007). Halcomb and Andrew (2015) contended that seeking data completeness is a means to achieve data robustness, even though each method can generate and reveal different aspects of the phenomenon of interest while still contributing to a more comprehensive understanding of the theme through expanding the breadth and/or depth of the findings.

3.7.4 Group Discussion process

The participants were asked the same open questions based on the outcome of the main study, then encouraged to present their perspectives and opinions. The participation was voluntary, with sessions lasting for approximately 2 hours within a safe and secure setting. Each group discussion was initiated with an invitation at the location and began with an overview of the

format for the group provided by the researcher and moderator which included a checklist guide of the themes to be covered. The researcher and moderator conducted all three of the group discussions. In relation to the conducting the focus group discussion, the participants were given equal time to recall their experiences and participate but were asked to firstly state their name before speaking. The interviewees were asked to respect the other participants perspectives and not to over-speak over each other. The group were also asked not to disclose any of the content of the conversations with anyone outside of the forum.

3.7.5 Integrating Individual Interviews and the Group Discussions

Although individual one-to-one interviews and group discussion were independent data collection methods, the combination of these two approaches can be advantageous to generate a richer and more robust qualitative insight (Rees et al., 2013; Taylor, 2015). Each method can be used with a different group of participants, and the data from one method does not necessarily influence or inform the other (Leung et al., 2005), which was reflective of this study. Although data source triangulation may provide different views about the same phenomenon and contribute to the credibility of the findings (Loiselle et al., 2007), the multi-method strategy was used to triangulate the findings, as advocated by Halcomb and Andrew (2015). For Halcomb and Andrew (2015), seeking data completeness is a means to achieve data robustness, even though each method can generate and reveal different aspects of the phenomenon of interest, but can contribute to a more comprehensive understanding of the theme through expanding the breadth and/or depth of the findings.

3.8 The Reliability and Authenticity of the study

Fundamental to any research project is the need to ensure that the study is sufficiently robust by providing the assurance of the creditability of the project. Careful consideration was given to the research design's robustness when investigating the individual's subjective perceptions of their experiences of designing, introducing, and using a disaster recovery strategy in their department, as opposed to addressing a specific predetermined assumption or hypothesis. To represent this qualitative aspect of the study, and to ensure that the study is sufficiently robust, Guba and Lincoln (1994) provided four criteria, which was adopted in this study. The four criteria were creditability, transferability, dependability or lack of bias, confirmability, and finally trustworthiness.

For Guba and Lincoln (1994), **credibility** is related to the trustworthy or believability of the findings. For research to have credibility, the researcher must represent accurately the experiences of those being interviewed so that they are understandable for the reader to fully engage with. This can be achieved through the interview data and narrative generated from the participants which was constantly checked and verified as to the content. To assist with checking the creditability, Guba and Lincoln (1994) and Lincoln et al. (2011) recommend that the sample is representative of the intended study whereby making the findings authentic. In this study, all those interviewed were in leadership positions associated with the disaster recovery processes as to designing, creating, and implementing.

Then to ensure the study was credible, the pilot study was used to confirmed that the interview questions were suitable and that the themes generated could achieve the aim. Then after the data had been collected, the researcher constantly reviewed the interview transcripts for accuracy and emerging themes.

The next criteria were **transferability**. Transferability enabled future researchers to use and draw on the findings, then adopt a similar approach for conducting new studies. This is however problematic as transferability is less important to the qualitative researcher than creditability (Baxter & Eyles, 1997). This is because a qualitative study is drawing on the participants' unique perceptions which may change later, and not to produce a generalised insight.

As to **dependability**, this is essential for any qualitative study. A qualitative research project needs to provide evidence that the data can be trusted, and that the study has integrity as to the data and narrative of the interview data being presented. Therefore, dependability relates to whether the findings accurately represent the focus of the study, and like creditability, there is a need to ensure future research can access the data. To achieve this need for dependability, this study ensured that the interviews were recorded. This recording enabled the analysis of the participant's words to be constantly reviewed and reflected on.

Finally, as to **confirmability**, this is the extent to which the findings are those of the participant leaders and not influenced by the researcher. This influence includes the bias of the interviewer as to questions asked, the extent to which the participant can respond to the theme being asked, but also how researcher interprets the data. Miles and Huberman (1994) considers that honesty, authenticity, and truthfulness are fundamental to any qualitative research project. Furthermore,

honesty and truthfulness are an essential part of the ethics of any project. In this study, the participants were asked whether they wanted to review the transcripts for authenticity and accuracy, which although offered none of the participants requested this.

3.9 Ethical considerations

When conducting a research project that involves individuals, the researcher must take important decisions and considerations including how the project will follow the ethical guidelines, which any study must adhere too. This section will now set out and present the ethical considerations taken in this project. The research was conducted to be aligned and to follow the University's Principles and Procedures framework. This framework was informed by the British Educational Research Association (BERA) and the British Sociological Association (BSA).

The regulations set out the researcher's responsibilities including to ensure that the 'physical, social and psychological well-being of research participants should not be detrimentally affected by the research' (University of Gloucestershire Research Ethics Handbook, 2023). This included ensuring that all the leadership participant provided free and informed consent. In achieving this, the researcher informed the participants of the nature and aim of the research, which included the reasons for the study and how the results would be presented, including their perspectives and identity. The participants' anonymity needed and was guaranteed, along with the assurance of the confidentiality of the data and information generated from the interviews. This was achieved by ensuring that the participants name was based on their role, without any real names or identity being used.

The power relationship between the participant and the researcher was also considered, and the researcher ensured that he had no direct connection to the leader or their department. Throughout the interview process the power relationship between the researcher and interviewees was considered. This included informing those involved with an outline of the study, so that the participants were given greater power, even though these were leaders of departments.

The participants were also given the right and the opportunity not to answer any questions during the interview (Brinkmann & Kvale, 2005). This included the participant being reminded

as to their right not to answer any question or to stop the interview at any stage (Few & Bell-Scott, 2002). The participants were also provided with a written summary of the research purpose and structure with the researcher checking that they understood and agreed before their participation commenced. Permission was sought to record the interviews, and the recordings were handled with care and stored securely. Confidentiality was enhanced by requesting an interview room, so that privacy was maintained and there were no interruptions. The ethics for the group discussion was slightly different to the main study. The difference included that the facilitator and moderator ensured that no one participant dominated or intimidated others. The views and perspectives of all those in the group were respected by others, and that the responses and opinions were not shared beyond the group discussion.

3.10 Methodological Limitations

In comparison with a positivist strategy, an interpretative methodology can create its own difficulties as to data generated from the interviews needed to be real, authentic, and reliable. For reliability of the study, part of this criteria of Guba and Lincoln (1994), was the need to ensure that the findings are repeatable (Willig, 2013; Gill & Johnson, 2010; Burr, 2003), but this cannot be effectively achieved as the interviews only capture that moment of time of the individual's perceptions and experiences. For writers like Hammersley (1990) there is a need for the acknowledgement that to achieve reliability can be problematic for a qualitative study, and therefore unachievable. But instead, a qualitative study provides a rich unique insight into a particular moment in time.

Another key limitation of this qualitative study was based on one individual which may not represent the whole organisation or even department irrespective that the perceptions and experiences were from leaders of key department in the Dubai Civil Defence. This can be a potential limitation as the researcher may not be able to fully understand or appreciate the other person's professional experience or perceptions. To address this potential limitation, the data from the interviews was continuously reviewed to understand the meaning of the participant's perspective to ensure the reliability.

The credibility and justification of the research was considered as with qualitative research it is dependent on the perceptions generated from the relationship between the participant and the researcher. To achieve creditability and to ensure that the data was accurate and therefore

reliable, the approach included the need to ensure that attention was paid to the participants' use of their native language of Arabic to capture their experiences. The study process therefore involved the constant reviewing of the interview data, revisiting the literature, together with some of the participants being re-interviewed. The translation into English was only completed when the data was completely coded. Finally, one of the challenges in qualitative research, particularly when using an interpretivist approach, is that the method produces an extensive amount of rich, interesting data to analyse. Separating out the data into themes can be considerably challenging (Easterby-Smith et al., 2012). To overcome this, the themes were grouped into categories as a means of understanding the complexities and challenges associated with disaster recovery strategies in the Dubai Civil Defence.

3.11 Chapter Conclusion

This chapter has presented and detailed the philosophical position of the study and the project's focus, strategy, and design. An interpretivist research paradigm was adopted using a qualitative research approach that is both subjective and inductive. The ontology positionality of the research is focused on understanding the experiences of those designing, creating, and implementing a departmental disaster recovery planning process in the DCD. The epistemology approach to gather and understand this reality, used a social constructivist strategy of using an interpretivist methodology to gather knowledge through understanding the perspective of the individual being interviewed, which in this case are Dubai Civil Defence departmental leaders. Prior to conducting the main study, a pilot study was conducted focused on testing the interviews which were then modified to ensure there was relevance and focus. In both the pilot and main studies, the participants profile was presented together with the outcomes of the interviews along with the strategies used to identify new and emerging themes. The chapter has provided a detailed outline as to the processes involved in developing the study's research protocol, including the usage of the pilot study, and how the results were analysed while ensuring that the research approach adopted was sufficiently robust. All interviews were recorded, analysed, and coded using a strategy to ensure that the data was valid, reliable, or authentic and trustworthy as set out by Guba and Lincoln (1994). The code of ethics of the University was followed to ensure confidentiality, anonymity, and privacy was assured. The methodological limitations were identified and considered, so that as the study progressed these limits were minimised.

Chapter Four
Findings

4.1. Chapter Introduction

This chapter is based on presenting the findings generated from the qualitative study, which was gathered from conducting six in-depth interviews with the leadership team, which will be presented based on the emerging themes from the research. The interview questions were designed to encourage the leadership participants to express their knowledge, experiences, and opinions as to disaster recovery planning. To present the interview data, a thematic analysis approach was adopted to identify themes from the interviews which involved selecting quotes and extracts from the transcripts and texts, which will be presented in line with the research problem statement, the aim of the study, the objectives and research questions.

The purpose of this study was to investigate the experiences of senior leadership, as to their strategic planning preparation and preparedness into operational leadership's disaster recovery planning process and practices at Dubai Civil Defence (DCD). The problem statement was based on the recognized lack of disaster recovery planning at Dubai Civil Defence (DCD) and to determine the challenges associated with operational leadership of developing and managing a suitable solution. Reflecting this, the research aim is based on *critically investigate the experiences of operational leadership in the Dubai Civil Defence (DCD) with critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plan in the event of unforeseen adverse events and disasters drawing on the operational artefacts*.

In achieving the aim, the following research objectives were created:

1) To critically examine the current DCD disaster recovery plan, main critical success factors (CSFs) and key performance indicators (KPIs) which are used in the event of an unforeseen disaster.

2) To critically analyse the operational planning of the DCD and execution using main critical success factors (CSFs) and key performance indicators (KPIs) when responding to the unforeseen events that are disastrous.

3) To critically evaluate by comparing the current DCD's operational disaster recovery planning and associated business artefacts with other approaches, to provide a theoretical model as to the critical success factors (CSFs) and key performance indicators (KPIs) which the Dubai Civil Defense could consider when improving the current disaster recovery plans in the event of future disasters.

Based on the aim of the research and the objectives, the following core research question was asked: How does operational leadership prepare an operational disaster recovery plan for implementation and assessment using CSFs and KPIs with operational artifacts to successfully implement and assess its performance?

Reflecting the core question, the following sub-questions were asked:

1) What are the components and activities essential in a disaster recovery plan for it to perform successfully in the event of possible disaster?

2) How does the operational plan use CSFs and KPIs while responding to unforeseen disaster recovery planning?

3) What is the suitability of an operational disaster recovery planning approach using CSFs and KPIs in a theoretical model to improve for a successful performance?

Reflecting these research questions, the next section will present the key themes which are focused on the key roles, responsibilities, and duties of the operational leadership team in managing and recovery of a disaster.

4.2. The key roles, responsibilities, and duties of the operational leadership team in disaster management

To commence the interviews, the participants in the leadership team, were asked about their responsibilities related to disaster management. The study found that the three senior leaders together with their nominated junior leadership team member performed their core roles related to the pre-, during and post-disaster planning process which were very similar to the adopted approach and strategies used by other departments. This shared strategy included assessing

their respective operational activities and creating plans to mitigate the department being adversely affected by a disaster or an unforeseen event. The leadership identified the need to collaborate and coordinate with other colleagues in the organization along with external entities, so making sure that the latest developments in their respective fields in relation to disaster recovery strategies are incorporated into their plans. This was particularly important for the IT department:

"My responsibilities include the coordination with external agencies, vendors, and service providers. This is to ensure the availability of necessary resources and support so that other departments can operate, as the whole organization is dependent on an integrated IT system. But part of this also includes timely and accurate communication. Our leadership team need to disseminate information, and keeping stakeholders fully informed. We must collaborate with other department managers, emergency response teams, and external partners to establish communication protocols to ensure IT services are running or at least restored as soon as possible" (Senior Leader, IT department).

As can be seen above from the senior leadership perspective of the IT department communication was one of the most important. The disaster recovery strategies needed to be disseminated throughout the organization so that the proactive knowledge-sharing which is needed for disaster recovery can be implemented through effective communication. To achieve this, the different leadership teams highlighted the importance of clear communication channels and strategies when implementing the various disaster recovery plans. This needed leadership support, which was seen from the junior financial leadership member as vitally important, but added the need for a departmental focus of ensuring that the financial aspects were included. Based on this, the next section will specifically focus on each of the departments commencing with the finance team, before progressing to present the IT, and finally the operational leadership viewpoints.

4.2.1 Leadership in the finance department

Fundamental to this leadership team as seen above, was the importance of communication, which for the junior leadership manager was essential, but so was ensuring that all the aspects of the department were also considered and accurately documented.

"One of the key directions given by leadership in disaster management is to establish clear and concise communication channels for smooth flow of information, coordination, and decision-making. This needs to include the assessment and addressing potential risks and vulnerabilities, develop comprehensive plans as to financial controls by identifying critical financial functions, and establish backup procedures for continuity of financial operations" (Junior finance Leader).

For the junior financial member of the leadership team, he saw that the disaster recovery processes needed to include a departmental level focus to be created to include areas such as the backing up of the data and putting in place various controls. Building on this, although not directly related to the finance team, the junior financial leadership team member, also identified the importance associated with protocols, which needed to be established and then correctly managed:

"We [the leadership team] provide guidance on safety protocols and evacuation procedures which is specific to this department, then ensuring that employees are fully informed and prepared… which includes supporting employees' mental health and well-being during and after a crisis" (Junior operational leader).

This junior leader appreciated the importance of informing and supporting staff during the disaster recovery planning process, and providing support after the event. The senior leader in the finance department provided an overview of the activities related specifically to disaster management for pre-, during and post-disaster scenarios. The focus for this department was on mitigating financial frauds and building robust systems for financial reporting on the usage of public funds. The finance department also provided financial support by coordinating with the procurement department indicating the broadness of the team's responsibilities.

"We are responsible for the financial planning, budgeting, forecasting, and financial analysis, together with the anticipation and estimation of financial resources required for different disaster scenarios…Developing financial guidelines and protocols, ensuring compliance with financial regulations and policies, and implementing effective internal controls to prevent fraud and misuse of funds. To achieve this, we have established mechanisms for financial reporting and

83

transparency… we work closely with Dubai Civil Defence's procurement department for goods and services procured cost-effectively… We conduct post-disaster financial assessments and evaluations involving the analysis of the financial impacts of a disaster, assessing the effectiveness of financial strategies and resource allocation, and identifying areas for improvement" (Senior finance leader).

This spectrum of duties and responsibilities was also supported by the junior leader who stated that the team leadership in disaster recovery needed to have established the cooperation as to dealing with other departments and teams.

"Leadership needs to encourage and enable cross-functional collaboration and support other departments in recovery efforts, and this is seen with our role in the finance department" (Junior finance leader).

Based on the comments of both members of the finance leadership team there was the recognition as to the importance of having a complete strategy in place and associated protocols as to how to respond and recover from a disaster. This included the usage of a dual strategy, which included the creation of a baseline strategy dedicated for the finance department, such as the inclusion of budgets for disaster recovery activities, which would need to be acted on by the finance department. Building on this theme of financial activities, the junior leader in the financial team, highlighted that importance as to functional activities needed to be incorporated:

"The role of leadership is to direct the assessment and reallocation of budgets, secure additional funding and monitor the financial impact of a disaster by identifying cost-effective measures and efficient utilization within the organization" (Junior financial leader).

In achieving this, interestingly it was the junior leader who recognized the importance of employee or team involvement in the recovery process, with the leadership encouraging ideas and opinions to be sought as part of the solution.

"As a leadership team we need to encourage employees to provide feedback and recommendations, which can inform future disaster management strategies and enhance the financial department's preparedness" (Junior financial leader).

Closely linked to the idea of collaboration was the finance leadership's recognition as to the importance associated with shared learning during the planning process, as both leaders had recently updated their plans based on industry trends after attending a training session on disaster management.

"…we definitely need to stay updated with financial best practices, regulations, and industry trends related to disaster management. I actively participate in professional development activities, attend conferences and workshops, and network with peers to exchange knowledge and experiences" (Senior finance leader).

4.2.2 Leadership in the IT department

From the perspective of the senior finance leader, who was the main owner of the plan, there was an understanding as to his responsibility towards creating a robust disaster recovery protocol, which needed to be informed and constantly updated as to developments into new ways of handling of disaster management processes. This perspective was shared by the senior leader of the IT department, who mentioned that in his role and responsibilities was primarily concerned with his IT team and how they were prepared for a disaster. The senior leader of the IT department indicated that he was primarily responsible for the decisions related to the department's planning processes and to provide a clear direction to the IT team for managing the disaster including the allocation of resources:

"I also provide guidance and support to my team during crisis situations, making timely decisions and allocating resources to address any IT-related challenges" (Leader, IT department).

Building on this statement on the scope of responsibility, the senior IT leader then broke down the areas of his responsibility, including the need to liaise with other teams and departments.

"I need to conduct asset-based risk assessments, identifying potential vulnerabilities in the IT infrastructure, and develop strategies and procedures to minimize the

85

impact of disasters on critical systems and data. I work closely with other departments to understand their requirements and then ensure that the IT disaster recovery plans align with the overall organizational goals and objectives. Another important responsibility is to ensure the availability and continuity of IT services during and after a disaster" (Senior IT leader).

From the perspective of the more junior leader in the IT department, there was a focus also on providing a strong IT hardware and software infrastructure including for data protection, together with the need for strong communication channels and protocols to be established with other departments:

"As a team we need to provide an IT infrastructure by investing in hardware and software solutions, implementing robust data and system backups, and recovery mechanisms. Therefore, as a leadership team we emphasize the importance of joined up communication systems to facilitate information sharing, particularly if an unforeseen event occurs, as we need to restore the systems as soon as possible" (Junior IT leader).

From the IT leadership interviews, it is possible to deduce that since technology is used throughout the organization, the participants understood that it was their duty to ensure that the organization kept this vital infrastructure fully functional during a disaster, even if other activities in the organization were affected. Building on this, the senior IT leader also recognized the responsibility to ensure availability, as noted by the junior leader, but also to communicate the processes to be followed from an IT perspective throughout the organization during the disaster, which interestingly may need to have external intervention or support with outside bodies and teams.

"Timely and accurate communication is crucial for coordinating efforts, disseminating information, and keeping stakeholders informed. I collaborate with other department managers, emergency response teams, and external partners to establish communication protocols and ensure that the necessary tools and systems are in place to facilitate efficient communication. I coordinate with external agencies, vendors, and service providers to ensure the availability of necessary

resources, while providing support other departments to integrate IT systems and processes into the overall emergency response plan" (Senior IT leader).

For the IT department, the disaster recovery planning process involved conducting test exercises designed to protect other departments' data. Therefore, the IT department needed to collaborate with other departments and perform joint exercises and training as part of their disaster recovery planning strategy:

"We in the leadership team also highlights the importance of collaboration and coordination among IT personnel. We have cross-functional teams participate with joint exercises and training programs" (Junior IT leader).

For the senior IT leader there was the need for active involvement in communicating with the recovery requirements to the entire organization and related stakeholders. To achieve this, he indicated the need to take the necessary actions to coordinate the resources and collaborative activities with other departments:

"I oversee the implementation of backup mechanisms, such as offsite data storage, backup power systems, and alternative communication channels. I also provide guidance and support to my team during crisis situations, making timely decisions and allocating resources to address IT-related challenges for the entire organization" (Senior IT leader).

It is possible to conclude that the senior IT leader was responsible for the recovery processes for the technical infrastructure including continuity of business activities that was dependent on technology within the organization. The senior IT leader, like those of the finance team, also indicated the importance as to learning about disaster recovery planning and having and an awareness of the latest trends and possible issues through attending training and networking sessions dedicated to disaster management.

"We are responsible for staying abreast of the latest developments and best practices in disaster management and IT security by continuously monitoring and assessing emerging threats, evaluating new technologies, and implementing appropriate security measures to protect the organization's IT infrastructure and data. I

personally collaborate with industry experts, attend conferences, and engage in knowledge-sharing activities to ensure that our disaster management strategies and IT systems are up to date and aligned with industry standards" (Senior IT leader).

Again, the senior IT leader, like the finance team took the responsibility of disaster recovery planning process by ensuring that he was up to date with recent trends and practices, which would benefit the entire organization, but from an IT perspective. The participant also highlighted the importance of training, gathering knowledge and networking, which indicated the need for constant assessment of how to improve the disaster recovery plans and processes.

With the junior leader in the IT department, there was the recent development of the "Readiness Platform" which was used to store and analyze data, whereby enabling decision-makers in a recovery scenario to take informed major and urgent decisions in real-time.

"… we have recently introduced a database, that provides data sharing protocols, and implemented a real-time dashboard using data analytics tools to derive valuable insights for decision-makers called the Dubai Civil Defence's Readiness Platform. The platform emphasizes the need for continuous monitoring and situational awareness by providing real-time data that is collected and analyzed from sensors, surveillance cameras, and social media platforms" (Junior IT Leader).

Since the data comes from various sources which is then stored at a central location there is a need for adequate security, which lead to the junior IT lead to highlight the importance of cyber-security which is an important aspect of IT department:

"We as the leadership team stress the importance of data security and privacy, which means we have implemented robust cybersecurity strategies to protect sensitive information from unauthorized access or breaches" (Junior IT Leader).

To assist in this introduction of the Dubai Civil Defence's Readiness Platform, the Junior IT leader also recalled the training provided to protect the data in the event of a disaster through conducting drills to test and highlight gaps in the existing disaster recovery plan:

"With the introduction of the Dubai Civil Defence's Readiness Platform, we have established regular training programs and exercises have been provided to enhance the skills and readiness of the IT personnel through simulating disaster scenarios, conducting drills to test IT systems and networks, and training staff on emergency response procedures." (Junior IT Leader).

4.2.3 Leadership in the operations department

Similar but different from the other two core departments, the senior operational leader indicated that one of the primary responsibilities was for the overall disaster recovery for the entire organization, particularly, as the department is public facing.

"My primary responsibilities are to establish a robust and comprehensive disaster management framework by developing and implementing policies, procedures, and guidelines that govern the entire spectrum of disaster management, from preparedness to response and recovery… We conduct risk assessments, developing emergency response plans, and conducting regular drills and exercises, establish an incident command structure, designate key roles and responsibilities, and ensure effective communication and collaboration among different departments, agencies, and stakeholders involved in the response" (Senior operational lead).

For the junior leadership team member working for the operational department there was a focus on how leaders helped in developing the disaster recovery plan and how to train employees. The team from the operations department was responsible for ensuring that all the resources from all departments were ready and available.

"We as leaders provide clear guidance on roles, responsibilities, and reporting lines, enabling a streamlined and effective response. Pre-emptive measures and development of robust disaster management plans are created by us through conducting risk assessments, identifying potential hazards, and formulating strategies to mitigate the impact of disasters. Then there is training, which needs to be regularly conducted to familiarize the organization and the department here with emergency protocols, practice coordination and communication strategies to manage different types of disasters" (Junior operational lead).

The junior lead also highlighted a key task of developing communication channels for disaster recovery by connecting with various agencies that can help during disasters.

From the interview data, it seems that this leadership team for the operations department was responsible for preparing the overall disaster recovery plan for the entire organization. The leadership team had to take necessary decisions regarding the disaster recovery from preparation to designating tasks to communicating the overall protocol within the organization and to the relevant external entities. From the interviews, there was an indication that during the planning stage, the leadership brought together the necessary resources for disaster management planning by aligning them to global standards but then customizing these to the specific organizational needs, before ensuring that the team was adequately trained to implement them.

"I am responsible for identifying, allocating, and mobilizing the necessary resources, such as personnel, equipment, supplies, and finance, required for an effective response. I work closely with my team to ensure that the disaster management frameworks are aligned with international best practices, regulatory requirements, and the unique needs of our organization. I also ensure that our personnel are adequately trained, equipped, and prepared to respond effectively to various types of disasters. I work closely with relevant departments and external agencies to ensure that resources are efficiently deployed and utilized" (Senior Operations leader).

For the senior leader it was clear from the interview, that the responsibility for creating a robust disaster recovery structure was aligned to his senior position, including the customization of any protocols to the organizational needs. For the senior leader he took decisions regarding resources to be used for disaster recovery planning including training the identified human resources to be able to effectively adopt and carry out the disaster recovery processes. At the time of a disaster, the leadership team in the operations department recognised that the role involved the taking of important decisions based on the available data, but the outcome and response was dependent on the entire team.

"I provide the strategic direction, making timely decisions based on accurate information and assessment of the situation, but I am also reliant on the team around me, as this is also my responsibility" (Senior operations lead).

The leadership in the operations department unlike the IT and finance teams, had the duty of communicating to the internal and external stakeholders about the organization's disaster recovery strategy and processes. Again, a common theme was the importance of communication and opening suitable channels:

"We as the leadership have to establish and then maintain effective communication channels by disseminating timely and accurate information to all stakeholders, which includes the general public which can be challenging" (Senior operations leader).

In expanding on this, the junior lead noted the importance of team involvement and also testing of the disaster recovery processes from the start to the post-disaster assessment stage to test out communication channels and protocols:

"We also encourage the entire process to be test through to post-disaster evaluation and analysis to review the response and identify areas for improvement, like with communication with the public" (Junior operational lead).

To achieve this, for the leadership they took the responsibility for the important decisions needed to be taken through actively engaging with the team, the organization's employees, but then communicate to external stakeholders including the general public. In contextualizing this need for active engagement throughout the organization and then externally, the leadership drew on the post-disaster recovery protocol, which had required the evaluation of actions which needed to be updated, and improved for future usage.

"The importance of this active engagement can be seen with the process and procedures which followed after conducting a post-disaster scenario. This included post-incident assessments, reviewing response plans and procedures, and then implementing corrective actions. This then required proactive working with other departments and external partners to analyze the data, identify trends, and make recommendations for enhancing our preparedness and response capabilities" (Senior operation lead).

This was supported by the junior lead for the operational team, who noted the importance of information flow which was tested during the scenario:

> "From the scenario test, we established communication channels and protocols to ensure information flow existed between emergency response teams, public safety agencies, and other relevant authorities" (Junior operational lead).

As can be seen above, the leadership were also actively involved in the conducting of a disaster scenario by analyzing the actions needed to be taken during the event, and then amending or revising aspects of the plans. This updating and learning from the past will be revisited later in the chapter.

4.2.4. Summary of key roles, responsibilities, and duties of the operational leadership team in disaster management

From the interviews with the leads of the IT, finance, and operational departments together with the nominated junior partners, it seems that all leaders recognised the importance as to planning, following, and responding to a robust disaster recovery process by taking timely decisions, while also adopting a learning attitude, and having clear communication channels within the department and externally if need be, for a disaster recovery planning to be effective.

4.3 The main operational objectives for disaster recovery planning

The interviews then progressed from understanding the key roles, responsibilities, and duties of the operational leadership team in managing and recovery of a disaster to exploring the main operational objectives for recovering from a disaster recovery planning. The interviews revealed that communication was seen as the most important consideration within the team, which often extended to external entities such as vendors, regulatory authorities, and other stakeholders. Effective communication was essential in public sector organizations as the work is often interdependent on different functions including tasks that must be undertaken in conjunction with other teams, both internally and externally. Therefore, the planning process of disaster recovery needs to ensure that communication protocols and procedures within the organization are accessible before a disaster occurs and that all members of the organisation

are aware of their roles and responsibilities. This awareness included ensuring that the teams were able to coordinate and cooperate with each other, and potentially being able to work independently from direct management involvement. In the post-disaster stage, there was a recognition that there was a need to prepare reflective reports regarding the events which had occurred, lessons learnt and the potential remedial steps to be undertaken in the future, which would be incorporated into the future-planning process of the revised disaster recovery plans and protocols. This was encapsulated by the junior leadership representative of the operational department:

> "A key objective for disaster recovery planning is the engagement with stakeholders including government agencies, donors, and funding partners to secure additional financial support if needed. Then there is the maintaining of effective communication channels to build trust, foster collaboration, and ensure that all stakeholders are well-informed about the organization's financial recovery efforts" (Junior operations leader).

This was supported by the IT department leadership team, who also identified the importance of coordinated communication as a key objective in disaster recovery planning:

> "… clear communication and coordination throughout the organization as well as with external service providers needs to be at the forefront of any disaster recovery process, but needs to happen immediately after a disaster" (Senior IT leader).

In expanding on this theme of communication as a key objective, it was the junior leadership partner in the operational department who noted the relevance of external and internal protocols:

> "…following a disaster, we need to establish as priority one the effective communication and coordination mechanisms with our internal and external stakeholders" (Junior operational leader).

Underpinning this need for communication channels to be set up and then reestablished after a disaster, was also the need for the fast recovery of the IT systems, which was the key responsibility and priority of the IT leadership. With the entire organization being connected

93

through technology, the task of the IT team was to safeguard and provide a quick resumption of IT services was seen as their next main or critical objective:

> "The department's operational objectives are to minimize downtime and restore IT systems and services, provide protection and recovery of critical data assets, while restoring essential services that are vital for the functioning of Dubai Civil Defense" (Senior IT leader).

This perspective was supported by the junior IT leader who contended that the recovery time needed to be fast as possible, so that the systems can resume soon after the disaster has occurred:

> "The primary operational goal is to minimize the downtime of critical IT systems and infrastructure and resume critical functions quickly and reduce disruption, restore data integrity through backup and recovery mechanisms, ensure availability of IT systems and infrastructure" (Junior IT leader).

The IT leadership also recognized that the Dubai Civil Defence is a public authority, serving the community, therefore has the duty to comply with the mandatory legal requirements, and all its plans and processes need to ensure that the public are safe. Part of this includes ensuring that the protocols are developed, tested, refined, and practiced, but also:

> "…operating within a legal and regulatory framework" (Senior IT Leader).

For the leadership in the finance department, there was also the recognition of needing to adhere then report back to the financial regulatory authorities whereby meeting the associated legal requirements. For the finance team, the compliance and objective of the disaster recovery process was based on meeting public authority regulations of the usage and reporting of funds. As the Dubai Civil Defence is a government entity, the funds used for any activity need to be reported to the government and other regulatory authorities for auditing and accountability to ensure that there is transparency of public funds.

> "…. although not directly related to the main objective of disaster recovery, there is the need to provide timely and accurate financial reports to stakeholders, the

Dubai Government Finance Department and Financial Audit Department. The main focus is to promote financial transparency, accountability, and compliance with regulatory requirements. This needs to happen in terms of disaster recovery were potential activities may impact on the authority, like through the need to draw on more public finances or even prevent malicious behaviour occurring" (Senior finance leader).

For the junior leader of the finance department, he mentioned that the major objectives were to control the costs while preparing for disaster recovery, but also to reduce financial risks arising from the event. These objectives were seen as critical as they were intended to provide public trust in the organization and accountable as a public authority. The junior leader like the senior leader recognized that the finance department had the responsibility to comply with the regulations while reporting on the various financial activities to ensure continued public trust in the organization.

"The primary operational objective is to ensure the continuity of financial operations, to swiftly restore essential financial functions, assess and mitigate financial risks, support the recovery efforts by allocating funds, establish financial controls and compliance measures to maintaining the Dubai Civil Defence's financial integrity and public trust through the collaboration with other departments about their financial requirements and budgets" (Junior finance leader).

Again, while different to the other two departments, there were also shared activities and responsibilities. For the operational department, the main objective of the disaster recovery planning process was centred on the recovery of all activities within the entire organization, including the safety of employees and the physical infrastructure. However, there was the additional responsibilities for the safety of the general public because the organization is a public authority.

"The operational objectives of this team include *life safety and preservation* during a disaster with timely assistance, implementation of strategies for incident stabilization to protect individuals from further harm. Therefore, the key objectives and focus is on the infrastructure restoration for the resumption of services and activities. Ensure that the business continues, offering support and assistance to the

community following the disaster and then learn from lessons learnt" (Senior operational leader).

With the junior lead for the operational team, a key objective was the need for preparedness.

"A key objective is to ensure the safety and well-being of individuals affected, conducting a damage assessment and data collection, then restoring the essential support services, like emergency supplies, and finally conducting thorough debriefings and post-disaster evaluations for improving the plan" (Junior operational leader).

In addressing the key objectives associated with disaster recovery planning, it is possible to deduce that the leadership see the restoration of the organizational activities as needing to be restored as quickly as possible. But as a public authority, the participants particularly as to the finance team must comply with the legal and regulatory requirements as the organization is accountable to the public with respect to the usage of resources, while ensuring that facilities are available.

4.4 The core components of the current disaster recovery plan

The interviews then progressed to focus on the disaster recovery planning process. The interview data revealed that there was a clear and shared disaster recovery plan for the Dubai Civil Defense, which was used by all the departments, but needed the various leadership teams to customize the format it to suit their own specific needs. The most common components of the disaster recovery plan were identified as being the risk assessment, business impact analysis, recovery objectives and strategies, resource allocation, communication and testing and updating of the disaster recovery protocol. The senior finance leader provided a rich explanation as to the usage of risk assessments, business impact analysis techniques, recovery objectives and testing of the disaster recovery protocols.

"We use asset-based risk assessments to identify potential hazards, vulnerabilities, and their potential impact on the operation and infrastructure. The business impact analysis approach helps to determine the critical functions and processes that must be restored as a priority by estimating the financial and operational impacts of

potential disruptions. To achieve this there is a need to establish clear recovery targets, which include recovery time objectives (RTOs) and recovery point objectives (RPOs). Then for the planning process to be regularly tested and validated against the plans to ensure that the strategies remain effective and up-to-date, including reviewing and update them regularly" (Senior finance leader).

It seems that for the finance leader the process of disaster recovery was based firstly on understanding the possible risks to the business then analyzing the potential financial impact on the business if a disaster occurred. This process involved the analysis of deciding the most appropriate action or actions to take, especially to the resumption of the activities post a disaster. However, to check the plan's efficiency, there was a need to test the protocols before the actual disaster event occurred. For the senior finance leadership, the disaster recovery plan needed to have a financial element attached to it in the form of a budget, which could be used to manage and inform the disaster recovery activities. The disaster recovery plan also needed to be communicated within the team and relevant external entities as to the sharing of the knowledge based as to the activities needed to be undertaken to manage the disaster recovery process.

> "We need to ensure that there is an allocation of financial resources for personnel, equipment, facilities, and technology. To assist in the budgeting, communication plans for employees, partners, and the public needs to be created to informed them about the disaster recovery processes, roles and responsibilities, together with the status of the recovery efforts" (Senior finance leader).

For the finance leader, the training of the team was also an important component of the disaster recovery planning process, so that the team was fully prepared to manage the disaster through following informed pre-determined actions and processes.

> "Training programs for me is an important aspect of the disaster recovery process, so that employees' become an integral part of the recovery strategy, so that the entire team understands their roles and responsibilities in the event of a disaster happening" (Senior finance leader).

But again, the finance leader also highlighted the importance of following the regulations created by the relevant authorities, which needed to be incorporated into the plans:

"Of course, there is the need to ensure that the plans comply with relevant laws, regulations, and industry standards. This may involve liaising with regulatory authorities and conducting audits to verify compliance, but still an important component of devising a recovery plan for this department" (Senior finance leader).

Drawing on the junior leader in the team, he stated that he was responsible for the preparation of written recovery documentation, and therefore he stressed the importance of ensuring compliance with regulations, as being the most important component, together with other government-related regulations.

"…the most important component of the recovery documentation has to be complying with the relevant laws, regulations, and industry standards, and then be open to audits to verify compliance" (Junior finance leader).

Although compliance was unique to the finance team, there were still similar components for the IT department, but from a technological perspective, including the need to ensure that the infrastructure was resilient to cope with unexpected events.

"In this team we actively identify vulnerabilities in our systems and infrastructure, determine which are critical IT assets, and allocate appropriate resources for their protection and recovery. We also establish recovery objectives and strategies such as data backup and restoration of infrastructure and critical systems. There is the testing and conducting of exercises to validate the effectiveness of our recovery plans, including conducting periodic reviews and revisions of the plan to incorporate lessons learned, address emerging threats, and align with changes in our IT environment and business operations" (Senior IT leader).

Both the senior and junior IT leaders provided examples of different components important to their strategies, like data backup to improve disaster recovery, and the increasing awareness of external cyber threats to the IT infrastructure through potential hackers or other malicious

activities. To address these threats, the planning processes and rehearsal activities was regularly reviewed.

"The disaster recovery plan is the main document used to respond to a disaster. In this plan there is the need for risk assessment strategies to be developed to mitigate risks by implementing security measures, conducting regular vulnerability assessments. These recovery strategies can include data backup and restoration procedures, server and network recovery processes, and system reconfiguration, availability of alternative infrastructure or off-site facilities to support the recovery process, all of which are important components for the plan to have documented" (Junior IT leader).

In contrast, the operational department while also sharing a similar approach and structure for disaster recovery planning processes, such as the need to conduct risk assessments and business impact analysis, along with the testing of the recovery protocols, the senior operational leader recognised the responsibility of the team for the entire organization's disaster recovery processes, and added two additional components: resource availability and training of employees, as being essential for disaster recovery planning, which although covered by the IT senior leader above, was expanded on more:

"I am in-charge and personally responsible for the direct creation and execution of an extensive recovery plan for the entire organization. This plan addresses the identification, allocation, and procurement of resources, like personnel, equipment, supplies, and finance, which are needed for any recovery process. An important component of the plan for us is the testing through drills to validate the plan's effectiveness and identify areas for improvement. We conduct extensive training through these activities to help us to familiarize the personnel with their roles, enhance their skills, and ensure a smooth execution of the recovery procedures. We regularly update the recovery plans to incorporate changes in technologies, processes, and lessons learned from previous incidents" (Senior operations leader).

When it came to the junior leader of the operational team, there was a rich insight provided into the department's priorities and components when recovering from an unforeseen event or

disaster. This included the communication strategy to communicate and liaise with departments and external stakeholders, particularly around reducing misinformation.

> "The planning process needs to include how to effectively respond and recover from a disaster. Our plans outline the procedures for resource procurement, deployment, and utilization to ensure that the activities are efficient and coordinated. These plans also have strategies and protocols for internal and external communication channels, tools, and procedures for disseminating information, providing updates, and engaging with relevant parties" (Junior operational leader).

The junior leader also mentioned about the importance of providing specific training to the employees/stakeholders for successful disaster recovery efforts. Training sessions were needed to prepare the employees/stakeholders in advance, so that in the event of a disaster the protocols are adequately rehearsed as to carrying out the various activities:

> "Our disaster recovery plan insists on training and awareness programs to enhance preparedness through drills for all employees and key stakeholders" (Junior operational leader).

In addition, like the senior leader, the junior leader also highlighted the important component of the maintenance of regular disaster recovery activities, as being essential for this department due to its responsibility for the entire organization's recovery from a disaster, but also the mandatory legal requirements of keeping this process and protocol up to date, which differed from the senior leader.

> "The recovery document should also focus on maintaining records of incidents, response activities, recovery efforts, and lessons learned for future planning and also help in tracking progress and compliance with regulatory requirements" (Junior operational leader).

In summary, these interviews reveal that the leadership for the three key departments were fully involved in the development and maintenance of the disaster recovery plans and understood their own important components. The leadership independently stressed the importance of training as being fundamental in implementing any disaster recovery processes.

The disaster recovery plan interestingly was organisational centric but needed also to be customized for individual functions based on the activities of the departments, which had similarities but distinct differences. In the main the key components were aligned to the departmental activities, but also shared the importance of communication strategies and training.

4.5 The current disaster recovery planning processes and protocol

All the leadership participants mentioned the components of the disaster recovery plan as being a series of steps to follow in the preparation of the disaster recovery planning process. Part of this included conducting extensive risk assessments, business impact analysis, the development of recovery strategies, preparation of the various departmental disaster recovery documentation, putting into place communication and coordination strategies and providing training protocols for employees, along with the testing of the plans then updating the documentation accordingly.

There were departmental similarities as to the steps taken. With the risk assessment, the process involved the identification of potential risks and vulnerabilities that could impact on the organization's functions, such as finance, IT support and operational activities. The business impact analysis process analyzed the impact on the organization's functions including the financial components including loss of revenue and increased expenses, potential IT and data loss, or threats to operational activities including the potential legal and regulatory infringements. With the development of the necessary recovery strategies, the process involved the outlining and then the documentation of the actions required to restore critical operational services in each department. For the documenting of the disaster recovery process and plan, the resources required needed to be aligned to the procedures and any agreements with any external entities.

Leading from the documentation of the disaster recovery process was the testing of the procedures and the running of training exercises to provide simulations and scenarios as to system failures, whereby ensuring that the reporting processes and evaluation activities were effectively undertaken. Through these training activities and programs, the various teams and personnel were able to gain the required knowledge and skills to execute their roles in the event of an emergency or unforeseen event. As mentioned above, there was the need for clear communication and coordination of the various activities. This collaboration extended to other departmental managers and senior leadership teams for decision-making and then for these

changes to be accurately communicated as to updates about the changes to the planning process throughout the organization. Finally, the maintenance and review of the plan, which needed to be constantly reviewed for any changes in processes, systems, or regulations which could impact on the effectiveness of the recovery process. This process also involved the collaboration with internal and external auditors to assess the disaster recovery protocols, as to whether they were compliant with various regulatory requirements.

The senior IT leader in contextualizing these different steps mentioned the time needed to undertake each stage, particularly as to the recovery phase when restoring services, but also meeting the agreed deadlines and service level agreements such as the RTOs and RPOs.

> "The most challenging part of any recovery process is meeting the recovery time objectives or RTOs and recovery point objectives (RPOs). The RTO refers to the maximum acceptable downtime for each system or application, while RPO defines the maximum allowable data loss, and we are often focused on these targets" (Senior IT leader).

The operational leader also shared his view as to the planning process of recovery, which included the effect of the changes in the external and internal environment, which needed to be considered and then incorporated into the documentation.

> "We dependent on lessons learned from real incidents, update information about technological advancements, changes in business processes, and regulatory requirements, which are then added to the existing recovery planning documentation" (Senior operational leader).

It is important to note that recovery protocols and documentation needs to be updated with changes in IT infrastructure, the experiences and lessons learnt from previous unexpected events or even modifications in the existing business environment, like core processes and legal/regulatory changes, which require the organisation to respond too. Building on the viewpoint of the senior leader of the operational team, the junior member noted again the need for training of the team as being a critical step for successful disaster recovery.

> "It is essential to educate and train our team on their roles and responsibilities during a disaster" (Junior operational leader).

This statement of the junior operational leader suggests that although there are several important steps to be taken in preparing a recovery strategy, like conducting a risk assessment, training was still an important consideration.

Overall, there was a consensus amongst the three leadership teams as to understanding the disaster recovery process and the steps needed to be followed in the preparation and updating of the recovery protocol. However, there was a need to train the teams to able to follow the disaster recovery processes, and the recognition that the plan was a dynamic document which needed to be regularly updated and changed.

4.6 The operational artefacts used in the disaster recovery operations management

From the interviews there were an array of different operational artefacts identified and used for the recovery of operational activities, which are listed below in Table 4.1. The list also has an indication as to the relevance depending on the department.

Artefact	Finance leadership	IT leadership	Operations leadership
Disaster Recovery Plan (DRP)	✓	✓	✓
Testing Plans		✓	✓
Training Plans		✓	✓
Reporting templates	✓		✓
Incident management plan		✓	✓
Tracking and monitoring tools	✓		
Communication and Notification Plan			✓
Data backup and recovery plans		✓	
Risk Management Plan		✓	✓
Contracts and agreements	✓	✓	
Audit reports	✓		
Change management processes		✓	✓

Table 4.1: Artefacts identified by the three teams

(✓ the existence of the identified attribute)

In contextualizing these artefacts, for the finance leadership it was about the importance of their usage:

"Operational artefacts are tangible and intangible tools, documentation, or processes to support the management and execution of disaster recovery operations, which are often based on procedures which need to be followed to ensure we can recover from an unplanned event" (Senior finance leader).

This perspective of the senior finance leader as to artefacts being documents used for the planning, execution and analysis of the disaster recovery process was seen as important to that department. These artefacts also included the policies and procedures which had been established to provide guidelines for business restoration. In explaining this further the junior leader mentioned the importance of the artifact being a comprehensive document:

"Disaster recovery plan is a comprehensive document that outlines the strategies, procedures, and protocols to be followed during the recovery process. It serves as a roadmap for the recovery of operations" (Junior finance leader).

As to the artefact being a reporting template, this term was associated with the reports generated after the event. These reports included a detailed account of the event and the actions undertaken by the teams to recover the service and how the disaster was managed. These reports would show the analysis and gaps in the original disaster recovery plan.

"Reporting templates detail the events, actions taken, and the outcomes of a disaster or emergency. They provide valuable insights into the effectiveness of our response and recovery efforts, highlight successes, and identify areas where improvements can be made in the original planning documentation" (Senior operations leader).

As noted throughout this chapter, the testing of the disaster recovery plan is a critical activity. Therefore, it is necessary to prepare a recovery document which provides information about the known disasters and the actions to be undertaken by the various teams and personnel, which is often seen as being inside the testing and exercise planning document.

"The testing and exercise plans define the schedule and scope of testing activities conducted to evaluate the readiness and effectiveness of our disaster recovery procedures. This includes scenarios, objectives, and success criteria for each

exercise, allowing us to identify any gaps or areas for improvement" (Junior finance lead).

Another important artifact was the training documentation. This artifact is necessary for the employees to be trained in the disaster recovery procedures by ensuring that they undergo exercises or drills so that they are aware how to resolve and restore services as quickly as possible. The training documentation can also act or provide the teams with a reference documentation to refer to during an unforeseen event.

> "Training documentation often includes training materials, simulation exercises, and tabletop drills that help familiarize personnel with their roles and responsibilities during a disaster" (Senior operations leader).

The leadership teams recognized the need to have tools to monitor their disaster recovery activities which could be then used to improve the disaster recovery planning process, which was identified as the tracking and monitoring artifact:

> "Tracking and monitoring tools which monitor and manage the progress of disaster recovery operations is vitally important. This artifact can include status reports, incident logs, recovery progress dashboards, and metrics that capture the key milestones and progress made in the recovery process" (Junior IT leader).

From these leaders, the incident management plan as an artifact for disaster recovery would be used during the actual event. This document would list out various known disasters and the actions taken to resolve or restore the services including teams that may be of assistance.

> "The incident management plan provides a structured approach for incident response, including activation of emergency teams, communication channels, incident assessment, and coordination of resources. The plan ensures a swift and coordinated response to mitigate the impact of the incident and initiate the recovery process" (Senior operation leader).

To ensure that the disaster does not impact on business operations and activities, data backup at least for the IT team was an important artefact, as most of the business activities are data-

105

driven. Therefore, the data back-up plans were essential in disaster recovery planning and was seen as being a disaster recovery artifact.

> "There is a need for the data backup and recovery plans to be documented specifying frequency of backups, location of backup data, and the steps to restore data in the event of a disaster to avail and ensure integrity of data" (Junior IT leader).

Throughout this chapter communication was seen as an essential component while planning for disasters and unplanned events, then maintained during the disaster and even after the services have been restored. Therefore, having a communication plan would guide the various teams as to how, and who to notify as to stakeholders, about the disruption to the business.

> "The communication and notification plans define the communication channels, protocols, and escalation procedures to ensure timely and accurate dissemination of information to internal and external stakeholders. This artifact should include contact lists, communication templates, and guidelines for efficient communication and coordination activities" (Senior operations leader).

The senior IT leader focussed on the risk management plan as an important artefact for disaster recovery to minimise the impact to the IT infrastructure of the organization.

> "The risk management plan outlines the strategies and measures to mitigate, prevent, or minimize the identified risks. The plan can help in proactively addressing vulnerabilities and implementing preventive measures to enhance the resilience of the IT infrastructure" (Senior IT leader).

The junior IT leader also mentioned about managing change without jeopardizing or invalidating existing disaster recovery plans. Due to constant changes in the technology, the IT department recognized the need to be vigilant about modifying the existing disaster recovery plan by including the potential changes to the existing technology infrastructure.

> "Change management processes helps to maintain the integrity of the recovery environment by ensuring that any changes made do not compromise the recovery capabilities. Proper change management practices minimize the risks associated

106

with unauthorized or uncontrolled modifications during the recovery process, which needs to be carefully and accurately documented" (Junior IT leader).

The following artefacts were mentioned by the finance leadership team and were specifically related to the financial nature of their roles and required signing of contracts and the auditing of expenditure activities.

"Contracts and agreements are legal artifacts that outline the financial terms and obligations between the organization and external parties involved in the recovery activities. Contracts are usually entered into with service providers, vendors, insurers, and funding agencies" (Senior finance leader).

In explaining this more, the junior finance lead mentioned about the artifact being useful as to providing a means of improving services:

"Audit reports provide valuable insights and recommendations for improving financial management in future disaster recovery operations" (Junior finance leader).

Based on the interview data, the operational artefacts of disaster recovery were seen as being important documents and tools which help the teams to carry out disaster recovery activities whether that is pre-, during and post-disaster, in a systematic way. The most critical artefact was the disaster recovery plan. The disaster recovery plan was seen as the genesis that produces other documents or artifacts related to disaster recovery. Some of the other documents included incident reporting, risk management and data back-up plans, along with data recovery procedures.

4.7 The existing disaster recovery planning model

The interviews then focused on the theme of what current recovery planning models or approaches were being used in the Dubai Civil Defence. When the leadership teams were asked about which specific model or approaches was followed for disaster recovery planning, it became very clear that the Plan-Do-Check Act (PDCA) approach was used in both the finance and IT departments, while the operations team used a more generic business continuity

strategy. Interestingly, there was no real awareness of the Balanced Scorecard or the TOE models. In investigating why no specific framework or model was used, for the IT and finance teams, the PDCA approach was seen as a means to mainly act as a tool to plan then perform tasks before executing them. The approach also enabled the checking of the outcome of the activity, and then for any necessary changes in the existing plan to happen, enabling better recovery performance in the future. However, the approach was mainly operational centric and not overarching or strategic.

The Plan-Do-Check-Act process was extensively explained by the senior finance leader as to the process followed in his department:

> "The *plan* stage involves assessing risks, defining recovery objectives, and developing the strategies and procedures to assess and understand what is happening, and to what extent the Dubai Civil Defense can continue its services and maintain solvency in the event of an unforeseen event. The *do* is the implementation phase and here, regular communication and coordination plays a crucial role in this phase to ensure that everyone is aligned and working towards the common goal of restoring services. In the *check* stage, there is the assessment and evaluation of the effectiveness of disaster recovery efforts by testing and evaluating recovery procedures to identify any gaps, weaknesses, or areas for improvement through tabletop drills or full-scale recovery tests to validate the plan's effectiveness. In the *act* stage, corrective actions and necessary adjustments are made to our plans. We can identify weaknesses and areas for improvement, update procedures and strategies, and enhance the infrastructure and systems to mitigate future risks. By adhering to this model, we can enhance the resilience of the existing organizational infrastructure, minimize downtime, and effectively respond to and recover from disasters or disruptive incidents" (Senior finance leader).

The junior finance leader provided a more operational perspective by focusing on the approach usage in the financial aspects of disaster recovery, as it seems he was responsible for managing and leading the operational tasks including the management of transitional activities, however again there was no awareness of a strategic framework to group key performance indicators and critical success factors.

"I am not aware of any framework, or the Balanced Scorecard, but we do follow the Plan-Do-Check-Act process, like for example during the *plan* stage, we have used the model to assess the impact of partial or complete shutdown of operations to determine the cost implications. This is important as we need to consider cost of expenses to maintain the operational activity during and after the event. We have also determined the amount and timing of potential recovery as to ensuring that our financial systems are back online and working. Planning has helped us to avoid unexpected cash shortages that can put business continuity at risk. During the *do* stage, we have put the disaster recovery plan into action, based on the availability of the financial resources. During the *check* stage, we have conducted simulated exercises to gain insights into potential issues and challenges that may arise during an actual disaster to improve our recovery strategies. With the *act* stage, we have taken corrective actions and made necessary adjustments to our disaster recovery plan by updating procedures to mitigate future risks" (Junior finance leader).

Clearly the leadership of the finance team benefited from the PDCA format to ensure that all the stages of the disaster recovery plan were covered and tested, if from an operational perspective. For the senior IT leader, the approach was based on operational activity of reestablishing related services by testing the plan to check its effectiveness in response to any unforeseen event or disaster, but interestingly, there was confusion of using the term *critical success factors* for the measurement of the outcomes, as the measures used were more related to the performance of meeting the criteria through the usage key performance indicators:

"We use the PDCA for recovery time objectives (RTOs) and recovery point objectives (RPOs) as critical success factors to determine the maximum allowable downtime and data loss tolerances in the *plan* stage. In the *do* stage, we execute the strategies and procedures outlined in the plan, such as data backup, system replication, and alternative resource provisioning. This phase involves coordinating with various teams and stakeholders. During the *check* stage, we conduct thorough testing and evaluation by conducting simulated exercises of the recovery procedures to identify any gaps, weaknesses, or areas for improvement to validate the plan's effectiveness. These tests are conducted to gain critical insights into potential issues and enhance recovery strategies. Finally, in the *act* stage, we take corrective actions and adjust our disaster recovery plan by addressing any

109

weaknesses, updating our procedures and strategies, and enhance our IT infrastructure and systems to mitigate future risks" (Senior IT leader).

From above, the senior IT leader focused on the activities of PDCA as being able to enhance the disaster recovery processes from a specific IT systems and infrastructure perspective, but also focused on the certain critical success factors, which indicated that there was a potential misunderstanding of the connection to key performance indicator and the overarching need for a strategic framework to work within. This was illustrated also by the junior IT leader, who indicated that the PDCA model enabled him to focus on strategies including the back-up of the data to protect from data loss and to test the disaster recovery plans to ensure that the IT hardware and software was protected, but was referring to key performance indicators, but was using the term of critical success factors instead:

"In the *plan* stage, we have conducted risk assessments, defined the recovery objectives, and developed our strategies around the recovery of IT systems and services. We use critical success factors like recovery time objectives (RTOs) and recovery point objectives (RPOs) to determine the maximum allowable downtime. During the *do* stage, we have executed strategies and procedures outlined like data backup. In the *check* stage, we have gained insights by conducting drills into potential issues and challenges during disasters to improve our recovery strategies. During the *act* stage, we have made necessary adjustments to our disaster recovery plan by identifying weaknesses, updating our procedures, and enhancing our IT infrastructure and systems to mitigate future risks" (Junior IT leader).

From the IT side, the leadership has shown how the model has assisted in the disaster recovery planning and updating process stages. It also appears that the PDCA approach was like the disaster recovery process, like for example with the planning step of undertaking a risk assessment of potential disasters, however there was a misaligned or misunderstanding of terminology, with a specific focus on operational activity only. In contrast to the IT and finance departments, the operations team mainly used a business continuity planning approach and there was again no specific framework mentioned, like the Balanced Scorecard. In explaining this approach of using the business continuity plan, the senior leader mentioned the typical stages of this model, and its design around the creation and then application of the disaster

recovery plan, which included the analysis of the potential risks that can affect the business operations.

> "We do not use the Balanced Scorecard, instead we use the BCP (business continuity plan) in conducting the risk assessment, we identify and analyze potential risks and vulnerabilities that could impact our operations. While conducting the business impact analysis, we are evaluating the potential consequences of a disruption to our operational activities. The BCP has helped us prioritize our recovery efforts and allocate resources effectively based on the impact and dependencies of various business units and processes." (Senior operations leader).

Based on the above, the senior operational leader then continued to explain how the business continuity plan approach was used, as to the forming of strategies related to the speed of response a disaster, by putting effective communication policies in place, then ensuring that the resources were available.

> "During the *strategy development* stage of Business Continuity Plan (BCP), we have developed strategies such as backup solutions, alternative working locations, data recovery procedures, resource allocation plans, recovery time objectives (RTOs) and recovery point objectives (RPOs) to mitigate the risks and ensure the continuity of our operations. From this we have conducted the *plan development and implementation* stage where we have created detailed recovery procedures, documented roles and responsibilities, established communication protocols, and outline resource requirements… The *implementation* stage has involved the disseminating of the plans to relevant stakeholders, conducting training programs, and assessing and ensuring the availability of necessary resources" (Senior operations leader).

For the operations team, once the strategies had been planned, it was essential to test and maintain the disaster recovery plan to check for the effectiveness of the processes and protocols, which again was conducted by using the business continuity approach:

"In the *testing and exercise* stage, we have conducted drills with key personnel from different departments to evaluate the plans, identify weaknesses, and improve our response strategies. For the *maintenance and continuous improvement* stage, we regularly review and update our disaster recovery plans to ensure relevance and effectiveness by incorporating lessons learned from real incidents, integrating new technologies or processes, and staying abreast of industry best practices and regulatory requirements" (Senior operations leader).

To contextualize further the usage of the business continuity plan, the junior leader provided a more detailed and operational perspective when creating and applying the disaster recovery strategy using this department's approach.

"I don't know about the Balanced Scorecard, but the BCP model emphasizes the importance of conducting a thorough risk assessment and business impact analysis to understand potential threats and their consequences on business operations. The model guided us in developing strategies and procedures to mitigate risks, establish alternative work arrangements, and ensured the operational availability of necessary resources for business continuity" (Junior operations leader).

From the different disaster recovery approaches mentioned by the participants, it appears that the departments within the organization could decide on their own approach to be used for forming functional disaster recovery plans, but there was no recognised framework or model used to underpin or inform the protocol. Furthermore, the focus of the planning and execution stages were mainly operational centric. From the interviews, it also emerged that there was a freedom for the departments to choose the disaster recovery approach which was best suited to their teams and departmental needs. But also, there was potential mixing of terminology and usage of critical success factors and key performance indicators. Reflective of the potential confusion of terminology and acknowledging the lack of a framework to group the operational and strategic aspects of the protocol, the chapter will now focus on the critical success factors and key performance indicators.

4.8 Key critical success factors (CSFs) seen as important in the disaster recovery planning process

The study then focused on the importance of critical success factors (CFSs) in setting out the criteria from which the disaster recovery plan was based. To emerge from the findings, there were common and identified critical success factors amongst all the departments and participants. The findings indicated that there was a clear understanding of the purpose of using critical success factors, but also potential misusage of terminology and the purpose of key performance indicators, together with the emergence of new key performance indicators and critical success factors, which will be presented later in section 4.9.

The first theme to emerge was the potential misunderstanding of terminology including the purpose of critical success factors such as the associated need for assessing and using data from risk assessments, business impact analysis, and recovery objectives which related to the measurement of performance, but then recognizing how critical success factors were required to establish goals, targets or success criteria, like having strong communication channels and collaborative agreements with internal departments and external vendors. When the leaders were asked about the importance of critical success factors, the senior finance leader highlighted the importance of employee training as a prime example when implementing a disaster recovery plan:

> "All employees need to be well-prepared and equipped to respond effectively in the event of an emergency. This can only be achieved by meeting CSFs like conducting training sessions, workshops, and awareness campaigns to educate employees about their roles and responsibilities, emergency procedures, and the use of recovery tools and systems, and their effectiveness in response to the event occurring is a critical success factor, which we measure" (Senior IT Leader).

To emerge from the interviews were also the need for critical success factors which included the creation and maintenance of cooperation and coordination activities with external agencies and partners, having adequate resources, strong operational leadership and management, establishing and maintaining high-quality processes and procedures and finally, the protection of the citizens and community, which the Dubai Civil Defence serve. To assist in interpreting the next section dedicated to the key performance indicators and the connection to the critical

success factors, the table below Table 4.2 sets out the alignment of the critical success factors and key performance indicators.

Critical success factors	Key performance indicator
Training and development of the team	Number of the team members trained
	Quality of training and team development
Creation and maintenance of cooperation and coordination activities with external agencies and partners	Level of integration with external agencies or partners
	Degree of synergy between agencies and partners
Capabilities, capacity and competent to execute the disaster recovery plans	Level of capacity
Adequate resources	Efficiency of resource usage
Effective operational leadership and management	Effectively recovery meeting the goals and objectives
Establishing and maintaining a high-quality processes and procedures	Response times
The protection of the citizens and community	Negligible destruction and damage
	Recovery time
	Stakeholder satisfaction

Table 4.2 Mapping of the identified critical success factors and key performance indicators. (Author's own work)

4.9 Key performance indicators (KPIs) used to measure and evaluate the disaster recovery

The next theme to emerge from the findings was related to the key performance indicators (KPIs) which are used to measure and evaluate the performance to track and check that the objectives of the disaster recovery operational activities are met against the critical success factors. The findings identified two types of key performance indicators: qualitative and quantitative. The quantitative key performance indicators, which is the common method of using this metric included: recovery time objectives, mean time to recovery, recovery point objectives, incident response time and cost of downtime, and were measured from numerical data. The other set of key performance indicators were qualitative, which included the level of compliance of regulatory requirements, stakeholder satisfaction, resource utilization, recovery point validation, training and awareness program deployment, timely and accurate reporting and testing and exercise results.

In explaining the key performance indicators, the interviews revealed that there were several key performance matrices that was used to check how effective the event was managed or executed, through to measuring and evaluating the performance of the recovery process. This

usage of the key performance indicator included the usage of checking the time needed to restore a particular service, through quantitative or numerical data. This was explained by the senior IT lead:

"A key KPI is the RTO measurement which indicates the time taken to restore critical systems, applications, and services after a disaster. It represents the maximum acceptable downtime for our operations. For us the defined satisfactory RTO is 1 hour" (Senior IT Leader).

Interestingly, the recovery point objective or RPO, while seen as an important quantitative KPI, the key performance indicator was also related to identifying the loss of data that may occur, and the department's level of loss acceptance, which was not based simply on performance. Another identified quantitative KPI used in the organization, was the time taken to restore predefined activities after the disaster had happened, which was determined or agreed on, to be 1 hour for these activities to be fully restored. This timeline makes the departments responsible for reestablishing their services within the 1-hour timeframe and from an IT perspective, reduce possible data loss, which was explained by the junior operations lead:

"The mean time to recovery (MTTR) measures the average time taken to restore a failed system or service to normal operation. A lower MTTR indicates better performance and faster recovery. 1-hour data loss is the accepted standard here" (Junior operations leader).

Another key KPI used in the operations team was the incident response time which measures the time taken by the department to respond to the disaster from the moment the event occurs through to the planning the method of handling the situation to re- starting or restoring services.

"In this department, incident response time measures are one of our KPIs, as in the speed at which the teams mobilize and respond to an event such as the time taken to assess the situation, activate the appropriate response plans, and initiate recovery operations" (Senior operations leader).

For the financial team in their disaster recovery management portfolio, the key performance indicators used included the measurement of the return on investment (ROI). This measurement

was an expense which occurred during the recovery process and the benefits received from the expenses.

"Return on investment or ROI measures the financial benefits or returns gained from the investment in disaster recovery operations or procedures" (Junior finance leader).

However, again there was some confusion as to the usage of key performance indicators as can be seen with the comments from the lead of the IT team. The confusion was around the area of legislation, as the team was responsible for ensuring that the business was prepared and protected from cyber-attacks, with a key performance indicator being identified as to creating an intention as opposed to measuring the performance or outcome:

"While we need to measure our compliance with regulatory requirements and commitments, our KPIs are based on achieving regulatory requirements which need to be followed to ensure that the current regulations are met, such as data protection laws and industry-specific requirements, therefore we need to have clear KPIs to reflect our level of compliance and then our targets need to be set" (Senior IT leader).

Another important qualitative key performance indicator was the level of satisfaction of stakeholders or the local community, but was based on qualitative feedback from surveys generated after the recovery of a particular service or process.

"Stakeholder satisfaction assesses the level of satisfaction amongst those stakeholders affected by the disaster and the subsequent recovery efforts. We gather feedback from stakeholders, including residents, businesses, and other agencies, to gauge their perception of our response and recovery operations" (Senior operations leader).

Other key performance indicators included qualitative information on performance of team members after attending a dedicated disaster recovery training or coaching session, by checking the trainees understanding of their duties which must be performed at the time of a disaster.

"Employee training and awareness measurements or KPIs are needed to assess the level of knowledge and preparedness among the employees regarding their roles and responsibilities during a disaster. We are constantly monitoring this through checking attendance and conducting simulations" (Junior IT leader).

Specifically related to the IT team was the need for the key performance indicators to assess any variances in the disaster recovery plan and the actual planned outcome, which was identified above by the junior IT lead, but then expanded on by the senior IT leader.

"Testing and exercise results assess the outcomes of the tests and exercises to identify gaps, weaknesses, and areas for improvement in the DR plans and processes" (Senior IT leader).

But again, the key performance indicators terminology usage was a little misunderstood, as seen with the comments of the junior IT lead below, who saw the role of key performance indicators as a mechanism for the preparation of documentation devised to set out the protocols which govern the actions of the team when using IT systems within the organization:

"We have established the focus on ensuring that documentation completeness and accuracy is met, is accessible, and aligned with the organization's current IT environment" (Junior IT leader).

This potential misunderstanding of the concept of a KPI, was also shared in the operational team, as to the need to assess and report on the proper usage of the resources available for disaster recovery, but also acknowledged that a metric was needed.

"In the area of resource utilization, we are focused on the usage of resources during the recovery process by identifying inefficiencies or bottlenecks and optimizing resource allocation to maximize operational efficiency, but this is hard often to identify" (Senior operations leader).

To emerge from the mapping out exercise as set out in Table 4.2 were the importance associated with training and developing of the team, which was assessed by reviewing the number of those being trained and the quality of the provision. While the interviews revealed the usage of

training records to assess those successfully trained, as for the quality of the provision, although important, the key performance indicator of assessment was unclear, as can be seen with the comment of the senior operational leader:

"One way to improve the quality of training and development is to ensure that all training programs are aligned with the needs of the organization. This means that the training should be relevant to the employees' roles and responsibilities, and it should be designed to help them develop the skills and knowledge they need to be successful. Additionally, Dubai Civil Defense should use a variety of training methods, such as lectures, simulations, and hands-on exercises, to ensure that all learners are engaged and able to learn effectively" (Senior Operations leader).

This perspective of the senior leader in the operational team recognized the importance of the quality of the training and skill development, but did not provide the means to measure or assess the outcome. This misalignment of the key performance indicators was also missing from the IT team, who focused more on the critical success factors of providing specialized, personalized and customized training and skill development programmes, as opposed to the measurement of the effectiveness or performance of the training provision:

"Information technology can be used to improve the quality of training and development by providing learners with access to real-time feedback and assessment. This will help learners to identify their strengths and weaknesses and to track their progress over time. Additionally, Dubai Civil Defense can use technology to develop simulations that allow learners to practice their skills in a safe environment" (Senior IT leader).

This misunderstanding of the usage of key performance indicators was also present in meeting the critical success factors of cooperation and coordinating activities with external agencies and partners. This was captured by the comments of the senior operational leads, who presented the essence of the critical success factors, but did not provide the means to measure the outcome:

"Dubai Civil Defense can improve its cooperation and coordination with other agencies by developing and maintaining formal and informal partnerships. This can

help to ensure that all agencies are aware of each other's capabilities and that they are working together effectively to achieve common goals. Additionally, Dubai Civil Defense can participate in joint training exercises with other agencies to improve communication and coordination skills" (Senior Operations leader).

From a financial perspective, to measure the effectiveness of cooperation and collaboration with external parties, the criteria used to assess the outcome was aligned to a performance measurement, but was tentative, as to the effectiveness of the indicator's usage:

"The level of integration can also be measured by the amount of money saved through shared resources and cooperative purchasing agreements" (Senior Finance leader).

This tentative means to assess cooperation and collaboration of external parties' activities, was similarly shared by the IT department:

"The degree of synergy can also be measured by the speed, relevance and effectiveness of shared databases and information systems between the various agencies" (Senior IT leader).

Again, there was no example provided as to how this measurement on performance or outcome could be assessed. Finally, the findings revealed that a key performance indicator was associated with the protection of the community, as to reducing the time needed to restore or recover services and amenities back to a pre-defined timescale, which for the senior operational leader was seen as the need to restore in a timely manner:

"This KPI [recovery time] measures how quick the Dubai Civil Defense is able to recover from fires, accidents, and other emergencies. A high score for this KPI indicates that Dubai Civil Defense is effective in restoring essential services and infrastructure after an emergency" (Senior Operations leader).

From a financial perspective, the recovery time was also aligned to limiting financial losses from occurring because of a disaster, as seen with the comments from the finance lead:

"A high score for this KPI can lead to cost savings for Dubai Civil Defense. By helping the community to recover quickly from emergencies, Dubai Civil Defense can reduce the need for long-term government assistance. Additionally, a high score for this KPI can help to attract businesses and residents to Dubai, which can boost the local economy" (Senior Finance leader).

Finally, in relation to the connection of assessing the outcome of the critical success factors associated with protecting the community, the ultimate measure of success was seen as the level of satisfaction of those that the entity served, the community in Dubai. To assess the level of stakeholder or citizen's satisfaction, of course needed to be well-defined as a performance indicator, which was clearly demonstrated by the viewpoint of the operational lead:

"This KPI measures how satisfied the community as to the recovery services of Dubai Civil Defense. A high score would indicate that Dubai Civil Defense is meeting the needs of the community and providing high-quality of service. We measure to assess how good our performance we conduct regular surveys of the community to assess satisfaction with services. But we also need to respond to feedback from the community and making changes to improve services, which does happen, but needs coordination and the current setup of using BCP does not really capture this" (Senior Operations leader).

In reviewing the comments of the senior operational lead, about acting on stakeholder or community feedback, there was an indication the usage of the disaster recovery model was missing the mechanism to proactively respond to feedback and possibly even ensuring that the recovery plan is a live document.

4.10 The emergence of new civil defence key performance indicators and critical success factors

As noted above and to emerge from the literature review was the recognition that critical success factors and key performance indicators often needed to be tailored to the event, organization or recovery process. In this study to emerge was the importance around having certain key performance indicators, which included determining of response time for

communicating and coordinating activities. All three departments recognized that communication, as seen above with the comments of the senior operation lead, who also noted the importance of gaining vital feedback including around community satisfaction, but then added:

> "…we are also assessing the performance of our communication activities as to how efficient we are to sending out our comms and updates, but also as to how we are coordinating our different recovery protocols" (Senior Operations leader).

In further explaining this emphasis on assessing the performance of effective communication and coordinated activities, the junior operation lead noted the importance that communication strategies in the planning documentation needed to consider the message content, the type of medium being used but also the timescale for the communication to occur, which was dependent and influenced on the severity of the disaster or event:

> "… in our plans, the speed of the communication strategy is measured as to the time of response, but it is dependent on the event, and ability or means to communicate, but is dependent on what is occurring at the time" (Junior Operations lead).

Interestingly, the departments also identified the necessity of critical success factors which were focused on the financial stability of the department and organization, together with having accurate budget allocation for the various recovery processes or protocols. The financial team saw this as being essential, but was also an important consideration for the operational team:

> "There is the importance of setting out critical success factors which are financially orientated, and this does include the criteria of ensuring there is a financial stability in the organization, so that we can meet the financial requirements post disaster so successfully recovering from the event" (Junior financial lead).

From an operational departmental perspective, the financial critical success factor was more related to the recognition of needing financial stability, to meet its obligations to recover the services and amenities from the disaster:

"As we are responsible for the operational side of the organization, whatever we decide to do, needs to be aligned to the overall organizational plan and this of course means that the process includes good budgetary and financial responsibility. Therefore, we need to have critical success factors which sets out and stipulates our commitment to financial stability, while adhering to any budgetary constraints" (Senior Operations leader)

The final emerging critical success factor was related to the need for public awareness and community education preparedness. This included the need for activities to assess performance through having key performance indicators devised to determine the effectiveness of public education campaigns. This again was captured by the operational team:

"We are critically aware for the need for public awareness and educational initiatives to be set out and defined. To address this, we have a critical success factor which is specifically focused on this activity. As to assessing the performance of meeting this critical success factor, we have also established the metric to measure the effectiveness of public education campaigns as to our preparedness in the community" (Senior Operations leader).

4.11 Generalized perspectives on operational leadership and disaster recovery planning

The interviews then focused on the generalized perspectives related to leadership and disaster recovery processes. The leaders from the three teams shared similar opinions regarding disaster recovery planning, which is indicated in Table 4.3 below which shows common and shared traits. For disaster recovery planning the common attributes were the need to assess risks, being able to create disaster recovery plans, creating a culture of preparedness and resilience within the organization, enabling collaboration, and to be an effective communicator. Other attributes included being focused on strategic and long-term aspects while seeking direction from internal and external entities and individuals as to disaster recovery strategies.

Attributes	Financial leadership	IT leadership	Operations leadership
Importance of Risk Assessment	✓	✓	✓

Disaster Recovery Plan – central document	✓	✓	✓
Culture of preparedness and resilience among employees	✓	✓	✓
Collaboration and communication	✓	✓	✓
Being strategic	✓	✓	
Adaptability	✓		✓
Seeking direction			✓

Table 4.3: General perspectives on operational leadership and disaster recovery planning for attributes (Author's own work)

(✓ indicates the existence of the identified attribute)

The finance leader recognised the need for successful planning of disaster recovery processes.

"Operational leadership is the driving force behind disaster recovery planning, encompassing the skills, strategies, and actions necessary to navigate and coordinate the recovery process. It involves the ability to lead and collaborate with diverse teams, stakeholders, and departments to develop a comprehensive and well-executed recovery plan. Leadership also has the crucial role to play in integrating every aspect of the recovery plan" (Senior finance leader).

For the senior IT leader, he provided an input that the IT leadership needed to keep looking for new technologies or new ways of conducting associated activities. Since technology evolves on a regular basis, the IT leaders have the additional responsibility to scan for cyber threats that can potentially harm the business operations periodically.

"Effective operational leadership involves anticipating potential risks and vulnerabilities. They actively seek opportunities to enhance the plan's effectiveness by keeping abreast of emerging technologies, industry trends, and regulatory changes that may impact the organization's disaster recovery strategies such as exploring cloud-based solutions, implementing systems, and integrating automation and monitoring tools" (Senior IT leader).

The operational leader saw the traits as being more of coordination of activities:

"Operational leadership includes the capacity to direct and coordinate teams, make crucial choices, and efficiently allocate resources in emergency situations. Traits of operational leaders in disaster recovery planning required are flexibility and adaptability, adjust plans and strategies in response to changing circumstances, evolving risks, or new information, critical thinking, make quick decisions, and mobilize resources" (Senior operations leader).

4.12 Group Discussions Findings

The three group discussions were conducted after the individual interviews were completed and then analysed to verify and triangulate the findings, as outlined earlier in section 3.7.2. The group discussion method involved participants who were senior management positions directly related to DCD and had professional experience related to disaster recovery. The purpose of these group discussions was to understand the planning process, the strategies adopted and how the plans were designed to be implemented to determine the potential effectiveness of the disaster recovery planning process. Each group was made up of four to six qualified individuals focused on discussing the topic, which was facilitated by a moderator, with each session audio recorded. The participants were asked the same open questions based on the conceptual model in Chapter Five, then encouraged to recall their experiences to address the study's three research questions.

4.12.1 Theme One: The components and activities essential for an effective disaster recovery plan.

From the findings which was based on Research Question One, the three groups were asked whether they agreed and saw leadership commitment and support as being vital when planning and instigating a disaster recovery plan, but to be effective, the initial findings indicated that there was an acknowledgement for the need to have more holistic involvement within the entire organisation through the establishment of disaster recovery committees. There was an agreement amongst all the groups irrespective of their role in the organization as to the importance of leadership commitment, as seen from the focus discussion, a senior leader in the first discussion group:

"As a senior leader, I know the importance of the commitment of leadership to provide support and the resources needed to achieve the individual departmental

and organisational disaster recovery activities. Without leadership support the plans and strategies, no matter how extensive, will not work" (FGD1SrLB).

This view of FGD1SrLB was supported by both a senior leader in the third group along with a junior colleague.

"Without the commitment of the leadership the disaster recovery plans and protocols we have put in place will not work. Resources such as funding, colleague availability and allocation, the ability to respond rapidly can only be achieve with our leadership commitment to our DR plans" (FGD1JrLB).

This perspective of the junior leader above, was supported from a senior management stance:

"As a senior leader our role is to ensure that these plans are fully supported. This support includes providing funds through to ensuring that any obstacles are removed in the event of a disaster, but also enabling the disaster recovery protocols to be rehearsed, while ensuring that DR is at the forefront of all our leadership activities" (FGD1SrLC).

The consensus and perspectives presented above indicated that there was the recognition for the need for leadership commitment, however when the focus changed to the theme of needing to have a more holistic approach to disaster recovery, this created more debate but also a synergy of ideas. These differences were most pronounced with those departments which had unique responsibilities, as seen with FGD1JrLA:

"We are a unique department which is different from most of my colleagues here. We have our targets and strategies which is aligned to ensuring that the Dubai Civil Defence services are recovered, but there are some distinct differences which need to be carefully considered and planned for" (FGD1JrLA).

But when asked whether this departmental uniqueness could be aligned to a more holistic approach, FGD1JrLA indicated that an overarching strategy could be adopted:

"Yes, I can see that although we all have different activities to be performed, ultimately, we are all focused on the Dubai Civil Defence to recover our services, and not only one department's recovery. An overarching or holistic approach could be beneficial and also learn from each other" (FGD1JrLA).

This perspective of FGD1JrLA above was shared also by FGD1SrLC, who had a similar departmental recovery protocol, but noted that the strategies developed may need to be tailored or modified to meet the specific requirements of the unit.

"I think a shared or a united disaster recovery strategy would be beneficial, but one size does not fit all. Therefore, there is a need for a holistic approach but also to be sufficiently flexible and adaptable" (FGD1SrLC).

Overall, from the three groups there was an acknowledgement that a holistic approach would be beneficial but while some departments had similar protocols, other units had recognised unique characteristics. To achieve this proposed uniformity or consistency, the group saw the need for a more overarching strategy, as seen with the comments of FGD3JrLD.

"I think our disaster recovery plans which are in place are effective, but there needs to be some form of mechanism that consolidates these plans together" (FGD3JrLD).

4.12.2 Theme Two: The usage of operational plans with the adoption of CSFs and KPIs when responding to unforeseen disasters

The next theme was based on the conceptual model and Research Question Two as presented in Chapter Five focused on the potential adoption and usage of CSFs and KPIs. The findings and the model did indicate that some of the existing CSFs and KPIs may not be fully understood or not used as effectively as originally designed. The three groups were presented with the extensive list of CSFs and KPIs which were identified during the first phase of the project, then the group was prompted as to their overall perspective of these indicators and factors, before focusing on whether a more unified approach would be beneficial, and if financial and budgetary CSFs and KPIs needed to be embedded throughout the organization.

Similar to the comments in the previous theme, there was an acknowledgement for departmental CSFs and KPIs, but also the need for more generic overarching ones:

"We need to have like our plans, critical success factors and indicators of our performance to be reflective of our needs and not simply one set fits all approach. But as we are looking through these different indicators and success factors, it is confusing as to their relevance and how they are used. I really do not understand. …May be a solution, would be to have core critical success factors and key performance indicators, but then I would like to see elements like the financial measurements being adopted and used the same way throughout the Dubai Civil Defence" (FGD3JrF).

This perspective of FGD3JrF was independently supported by the other two groups:

"We are a large organisation, but I can see that there may be too many CSFs and KPIs, as you call them. May be a more unified approach or set can be agreed upon and then applied at departmental and then at an organisational level" (FGD1JrC)

The concept of a unified or holistic approach was acknowledged by FGD2SrLD also:

"This list is comprehensive [laughter] but also how can senior leadership take a helicopter view of what is happening in terms of recovering the Dubai Civil Defence services? Having said this, we need to ensure that at an organisational level the plans are aligned to the department, and we are accurately assessing the progress, which are then linked to the strategic goals of the Dubai Civil Defence" (FGD2SrLD).

In developing the theme of finance and then need for further CSFs and KPIs beyond the finance team, the group discussion then specifically focused on finance. Partly based on addressing Research Question One, as indicated above, there was a consensus that financial stability and allocating budgeting funds needed to be embedded into all departments.

"It is interesting that we have all these different indicators and success factors, but missing is the budgetary and funding measurements. This needs to be in all

departments but may be tailored to the needs of the department, but a group of generic critical success factors or key performance indicators would be ideal" (FGD2SrLB).

This was supported by both FGD2SrLE and FGD2SrLA, who indicated the need for finance to be monitored, assessed and controlled by all departments:

"This activity is interesting as I never realised that the finance team were almost solely responsible for financial stability and budgetary allocation, and we definitely need this to be devolved to all departments, and therefore we need to have some form of generic CSFs and KPIs (FGD2SrLE).

In agreeing, FGD2SrLA stated that financial CSFs and KPIs was vital:

"We need to ensure that all our critical success factors and key performance indicators are relevant, may be less than we currently have, and of course there is a need for fundamental indicators and measures in place, which must include departmental financial and budgetary responsibility" (FGD2SrLA).

The discussion then asked the question as to who was involved in the disaster recovery process, including the planning and then setting of the CSFs and KPIs. This question was design to determine whether the findings in the first stage of the project, which indicated that this was the responsibility of a small group of leaders was accurate and if so, was the approach effective. The groups all concurred that at a departmental level the planning and then the devising of the CSFs and KPIs were created, developed and analysed by a small group of leaders.

"Yes, this is our department's strategy. As a leadership team we know what is required at a departmental and strategic level, therefore we are responsible for this activity. Whether this is the best solution in working in *isolation*, we do seek external colleagues' advice but have not considered forming committees as your research has recommended" (FGD1SrLA).

In exploring FGD1SrLC perspective of forming committees, the senior leader added:

"I am not against committees, and I can see the benefits, however ultimately we are as the departmental leaderships responsible for DR planning, but the Dubai Civil Defence recovery needs to be our joint goal" (FGD1SrLC).

This acknowledgement of the usage of the committee to generate a more holistic perspective was confirmed by other members of these three groups, as seen with FGD1JrLB:

"I can see the benefits of forming a committee, seeking their more operational viewpoint and expertise, then this can inform the ultimate DR plan."

This was shared by FGD1JrLA, also saw the potential benefits:

"…clearly, the usage of the committee will generate new insights and opinions which will provide us with a more comprehensive departmental plan. This strategy of creating committees will also mean that we can gain a departmental buy in from all our colleagues" (FGD1JrLA).

However, there was also some voices of caution, as to how a committee may change the strategic focus of the disaster recovery planning process.

"I think the concept of using a committee will provide us with new insights from a more operational viewpoint, but we need to ultimately ensure that the disaster recovery planning process is linked to the overall strategic objectives of the UAE Dubia Civil Defence" (FGD1JrLC).

Again, like the first theme as to planning, KPIs and CSFs, the three group discussions indicated the need for a hybrid departmental driven solution but also a united or generic overarching framework. This overarching framework was the next theme discussed in the context of presenting the Balanced Scorecard.

4.12.3 Theme Three: The usage of the Balanced Scorecard is a suitability framework of an operational disaster recovery planning approach by using CSFs and KPIs.

The final focus of the group discussion was focused on presenting the Balanced Scorecard to provide an operational and strategic tool where the CSFs and KPIs are integrated into, whereby

providing a potential holistic representation framework for the entire Dubai Civil Defence. The group discussion then focused on whether the Balanced Scorecard can provide strategic and operational insights, whereby enabling managerial and stakeholder measurements to be created and used. Finally, whether the usage of the Balanced Scorecard can achieve the involvement throughout the entire organisation as proposed by the originators.

Once the Balanced Scorecard had been introduced and an overview of the concept had been presented as to the four dimensions: financial, customer, internal processes, and finally learning and growth, the discussion began. Linked to the presentation of the Balanced Scorecard was how this concept can be used at an operational and strategic level which included incorporating the CSFs and KPIs. The group discussion firstly revealed that there was limited awareness of the framework but also recognised how the Balanced Scorecard could provide this generic or holistic concept, as indicated in the two previous themes. For FGD3JrLF, the Balanced Scorecard was interesting, and he saw the benefits:

> "This Balanced Scorecard does seem to provide a framework of sorts to consolidate all the Dubai Civil Defence disaster recovery plans. It is interesting that this framework does seem to link operational and strategic activities and does cover most of the DCD DR activities" (FGD3JrLF).

This recognition as to the relevance of the Balanced Scorecard was shared by FGD3JrLE, who saw the value of the concept, including the financial focus:

> "… as model, yes, I think the Balanced Scorecard does provide an overarching framework. I can see how we here at DCD can use the four dimensions, as you call them, but some might be more relevant than others. I do like the financial aspect and can see the connection to the CSFs and KPIs being used to each if not all those four squares" (FGD3JrLE).

This viewpoint was independently supported by FGD3JrLC, who focused on the shareholders and internal processes:

> "There are two parts, I really liked, the internal processes and stakeholders or shareholders. The internal processes have a direct close connection to us, as we are focused on the internal processes in our recovery plan. As to shareholders,

130

Dubai is ultimately our shareholder, so again I can see the connection" (FGD3JrLC).

For others in the group discussion, the financial aspect and having a focus of the mission of the Dubai Civil Defence was always prevalent when constructing both operational and strategic plans:

"The financial aspect of the model makes sure that all departments and plans have considered the financial and budgetary implications of their various disaster recovery strategies. Then if we provide more generic financial critical success factors and key performance indicators, this will ensure that we are providing value for money for Dubai" (FGD3JrLA).

The focus of the mission of the DCD was important for FGD3JrLD:

"The fact that the Balanced Scorecard has the mission of the entire organization as the main focus, as often we plan based on our departmental needs and may neglect the overall mission or purpose of disaster recovery for Dubai" (FGD3JrLD).

This last comment of FGD3JrLD lead the group discussion to focus on how the Balanced Scorecard could be effectively implemented, bearing in mind the originators, Kaplan and Norton (1992) advocated an entire organizational approach. The outcome of the group discussion mirrored the usage of committees, as to whether a committee or entire organizational involvement would be effective, but there was an acknowledgement that there were associated benefits:

"We are back to the discussion about key performance indicators and success factors, and the debate about greater organizational involvement. There are clear benefits, but we also need to ensure that we ultimately provide a robust disaster recovery solution for Dubai and not a departmental operational remedy which excludes the strategic aspect, or only having a strategic focus and making the plan not operationally viable" (FGD3JrLD).

131

This perspective of FGD3JrLD was also shared by FGD3JrLF, who saw both the benefits and potential limitations:

> "We definitely need to move away from solo DR planning process and only for the plans to be developed and instigated by the leadership team. However, I would like to add that involving the entire organization may not be totally feasible as we have over 15,000 employees, but I understand the reason and motivation" (FGD3JrLF).

This possible skepticism about the entire organization involvement did produce however some other ideas, including the use of smaller committees representing the Dubai Civil Defence, as seen with FGD1SrLB:

> "…you could use the idea of committees which are made up of a composition of all departments and levels, but then divided into small discussion groups like this format" (FGD1SrLB).

4.13 Comparison of Senior and Junior leaders' views on Disaster Recovery Planning

Based on the senior and junior leaders' views, the following tables below presents a summary comparison in Table 4.5 as to key similarities and in Table 4.6 the key differences associated with the DR planning process.

Comparison of key similarities between the senior and junior leaders' views on DR planning	
Risk Assessment	Proper and regular frequency of risk assessment is completed by both internal personnel and external agencies.
Risk Mitigation	Steps for risk mitigation takes long time to achieve.
Resource allocation	Availability of finance exists to procure required resources timely.
Collaboration	Several government and semi-government associated agencies are contracted for providing specific services.
Communication	There is strong communication within DCD, but external communication seems lacking.
Coordination	Internal coordination is essential
Training	Internal personnel's training and retraining are conducted in schedule with upskilling.
Drills	Frequent drills are successfully conducted.
Data / Information	Required data / information is available to concerned individuals and groups. However, there is need for more for which there is continuous updating.
Community engagement	Community engagement is only on need basis, with community representative panels appointed and occasionally conducted meetings between DCD, agencies and community panels.
Planning process	The planning is done by a dedicated team under directions of the functional and operational leaders. The DR plan is developed based on the inputs provided by internal and external sources and close coordination between IT, finance and operations.

Table 4.4: Key similarities in senior and junior leaders' views on DR planning

Comparison of key differences between the senior and junior leaders' views on DR planning		
	Senior leaders' views	**Junior leaders' views**
Risk Assessment	Risk assessments are being well done.	Felt that there are gaps between the internal assessment reports and external agency's assessment reports.
Risk Mitigation	Risk mitigation is mostly done.	Often the actions taken to mitigate are delayed and long drawn.
Resource allocation	Nearly of the resource requirements are fulfilled.	In many situations there is mismatch between what is required and what is allotted and allocated. Either in excess or in short while sometimes delayed beyond time limits.
Collaboration	Long term collaborations exist and are functioning very well.	Sometimes there are differences of opinion and decision between external agencies who feel they have specialized expertise resulting in postponements or compromises.
Communication	Communication flows are smooth.	There have been situations when communication is done only when required rather than having continuous and open channels. Total communication internally is in Arabic but with external agencies its mostly English that could be resulting in some loss of translation.
Coordination	Sometimes there is lack of coordination, but gets resolved promptly.	Depending on individuals, groups, departments, there are some coordination that are good while in some cases difficult and challenging.
Training	As per HR's plan the training programmes are well implemented.	Training programmes are good, but the follow-up on implementing the training in practice and its evaluation is rarely done.
Drills	Mock drills and simulations are done as procedures.	Sometimes they lack the seriousness and tend to get postponed and often rescheduled.
Data / Information	Adequate for decision making.	Sometimes critical data is either not available or not accessible due to protocol strictness.

Community engagement	Essential engagement is done on a regular basis, but if and when required can be stepped up.	There is need to have more frequent interaction with the community to understand and assess their needs for including in the DR plan.
Planning process	Follow a flexible approach to adapt and adopt changing inputs and desired outcomes.	There is need for more systematic planning with persons concerned to interact with the DR planning team so that their views and suggestions are considered in the planning exercise.

Table 4.5: Key differences in senior and junior leaders' views on DR planning

From the above tables, there is an indication that there is a need to streamline the overall DR process to be more effective when implementing the planning process, and also for continuous improvement to be embedded into the entire process.

4.14 Chapter Conclusion

The integration of the individual interview dataset with those of the group discussions has enabled the triangulation of the findings. The analysis of these data sets has been done in an unbiased manner of the qualitative data which was collected from the interviews conducted at Dubai Civil Defense. The findings have been represented in the form of themes and interpretations that emerged from the data analysis. The themes that have emerged from the extracts of the interview transcripts and texts were presented in this Chapter. The themes are connected to the research questions and the aims. Each question was analyzed from the answers of the interviewees which highlighted their experiences and opinions brought out the relevant themes.

The data analysis has emphasized the importance of having an effective disaster recovery plan (DRP). The DRP forms the foundation document which the employees must refer to during the time of disaster event. The main objectives of the DRP are to have a reduced time to restart the operations. The organization has set the target of resuming activities within one hour. The functions within the organization have ensured that their data is duplicated so that there is little chance of data loss.

It has also been revealed that the structure of the DRP is mostly common; however, due to the individual functions' responsibility and autonomy, the individual departments have the flexibility to create their own DRP. The DRP formation has also accentuated that there is flexibility involved at all stages. Flexibility also puts the responsibility on the leaders to ensure

that the DRP is effective for the future. To develop a robust DRP, the leaders have made use of varied leadership styles to motivate the employees to work on building a strong DRP. This shows that leaders have a great influence over the employees. This influence has led to employees showing respect to the leaders and following their instructions. The employees are also obedient and mindful about following the national laws and regulations as it is about the safety of the people and property.

The data analysis also brought out that the employees, both leaders and the employees, are aware of their responsibility with respect to the preparation of DRP and the execution. The leaders, of course, have greater responsibility and the leaders also take ownership of their duties while creating DRP. From the conduct of the leaders, the junior employees have also been instilled with the similar sense of responsibility. The responsibility does not only restrict the making of the DRP and its successful implementation, but also extends to the safety of employees and the public at large. This attitude of responsibility shows that the leaders have created the culture of responsibility and authority which has acted as stimulus for the employees to take responsibility while at the time of preparing the DRP and at the implementation stage.

Chapter Five
Discussion

5.1 Chapter Introduction

This chapter is focused on the discussion of the findings generated in relation to the current debate as presented in the literature review. The central focus of the chapter is to address the aim of the study as to critically investigating the experiences of operational leadership in the Dubai Civil Defence (DCD) as to the critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plans to respond to unforeseen adverse events and disasters, by drawing on their operational artefacts.

As presented in the literature review and then in the finding's chapter, the following research objectives were created and addressed to achieve the aim of the study:

1) To critically examine the current DCD disaster recovery plan, main critical success factors (CSFs) and key performance indicators (KPIs) which are used in the event of an unforeseen disaster.

2) To critically analyse the operational planning of the DCD and execution stages using main critical success factors (CSFs) and key performance indicators (KPIs) when responding to the unforeseen events that are disastrous.

3) To critically evaluate by comparing the current DCD's operational disaster recovery plans and associated business artefacts with other approaches, to provide a theoretical model as to the critical success factors (CSFs) and key performance indicators (KPIs) which the Dubai Civil Defence could consider when improving the current disaster recovery plans in the event of future disasters.

This chapter will critically review the current debate which has been drawn from a range of academic sources which have focused on the key attributes of operational disaster recovery planning, but as previously noted has mainly been conducted in the field or disciplines of information technology and project management rather than from a governmental organisation, like with the Dubai Civil Defence. The chapter will commence with the perceived roles and responsibilities as seen by the disaster leadership team, before setting out the debate as to the core components needed during the planning process. The final part of the chapter is focused on how the critical success factors and key performance indicators used in disaster recovery management have been used in the Dubai Civil Defence compared to existing theory.

5.2 The fundamental attributes associated with the disaster recovery and planning process

The disaster recovery planning process is centred on ensuring that the essential business functions and operations, which have been pre-determined and agreed too are restored to an agreed timescale (Hoong & Marthandan, 2014; Vuong, 2015). To restore these services there are several important attributes, resources, and personnel which need to be considered and then actioned, together with procedures and instructions which need to be embedded throughout the organisation. To achieve this, there is a need to have the commitment of the senior management and leadership teams, an important facet which will be presented below.

5.2.1 The role and commitment of senior management and leadership

To effectively enable the restoration of services and activities, there is clearly a need for senior management and leadership commitment and support (Järveläinen, 2016; Wong et al., 1994). Earlier Haji (2016) and Chow (2000) emphasised that since the disaster recovery planning process is concerned with the entire organisation, it is essential to align the strategies with the scope, the objectives, mission, and vision of the organisation, but needs initially senior leadership support. In elaborating on this need for senior leadership commitment, Costello (2012) identified the importance of aligning the disaster recovery processes with the strategic direction of the organisation and those of senior management. But challenging this dominant role of the leadership team, which will be explored later in this chapter, was the contention for the need to have established a disaster recovery planning committee, made up of employees whose sole purpose is to coordinate the functional activities in the organisation from a recovery perspective (Rostami, Karlsson & Kolkowska; 2020; Cook, 2015; Blokdijk, 2008; Blokdijk & Menken, 2008; Chow, 2000), but still aligned to the senior management and organisational priorities.

This alignment and level of engagement and support by senior management however needs to include the departmental and also organisational objectives, a theme which will be investigated further in the next section. But an important aspect of disaster recovery was the level of commitment given by the organization's leadership and management team. The theme of organisational management can be seen as an overarching activity from which other activities and strategies are grouped together. Generated from the findings of this study, was the recognition that the role and responsibilities of senior leadership and management were vitally

important to the extent that this group took total charge of the devising, creating then potentially implementing the processes and procedures. While taking total responsibility, the leadership team did identify the need to work collaboratively and coordinate with other teams and departments so ensuring that the strategies and plans were up to date and effective. There was also the recognition that the plans and strategies needed to be disseminated throughout the organisation, so that new knowledge or requirements could be shared, therefore required effective communication channels to be established and maintained. In the second phases, the group discussion, all three groups recognised the importance and need for leadership support particularly as to the resourcing the recovery protocols. This perspective was supported by Tun, Gehbauer, Senitz and Mueller (2007) who argued that the recovery process to be effective, needs to have senior management and leadership commitment which included establishing clear communication channels and protocols.

From a theoretical and then empirical viewpoint, the disaster management recovery planning process from an organisational perspective, needed the leadership and management to be proactively responsible for the allocation of resources, and provision of suitable time to prepare and rehearse, which involved the entire organisation (Nasiren, Abdullah & Asmoni, 2016; Bakar et al., 2019). From the findings of this study, the strategy adopted to disaster recovery planning, was mainly centred on essential departmental disaster recovery needs, although there was some evidence of entire organisational scenario activities. This departmental focus was illustrated by the perceptions shared by the financial team who highlighted their responsibility of needing to implement various recovery processes in advance, to mitigate financial fraud and provide robust reporting strategies in relation to the use of public funds. In achieving this, which will be explored later in this chapter, was the importance of creating and establishing baseline strategies. For the IT services department, and like the finance team, there were individualised recovery plans devised and created specifically from a departmental perspective. Interestingly, while the IT leadership team noted the importance of individualised recovery plans, there was also the recognition for collaborative activities between departments, through conducting disaster recovery planning scenarios, but the actual coordination was a little unclear as to how effective this was, which potentially indicated the need for a more holistic recovery process through adopting a framework in which all departments would follow. When the outcome of the study was presented to three groups of experts, there was a consensus that although recognising the need for having strategies and plans designed specifically for

departmental needs, there was a necessity for an overarching methodology or framework to be adopted in the DCD.

5.3 The main attributes of the disaster recovery planning

As indicated above, fundamental to the recovery process was the need to have senior leadership commitment, but also to have a departmental and organisational focus, including the importance of establishing then maintaining effective communication channels and collaborative partnerships. In developing the plans from an organisational viewpoint, the recovery process needs to have the identification and clarification of those critical resources needed, while also understanding the various capabilities within the organisation. These critical resources were often drawn from and informed by departmental needs, as can be seen above, but in this study only from the Dubai Civil defence leadership perspective.

To emerge from the findings was the absence of having established recovery planning committees, which for Rostami, Karlsson and Kolkowska (2020), Cook (2015), Blokdijk (2008), Blokdijk and Menken (2008), and Chow (2000) was important. In this study, all the departmental leadership and management teams assumed the roles and responsibility for being the planner and then instigators of the recovery strategies. Partly justifying the potential absence of a disaster recovery committee was related to the composition of the leadership team which was made up of those in senior and junior management positions, therefore providing a potential strategic and operational focus. This recognised need for the potential usage of a committee or expanding the disaster recovery process was also acknowledged as a potential benefit, when the outcomes of the study was presented to the expert group interviews. However, there was also an expressed caution of needing to ensure that the committee focused on both departmental and strategic outcomes. However, for writers including Rostami, Karlsson and Kolkowska (2020), Cook (2015), Blokdijk (2008), Blokdijk and Menken (2008) and Chow (2000), there was a consensus as to the importance of establishing a disaster recovery planning committee, who are responsible for coordinating the recovery functional activities within the organisation. In explaining the functions or responsibilities of the committee, writers such as Cook (2015) and Hawkins and Maurer (2010), noted that the role included the responsibility for performing risk assessments and analysis to identify core functional areas which could be affected or be potentially damaged in the event of a disaster. While Karim (2011) recognised the importance of leadership and management in the disaster recovery

planning process, also recognised from a theoretical and empirical viewpoint that there was a need to conduct a business risk analysis which needed more localised or operational expertise, therefore needed the involvement and participation of all employees in the organisation. For Chow and Ha (2009), then later by Cook (2015) and Haji (2016) there was the acknowledgement of the importance associated with conducting an extensive risk analysis, which could only be achieved through the establishment of disaster recovery committees and having direct operational staff involvement in the entire process. This involvement and participation included the representation from all departments and included key staff members as committee members therefore all functional areas throughout the organisation are included. As noted by Cook (2015), the committee therefore focused on the essential services and amenities by drawing on those who were the most familiar with the functional aspects of the organisation, as opposed to only the leadership team who take a more strategic approach (Haji, 2016; Asgary et al., 2012; Chow & Ha, 2009; Sahebjamnia, Torabi, & Mansouri, 2015).

Irrespective of whether the disaster recovery planning process is driven by a committee or the leadership team, part of the process involves undertaking a risk assessment to ensure that the plans are up-to-date whereby making the protocol a living document. To ensure that the documentation is current, there is the need for constant conducting of risk assessments and business impact analysis scenarios to assist the organisation in determining any possible disasters which might affect critical business functions. To ensure that the recovery planning process is conducted successfully, the senior leadership team or the committee, needs to perform an-depth risk assessment and business impact analysis throughout the organisation's functional areas (Haji, 2016; Cook, 2015; Blokdijk, 2008; Wold, 2006; Yang, Yuan, & Huang, 2015), so that essential activities can be identified, maintained and restored in the event of a disaster. This may include assessing which parts of the organisation are seen as being business critical, and this process may also involve conducting cost analysis calculations, to determine the impact if the service is restored immediately compared to the cost of needing to restore it in a later predetermined timeframe (Wold, 2006). But to be able to achieve this, this requires those who possess the correct level of knowledge and expertise. Again, in this study, the sole responsibility was taken by those in the senior management team, who justified this approach without the direct involvement of operational team members through a committee as being unnecessary as the junior leadership were seen as being closely engaged with the operational processes and procedures.

Furthermore, on the theme of using a risk assessment, although the usage of a disaster recovery committee was not present, the findings of this study did indicate that the departments did use similar approaches to the assessment methodology. The findings revealed that the risk assessment process involved identifying potential areas of vulnerability and those which could be susceptible to a disaster. This included assessing loss of revenue from a financial perspective together with associated increased expenses to minimise the impact, the potential loss of data which was a focus for the information services team, and potential threats to operational activities in the community, which was related specifically to the operational department in the Dubai Civil Defence. The recovery processes followed by these three independent teams was to ensure that their departmental recovery plans were effectively designed, and that the various resources needed were present and aligned. This included the testing of the processes and procedures at both a department level and in certain cases from an organisational perspective.

Another important aspect of the recovery planning process is the need to align these to the objectives of the departmental or organisational strategies and goals (Järveläinen, 2016; Wong et al., 1994). However, in achieving this, while writers including Haji (2016) and Chow (2000) emphasised the importance of the disaster recovery planning needing to include the entire organisation, it was also recognised as an essential requirement that the plans were aligned to the organisational strategies, scope, the objectives, mission, and vision. In expanding on this theme, Costello (2012) noted the importance of alignment to the strategic direction of the organisation, which must be linked to the critical business operational activities. Interestingly, this theoretical aspect associated with the importance of strategic alignment in the findings was unclear as to the recognition for the need for critical success factors being established, then as to how performance can be assessed through using key performance indicators. The findings revealed that there was a potential mixed usage of these two methodologies, but also the lack of a clear alignment to the overall organisational goals or vision. This theme of potential mis-usage of terminology will be critically presented later in this chapter.

5.3.1 Disaster recovery plans and documentation

As noted above, there was a recognition in this study as to the disaster recovery planning process being seen as a living document, therefore needing to be updated continuously to reflect changes in organisational processes and functions (Haji, 2016; Blokdijk, 2008; Nelson, 2006). This need for constant updating of the plans is increasingly important as often in some

departments such as information technology, there are changes and modifications being made through regular upgrades and patches. The findings in this study indicated that all these changes needed to be accurately captured, but also the importance as to have roles, responsibilities, process accountability, and ownership accurately documented (Hoong & Marthandan, 2011). In this study, the leadership participants recognised the importance of having the resources and data required, and the actions needed to manage and update any critical functions. However, all these documented activities were conducted only by the leadership team and was not devolved to operational employees or a disaster recovery committee, which may have led to certain important aspects being missed.

5.3.2 Training of the disaster recovery team

As previously mentioned, the findings revealed there was the identified need for updating the recovery protocols, but also the need for ongoing rehearsals and training. As noted by Cook (2015), Chow and Ha (2009), when implementing a disaster recovery strategy, there was a need for constant rehearsals to ensure that all staff are aware of their roles and responsibilities when implementing the strategy. Without the training of associated teams and personnel, the effectiveness of the disaster recovery plans could be compromised if any of the teams or individuals are unaware of their roles (Meyer, 2018; Ashrafi & AlKindi, 2022). From the study's findings, training was provided by the three teams and occasionally across the entire organisation with simulated walk-through activities, and included real-life simulations, together with in-house training. The motivation behind this commitment was to ensure that in the event of a disaster, the organisation and the teams could minimise the potential threat to operational activities due to the consequences of the unforeseen event, which can lead to further delays and disruption to stakeholders and the community. This perspective was supported by several studies including Moe, Gehbauer, Senitz and Mueller (2007), Meechang and Watanabe (2022), Chow and On Ha (2009), who independently identified that there was the requirement for a suitable disaster recovery framework which can assist in the planning, training and execution of the disaster recovery and business continuity strategies, along with the mechanism to set and assess the performance following the response to the event. However, for Jarvelainen (2013) as seen in this study also, there was no one specific framework adopted and used for disaster recovery planning, or even the means to assess the effectiveness of the protocols. As a consequence of not having a universal or overarching framework, the effectiveness of the training and rehearsal initiatives potentially were unable to capture the entire organisational

response. Furthermore, the training mechanism was dependent on the different departmental needs and again may not have been integrated into other aspects of the organisation.

5.3.3 Summary of the main attributes of the disaster recovery planning

In summary, there was a consensus as to the role and importance of management and leadership commitment to the overall disaster recovery process. This included the need for ensuring that the leadership team provided clear guidance as to the roles and responsibilities around ownership of the recovery plans, when and how the plans are updated and when training and scenario planning is conducted. However, as noted above, the leadership team although recognising the importance of training, role play and scenario rehearsing, together with constant up-dating and running of risk analysis, the leadership team were the sole owners, creators, and instigators of the protocols. This contradicted the current theoretical perspective that there was a need to have key operational inputs from staff members in the form of a recovery planning committee. Finally, there was an acknowledgement that the plans and protocols needed to be reflective of the department and organisation, but also aligned to some form of overarching framework, which could incorporate the operational and strategic recovery needs of the organisation. This last requirement however was missing in the Dubai Civil Defence.

5.4 Key Performance Indicators

As indicated above, a key finding of this study was related to the usage of key performance indicators or KPIs and critical success factors (CFSs). Key performance indicators are established in the pre-design stage to measure the performance through the usage of physical parameters, which tend to be quantitative. To be effective these quantitative indicators must provide real-time reliable information about performance, which are usually designed and defined by the senior strategic leadership team or at a governmental level. This study found that firstly that the key performance indicators were a combination of quantitative and qualitative measurements, which were seen as suitable for the organisation and the three departments. While this combination of quantitative and qualitative measurements was different to current theoretical understanding, there was an agreement that critical processes needed to be qualified and clearly set out, then fully understood, and agreed too, by the key stakeholders including the community and at a departmental level (Neely et al., 2000; Strecker et al., 2012; Frank et al., 2009; Popova & Sharpanskykh, 2010). In relation to the theme of

stakeholder and community involvement, to emerge from the findings was also the need for performance indicators to include the capture of the effectiveness of public education campaigns when restoring services and amenities. This was a new indicator which has not been identified or mentioned in previous studies related to restoring society's essential services (Bahmani & Zhang, 2021; Platt, 2018; Roosli & O'Keefe, 2013; Xu & Lu, 2018; Li et al., 2016).

To ensure that these key performance indicators were correctly established, the findings in this study showed that the indicators, like the plans were designed to be departmentally specific. Part of this rationale was to ensure that the indicators reflected the environment, including the language used, which was aligned to the department's usage, but did not contain an extensive use of professional jargon, undefined or misleading criteria, which outside of the department could be misinterpreted. Closely aligned to the need for performance indicators to be easily understood, was the emergence of another new measurement which did not exist in the current academic disaster recovery planning protocols. This indicator was associated with the measurement of the response time for informing the various stakeholders as to the effectiveness of communicating and coordinating activities.

This study also recognised and provided examples as to how the departments and their leaders addressed Berler et al.'s (2005) concern that key performance indicators tend to fail due to not accurately representing future performance but instead are focused on highlighting or measuring the actual performance problem. For this study, the key performance indicators were focused on the overall performance of the recovery process. This included the existence of the final new key performance indicator which was used and adopted by the Dubai Civil Defence. This measurement captured the accuracy and timeliness of decisions being made throughout the department or organisation in the event of a disaster occurring. This perspective was supported by the experts who were presented with the outcomes of the study in the form of group interviews.

Leading from these new indicators, while writers including Kueng (2000) recommended six essential properties associated with the creation of key performance indicators, which included the need for a quantifiable format, this study did not only use a means to quantify the performance. This study also challenges the view of Andrews (2002) that key performance indicators need to be presented in a quantifiable and logical format, but instead the findings

indicated that the leadership team saw this mechanism as being a composite of both quantitative and qualitative measures. The study however did follow Kueng's (2000) perspective as to key performance indicators needing to be devised to accurately capture and measure the performance of the disaster recovery plan, which were followed independently by the three departments. However, for Keung (2000), also noted that key performance indicators needed to be linear, therefore the indicator to be effective had to measure the performance changes in line with the value of the variable or attribute being used, hence the usage of quantitative key performance indicators. Apart from the need for a key performance indicator being quantitative and linear in nature, there was the need for reliability, so that the outcomes of the measurement can be generated from an algorithm which can be used to predict future performance. Again, in this study the quantitative performance indicators used, did adopt these characteristics such as being linear, and generated from an algorithm, and that these important attributes were incorporated into their design. The findings also found that those key performance indicators which were quantitative tended to include a range of recognised metrics, including recovery time objectives, mean time to recovery, recovery point objectives, response time and cost of downtime, which were all measured numerically. However, most of these identified quantitative indicators were information technology centric, which included the mean time to recovery. But there were also other departmental focus metrics used, such as with the finance team, who adopted a return-on-investment measurement, which focused on the performance against the costs and expenses incurred. From the findings of this study, those departments researched used some form of indicator to determine the percentage of budget allocated for disaster recovery activities compared to the actual usage, whereby assessing financial effectiveness. This need for more financial indicators was recognised by the group interviews as being vitally important. These measurements also reflected Kueng's (2000) observation that key performance indicators needed to be intuitive, unambiguous, and easy to understand so that relevant parties can understand and interpret the outcome and then act on the data.

However, this study also identified that there were also qualitative key performance indicators which were designed to assess and capture performance themes such as stakeholder satisfaction, resource utilization, recovery point validation, the outcome of training programs and feedback from those attending awareness sessions, along with qualitative information related to the timely and accurate reporting and the testing of the recovery plans. These qualitative key performance indicators do challenge the current theoretical understanding of how this mechanism is used (Andrews, 2002), as the leadership in this study used key

146

performance indicators to capture this form of subjective data, indicating a potential confusion of the mechanism usage. This confusion was captured with the perspective of one of the IT leaders who used the term key performance indicators to assess whether the strategies were meeting regulatory and legal requirement targets. This potential misunderstanding was shared with the operational leadership team, as they assessed whether stakeholders were satisfied through gathering qualitative feedback from the overall community in Dubai. This lack of understanding was acknowledged by the expert discussion groups as being potentially problematic and intended to address this in the future.

5.5 Critical Success Factors

Unlike key performance indicators, critical success factors are more short-term operational focused, which are often targeted and are goal orientated, focused on setting goals to be reached, while key performance indicators as noted in the previous section are used to measure the performance. Therefore, critical success factors are used to focus on certain aspects of a business which are needed to be achieved for the organisation to reach its intended goals.

This study agreed with Rockart (1979) who defined the concept of critical success factors as being key areas of activity, which are necessary for the organisation or department to meet or reach the intended goals or outcomes. Therefore, critical success factors are the means to set out targets to achieve the desired results, like for example achieving short-term recovery objectives.

As the existing literature indicates (e.g., Meechang & Watanabe, 2022), to be effective these critical success factors need to be tailored specifically to a particular activity in the organisation. From a project management perspective, Meechang and Watanabe (2022) in relation to disaster recovery stated that the usage of critical success factors is fundamental and therefore needs to be created to provide a focus for the department and the organisation to aspire to achieve.

Drawing on a key author in the field of disaster recovery and critical success factors, Meyer (2018) focused on ranking the importance of critical success factors when being used to define the success of a disaster recovery process. Meyer (2018) found that there were 17 critical success factors associated with the process of disaster recovery, which included the target for

setting out to achieve recovery / restoration time, the need for conducting a business impact analysis, the maintenance of disaster recovery plans along with periodical testing of processes and strategies. To emerge also from Meyer's (2018) study was also the relevance and importance of training of recovery teams and the engagement with external consultants, together with the necessity for senior management support and the alignment of disaster recovery objectives with organisational goals. The findings of this study from a governmental entity of the Dubai Civil Defence, did align with Meyer's (2018) study, except for the reliance on external consultants, which was only seen as a critical success factor for the information technology team. In this study, the finance and operational facility management teams did not rely on external consultants but based their critical success factors through their experience, indicating that critical success factors were often devised and created to reflect specific operational needs drawn from a single team's perspective only.

As this study was based in the Dubai Civil Defence, there was a close alignment also with Moe and Patheanarakul (2006), who focused on critical success factors adopted in the public sector. For Moe and Patheanarakul (2006) critical success factors needed to clearly set out strategies for governmental involvement by ensuring that institutional arrangements are in place which include clear lines of authority to avoid delays in decisions being made in the event of a disaster, which should be incorporated into these success factors. To emerge from the findings, where three important critical success factors, which had not been identified in the current academic debate. The first critical success factor was related to the importance of setting out timely decisions and the response needed to effectively coordinate the recovery activities. The second new critical success factor was associated with financial stability of the department and ultimately the organisation, as to how the disaster recovery activities and associated budgetary allocation could be initiated and instigated. The final critical success factor which existed in the Dubai Civil Defence but has been omitted from existing disaster recovery literature, was the importance of establishing public awareness and educational programs associated with disaster preparedness. All three of these new critical success factors were seen as imperative in this study.

While these three critical success factors were not identified in the existing literature, other facets noted by Moe and Patheanarakul (2006) included setting out the criteria associated with coordinating and collaborating associated activities with key stakeholders, including government involvement, and the participation of community and external entities, while also

following any legal or regulatory requirements were present. As with other authors in the field of critical success factors (e.g., Meyer, 2018), Moe and Patheanarakul (2006) indicated the importance for effective management systems to be incorporated into the criteria of success, which included the need for communication channels to be established and maintained, so that key stakeholders are fully informed. Moe and Patheanarakul (2006) and then confirmed in this study, was the importance of having clearly defined goals and commitments to key stakeholders, which are then aligned with the purpose of the disaster recovery plans. There was also the necessity surrounding the need for effective logistics management strategies to be set out before, during, and after the disaster. This included having the correct people, expertise, and technology to support the response and recovery activities in the event of a disaster occurring, but to be grouped in an agreed framework which is used throughout the organisation as noted by Hoong and Marthandan (2014).

In explaining the relevance of an agreed framework, Hoong and Marthandan (2014) from a Malaysian financial industry information technology perspective advocated the usage of the technology, organisation, and environment or TOE model, which was originally developed by DePietro et al. (1990), but then identified 8 critical dimensions or success factors. These included the need for staff to possess the correct skills and competencies, to have clearly set out roles and responsibilities, to include the level of technological competency amongst the staff, along with IT availability and reliability. However, on closer examination of Hoong and Marthandan's (2014) study, these critical success factors tended to be operational orientated, and that the TOE framework was also focused on being information centric, which may not be suitable for the entire Dubai Civil Defence.

In another, but similar study, Bakar et al. (2015) proposed a different model compared to Hoong and Marthandan (2014) to establish and create critical factors associated with success, but from an operational and strategic perspective, which included the incorporation of both financial and non-financial performance within an organisation, through the usage of the Balanced Scorecard. This was earlier supported by Jarvelainen (2013) who developed and validated this framework for disaster recovery from a Finnish information system perspective, which will be explored further in the next section.

5.6 The usage of a framework

To emerge from the current academic debate was the recognised need to have a framework to guide the process of setting departmental critical success factors and key performance indicators from both an operational and strategic perspectives (Jarvelainen, 2013; Sahebjamnia et al., 2015). But there was also the question as to whether there should be both an operational and strategic linkage or alignment to the organisation's disaster recovery processes, which is then used to align with the strategies and vision of the entity. To emerge from the existing literature were three potential frameworks, the Plan-Do-Check-Act or the PDCA, the technology, operation and environment or TOE model, and the Balanced Scorecard. Interestingly, irrespective of the model or framework adopted, Cook (2015) argued that some form of construct was essential to frame the disaster recovery processes, but also needs to have the support from upper or senior management, and that the criteria used needs to be aligned to the strategic goals, have a list of critical processes identified and followed, which are all underpinned and informed by conducting regular business impact analysis and risk assessments, but also framed within a specific time frame, then updated including any budgetary requirements. While this study agreed in the main with Cook (2015), the main difference was the lack of any overarching framework which could enable the strategic goals of the Dubai Civil Defence to be aligned with current operational needs.

Although there are various frameworks and strategies which have been used and adopted, the majority are financial, information technology, engineering, telecommunications, banking, or even governmental centric. These models have included the TOE, PDCA and the Balanced Scorecard. In conducting the literature review and then from the findings of the study, the Balanced Scorecard seems to be the most suitable framework, but there was no evidence of an awareness or usage of this model in the Dubai Civil Defence.

5.6.1 Plan-Do-Check-Act (PDCA) approach

Instead from the findings was the indication that the information technology and financial teams were using a version of the PDCA or the Plan-Do-Check-Act approach. While these two teams recognised the benefits of this strategy, the methodology was mainly project management centric, as it neglected certain aspects of operational activity and the overall strategic direction of the governmental recovery process. In reaching this conclusion, the findings in the study did indicate an extensive awareness of how the PDCA process worked

and how the methodology was used, but also the lack of strategic alignment. This usage of the PDCA, like in the information services team included the inclusion of certain financial aspects of disaster recovery, together with how the approach can inform the recovery and restoration of services. Interestingly, in measuring the performance of the recovery process there were certain key performance indicators adopted which were primarily departmental centric. These included recovery time and recovery point objectives, but the usage of the terminology used in the findings were different from the existing theory indicating that the purpose of these two methodologies may be misunderstood.

Although the PDCA had a series of steps to follow in managing a disaster, which included the *plan* phase which identified risks, defined recovery objectives, and developed the strategies and procedures to determine and understand what was happening, the phase did not capture the entire organisation's activities or overall strategic objectives. The next stage of the PDCA was the *do* phase. This phase required regular communication whereby ensuring that the entire department was aligned and working towards the common goal of restoring services, but neglected interdepartmental and strategic level of engagement. The next phase was the *check* stage, which was related to the assessment and evaluation of the effectiveness of disaster recovery efforts through the testing and evaluating recovery procedures to identify any gaps, weaknesses, or areas for improvement through testing the protocols to validate the plan's effectiveness, but only from a departmental perspective. Finally, the *act* stage was related to the corrective actions and necessary adjustments which are needed to be made to the plans, but again was related to a specific department as opposed to the entire organization and its vision and mission.

5.6.2 Business continuity plan approach

Unlike the finance and the information service's teams, the operational department used the business continuity plan approach when determining potential risks or setting out their recovery strategies. This was centred on departmental needs and was not aligned to any strategic approach. The business continuity plan was used primarily to restore services and amenities only, and had not direct alignment with other departmental or teams' protocols.

In summary, although there were different models or approaches used between the teams, both the information services and the operational teams used similar measurements and shared the same confusion of terminology. Underlying this, was the fact that there was firstly no specific

strategic model used amongst the three teams, as the business continuity plan and the Plan-Do-Check-Act approach are more operational and departmental centric, indicating the lack of a universal framework which could be used to align all disaster recovery plans. Then there was the absence of ensuring that the core components of an organisation: finance, people and learning, internal process, and the customer/ community, were aligned to the vision and mission of the organisation when creating and implementing a disaster recovery strategy. To address this, the next section will present the Balanced Scorecard.

5.6.3 The Balanced Scorecard

The Balanced Scorecard was conceived by Kaplan and Norton (1992), and was used effectively by Moe, Gehbaurer, Sentiz and Mueller (2007) to contextualise the recovery methods and strategies used in a project in Thailand. Unlike the PDCA or TOE frameworks, the Balanced Scorecard can provide a more holistic perspective of the entire organisation and its activities including from a financial, customer or community perspectives, internal operational activities and finally capturing innovation and learning practices, including how to improve the disaster recovery activities in the future. As a framework, the Balanced Scorecard in Moe, Gehbaurer, Sentiz and Mueller's (2007) study was used to assess the effectiveness of disaster recovery planning by measuring five generic phases of managing a disaster, from the preparedness, early warning, providing initial and emergency responses, then the rehabilitation of the organisation or community, and finally restoring and recovering from the initial event.

While this study is not based on a project management scenario as presented by Moe, Gehbaurer, Sentiz and Mueller (2007), and recognising that the Balanced Scorecard was originally devised to enable *normal* business activities to be captured for managers and leaders to assess various business activities from four distinct areas, the concept can be used to integrate operational and strategic disaster recovery activities.

Firstly, the Balanced Scorecard presents the financial perspective, which is seen from a shareholder or stakeholder viewpoint, as they fund or finance the organisation. The second criterion is related to the customer or community, then thirdly, an internal perspective which is focused on the activities conducted in the organisation, and finally, the last criterion, innovation and learning which was related to how the organisation develops and trains its employees. To be effective, the framework or model requires the development of a strategy which commences or is instigated by senior management and the leadership. The activities and processes include

the need to begin with a review of the mission statement of the organisation and the identification of core values, which are related to the ultimate goal of the leadership team. From this, the related disaster recovery processes can be developed and created. For Kaplan and Norton (1992), this needs the active involvement of the entire organisation, which could be achieved from a disaster recovery planning perspective through potentially using a disaster recovery committee.

The commencement of these disaster recovery processes needs to commence with the financial strategy by assessing how to provide value to its shareholders or stakeholders, those who are financing or funding the organisation. From a disaster recovery viewpoint, the Balanced Scorecard therefore could be used to meet the stakeholders' expectations of what services and amenities are needed to be recovered following a disaster in relation to the financial commitments initially provided, which could then be devolved to a departmental level. Leading from the financial perspective of the Balanced Scorecard, Kaplan and Norton (2000) stated the concept then needed to have a clear understanding of customers' values and needs. Again, from a disaster recovery perspective, the focus is on understanding the customer or community expectations as to what services and amenities are needed to be restored, and within which timeframe, from which then all departments can respond too. The next category is the internal processes, which is related to the assessment of what strategies and plans are in place, and then to determine which processes are effective, indicating the need for a constant review and the testing of procedures and protocols. The fourth and final category is related to the core competencies and skills in the organisation and the need for a culture which provides a learning environment to support the disaster recovery plans within the organisation and associated departments.

As noted above, the Balanced Scorecard has been used by studies including that of Moe, Gehbaurer, Sentiz and Mueller (2007) to provide a framework for managing and planning a disaster recovery scenario. In the study of Moe, Gehbaurer, Sentiz and Mueller (2007), when management looked at these four business areas set out in the Balanced Scorecard, the executive team were able to be provided with an accurate representation of the entire organization whereby enabling the leadership to respond to the disaster effectively, which is seen as critical for writers including Stewart (2001). In summarising the benefits of using the Balanced Scorecard, Moe, Gehbaurer, Sentiz and Mueller (2007) further identified that the concept provided an accurate measurement of the response to the disaster, through the

establishment of meaningful performance measurements or benchmarks, while also acting as a term of reference whereby enabling the establishment of criteria to assess the efficiency and effectiveness of the entire organisation, but also the interconnectedness of operational and strategic activities. To achieve this interconnectedness, Moe, Gehbaurer, Sentiz and Mueller (2007) noted that there was a need to have three standard types of measurements adopted. The first measurement is focused on the 'outcome' of the execution of the plan, next is 'action' which measures the performance, and finally, 'diagnostic', as to why the outcome or action measurement is at a particular level. In explaining the usage of these three stages, Moe, Gehbaurer, Sentiz and Mueller (2007) stated that the measurement used in the four areas of the Balanced Scorecard often needed to be modified to fit with the nature of the activity, the stakeholders, and that of the organisation.

In explaining this adaptation, Moe, Gehbaurer, Sentiz and Mueller (2007) contended that the stakeholders' criteria could be used to plan and then assess the recovery delivery of services around the preparedness, mitigation, emergency relief, rehabilitation, and reconstruction within a specific budget, timeframe, and meeting pre-determined quality standards. As to the customer component of the Balanced Scorecard, this aspect was originally focused on four attributes: time, quality, performance and service, and costs (Kaplan & Norton, 1992), but in the context of disaster recovery planning, the focus is not on customers, but rather the community, as to how effectively a timely resolution to the crisis can be achieved through careful planning to restore services and amenities, by providing a quality but cost-effective preparedness, response, and associated recovery activities following the unexpected event, potentially measured through key performance indicators.

In relation to the internal business perspective, Kaplan and Norton (1992) argued that customer-based measures must be translated correctly into measurements of what the company must do internally to meet its customers' expectations. From a disaster recovery planning viewpoint, this category is related to the effective use of knowledge, skills, tools, and techniques undertaken by those nominated in the organisation to respond to the crisis. To achieve this, Moe, Gehbaurer, Sentiz and Mueller (2007) recommended that the organization must carefully examine anything that will have an impact on the process of providing products and services regarding disaster preparedness, mitigation, emergency relief, rehabilitation, and reconstruction. Therefore, specific measurements are needed to evaluate the current level of each of the phases of the recovery process through predefined criteria. This can be achieved

through the adoption of key performance indicators linked to the plans. While aspects of these characteristics and requirements were present in this study, there was no direct connection between departments and less evidence as to being aligned with the organisational strategic goals.

The final phase is related to the innovation and learning aspect of planning for a disaster recovery strategy. It is essential for an innovative and a creative culture to be established, maintained, and promoted, where the entire organisation learns from lessons of the past to ensure that best practices are adopted throughout the organisation in the future. From a disaster recovery perspective, innovation, and learning, is centred on ensuring that the recovery and restoration of services and products needs to have the entire organisation to have the correct and up-to-date skills within the teams. Again, although there was an indication from the findings that these criteria were recognised and met, there was still the almost departmental silo approach adopted by the leadership teams when devising the plans and strategies.

To establish the Balanced Scorecard's measurements from a civil disaster recovery viewpoint, the strategies need to commence with the formulation of national policies to manage the disaster recovery process, which are then embedded into the mission and vision of the organisation. Except for the operational team, this alignment to the national policies was not explicitly expressed during the interviews, although the various departments indicated their awareness of some form of overarching roadmap. From these policies, the measurements of what is seen is acceptable to long-term performance through the development of key performance indicators (KPIs) can then be created, together with more focused targets in the form of critical success factors (CFSs). Both of these mechanisms should be informed and aligned with the strategic goals of the Dubai Civil Defence. From the identified and generated objectives, the Balanced Scorecard then requires the framework to be regularly updated with the four identified key activities, which will include the identification of major outputs from a long-term and short-term perspectives aligned to the operational and strategic goals, which in this study was missing.

Next for the Balanced Scorecard to be effective is the need for key individuals to be identified along with their roles and responsibilities. To be effective, appropriate Balanced Scorecard measures need to be identified, designed, and agreed on, which can measure the performance of the recovery process which are aligned to one of the four dimensions of the construct and

the organisation's disaster recovery planning strategy. To achieve this, the Balanced Scorecard requires the entire organisation involvement, which challenges the current Dubai Civil Defence departmental approach. In each phase of a disaster recovery plan, the actual performance is then measured against the selected indicators based on the four dimensions in the Balanced Scorecard. When the actual recovery occurs, if the performance is in line with the selected baseline indicator or critical success factor, then best practice is documented, whereas it the criteria is not met, then the dashboard can indicate where there are differences and lessons can be learnt, not just from a departmental, but from an organisational perspective, which again may not have been present in the Dubai Civil Defence.

As mentioned above, in illustrating how this concept in a disaster recovery situation can work, Moe, Gehbaurer, Sentiz and Mueller (2007) used the framework to present five pre-defined generic phases used to recover from a natural disaster in Thailand. Instead of measuring overall success of the recovery process, the Balanced Scorecard was able to focus on each phase to enable accurate measurements to be taken. This phased approach was different from what was happening in the Dubai Civil Defence. Through focusing on different aspects of the processes and phases there was the recognition that all activities and departments throughout the recovery stages could have different requirements which needed to be completed before the recovery could be seen as being overall successful. This indicates that the recovery process is not simply a departmental activity, but instead more holistic and organisational. Furthermore, the framework could enable the disaster recovery process to establish measurements for each phase at the commencement of the recovery planning phase, then be revised if required, as often key stakeholders' requirements could change as the planning or crisis progresses. As the recovery process continues, the Balanced Scorecard could enable the organisation to monitor different aspects holistically across the organisation, ensuring that the planned activities are aligned to the four criteria, and not only being departmental centric.

For Moe, Gehbaurer, Sentiz and Mueller (2007) the Balanced Scorecard provided a comprehensive checklist for all the recovery teams to follow, through which potential problem areas and activities could be identified from a holistic perspective. In identifying and establishing these potential areas of concern there is the need to have accurate measurements of recovery activities recognised which are aligned to the framework. This process for Moe, Gehbaurer, Sentiz and Mueller (2007) was classified as being the predictive stage. This predictive activity could be likened to the initiation or planning stage of the PDCA, which

requires the recognition and identification of potential problems associated with the disaster which are then aligned to the organisation's recovery plans. The adoption of the Balanced Scorecard also enabled the recognition of various input data, tools and techniques which would be needed to recover the identified activities, amenities, and services, which for this study would be through the establishment of key performance indicators and critical success factors. These techniques involved the conducting of hazard assessment reports, disaster recovery documents including the scope of the disaster recovery process, the financial commitment and associated budgets, the organizational structure and lines of communication and responsibility, along with the schedule for restoring services. It should be noted that in the documentation, this will include senior executive and stakeholders' commitment to the availability of resources and financial funding, but not just for a specific department, but throughout the entire organisation. Finally, part of the prediction process was determining risk and recovery time, which are often captured and then assessed through the usage of performance indicators.

An important aspect of the Balanced Scorecard is the means to measure performance using key performance indicators or KPIs. In using the Balanced Scorecard, the KPIs are based on achieving and meeting long-term performance objectives or goals. With the four dimensions or perspectives of the Balanced Scorecard: the financial, customer or community, internal or processes within the organisation and finally in relation to innovation and learning, the concept can enable both strategic or external and operational or internal perspectives to be considered, like for example, the stakeholders' viewpoint, as how to ensure that the performance of the recovery procedures and processes embedded into the plans are meeting national policies and priorities. For the target 'beneficiaries,' which is a term used by Moe, Gehbaurer, Sentiz and Mueller (2007), which for this study is represented by the community, the Balanced Scorecard can ensure that from the outset, the planning then the instigation processes can be used to recognise risks and the various needs of the organisation which is being serviced. With the inclusion of key performance indicators along with critical success factors, the framework does ensure that there is the clear identification of teams and individuals involved in the recovery process. This therefore ensures that these resources have the capacity to undertake their designated duties in a planned manner. This is directly linked to the perspective of innovation and learning, where organizational capabilities are developed through on-going training and commitment to these resources. Again, whilst the characteristics were identified in this study's findings, the Balanced Scorecard does provide a more holistic framework for all departments to use.

Following the initial response to the disaster, and based on the Balanced Scorecard, for Moe, Gehbaurer, Sentiz and Mueller (2007) the next stage of the construct is the rehabilitation or recovery phase. The rehabilitation or recovery phase is associated with activities focused on restoring the environment or amenities back to normality in the interim or short-term. Again, in this study, this process was often conducted at a departmental level and the interconnectedness of the recovery planning process would have benefited from a more holistic framework. This adoption might lead to more joined up and integrated approaches being established to respond to the initial requirements, such as the restoration of basic or fundamental services and amenities (Bayleyegn et al., 2006).

One of the key benefits to emerge from Moe, Gehbaurer, Sentiz and Mueller's (2007) research was that the Balanced Scorecard provided leaders and managers with a summarised format of complex information. The Balanced Scorecard can enable the production of disaster recovery reports in a concise format, while enabling various strategic criteria to be measured effectively through providing a comprehensive overview of the planning activities at both an organisational and departmental levels. This could be through establishing measurements of performance through key indicators against predefined criteria, via using a traffic light or RAG rating (Stewart, 2001). This usage of a traffic light or RAG rating again was not identified during the interviews. When the outcome of the study was presented to three groups of experts in the form of a group discussion, there was an overall agreement that the Balanced Scorecard could provide an overarching framework or methodology. The four domains were recognised as beneficial and relevant. The group interviews saw how the various KPIs and CSFs could be incorporated into the framework effectively but needed to have only agreed and core measurements adopted. However, the original approach advocated by Kaplan and Norton (1992) of having the entire organisation participating was not seen as viable.

To investigate the experiences of operational leadership in the Dubai Civil Defence (DCD) with critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plan in the event of unforeseen adverse events and disasters drawing on the operational artefacts

RO 1
What are the components and activities essential in a disaster recovery plan for it to perform successfully in the event of possible disaster?

RO 2
How does the operational plan use CSFs and KPIs while responding to unforeseen disaster recovery planning?

RO 3
What is the suitability of an operational disaster recovery planning approach using CSFs and KPIs in a theoretical model to improve for a successful performance?

Key findings
Leadership commitment and support is vital (Järveläinen, 2016; Wong et al., 1994), but there is also a need for a more holistic involvement of the entire organisation through the establishment of disaster recovery committees (Chow & Ha, 2009)

Key Findings
CSFs and KPIs are used, but possibly not fully understand
There potentially new CSFs and KPIs that can be use in civil defence
There is the usage of KPIs which are quantitative (Andrews, 2002), but also qualitative, which challenges the quantifiable nature (Keung, 2000)

Key findings
The usage of the Balanced Scorecard is needed to provide a holistic representation
Provide strategic and operational insights
Enable managerial and stakeholder measurements to be created
Involvement of the entire organisation

Figure 5.1 Conceptual Model (Author's own work)

159

5.7 Discussion of the Focus Groups Findings

The group discussions provided valuable insights into the practical application of disaster recovery planning within the DCD. Unlike the individual interviews, which captured leadership perspectives at a departmental level, the group discussions enabled a collective discussion among operational and strategic stakeholders, revealing key gaps and opportunities for improvement. The discussions revolved around three primary themes: leadership commitment and operational integration, resource allocation and interdepartmental coordination, and the effectiveness of training and preparedness measures.

5.7.1 Leadership Commitment and Operational Integration

The group discussions reaffirmed that strong leadership commitment is evident within the disaster recovery planning framework of DCD. However, a critical observation was that decision-making processes remain largely centralized within senior leadership teams, with limited input from mid-level managers and operational staff. This has resulted in a strategic-operational disconnect, where policies are designed at the top but do not always translate into effective execution at the operational level.

Participants noted that while leadership prioritizes disaster recovery as a key function, there is insufficient engagement with operational staff during the planning phase. This lack of integration often leads to unrealistic response timelines, impractical resource distribution, and inefficiencies in real-world disaster scenarios. The discussions highlighted that a more participatory governance model, involving mid-level leadership and frontline responders, would enhance the adaptability and practicality of disaster recovery plans.

5.7.2 Resource Allocation and Interdepartmental Coordination

A major theme that emerged from the group discussions was the lack of standardized protocols for resource allocation across departments. Participants noted significant variations in how financial, human, and technical resources are assigned to different units:

- IT and Finance departments often operate within structured allocation frameworks.
- Operations teams, however, experience resource constraints, particularly in scenarios where immediate responses are required.

The discussions emphasized the need for a centralized disaster recovery resource management framework, ensuring that all departments have equitable access to necessary assets. A recommendation from participants was to adopt a Balanced Scorecard approach, which would establish predefined performance metrics including Key Performance Indicators (KPIs) and Critical Success Factors (CSFs) to guide resource distribution effectively.

5.7.3 Effectiveness of Training and Preparedness Measures

The group discussion participants had mixed feedback on existing disaster recovery training programs. While some departments conduct regular disaster simulation exercises, others have limited exposure to structured training programs, leading to inconsistencies in preparedness levels. This included the departments that engage in frequent training reported higher confidence in executing recovery protocols, and then the teams, with minimal training exposure struggled with response efficiency during disaster scenarios.

A key conclusion was the implementation of cross-departmental training sessions that integrate multiple functions such as operations, IT, and finance, allowing teams to align their response strategies. The participants also advocated periodic scenario-based training drills to be made mandatory, ensuring that all staff are adequately prepared for emergencies.

5.8 Chapter Conclusion

In conducting this research, the findings have arguably expanded the knowledge around the creation of and execution of effective recovery procedures and the usage of critical success factors, as there has been limited research conducted around non-business entities such as libraries, museums, academic institutions, and even less from a governmental environment (El-Temtamy et al., 2016; Omar et al., 2011). The fundamental attributes associated with the disaster recovery and planning process required the restoration of the disrupted services which needed several important attributes, resources, and personnel to be identified and then actioned, together with procedures and instructions embedded throughout the organization. To achieve this, there is a need to have the commitment of the senior management and leadership teams, but also the involvement of the entire organization. There was also the indication for the need for a more holistic recovery process through adopting a framework and protocol for all departments to adopt, use, and follow.

Other attributes to emerge from the study were that disaster recovery planning needed to have clear DR plans and documentation together with training of the associated teams. There was an acknowledgement that the plans and protocols needed to be reflective of the department and organisation, but also aligned to some form of overarching framework, which could incorporate the operational and strategic recovery needs of the entire organisation. This last requirement however was missing in the Dubai Civil Defence.

The study then identified KPIs that were mainly quantitative which included a range of recognised metrics, including recovery time objectives, mean time to recovery, recovery point objectives, response time and cost of downtime, which were all measured numerically. In addition, there was the recognised need to have qualitative indicators designed to assess and capture performance themes such as stakeholder satisfaction, resource utilization, recovery point validation, the outcome of training programs and feedback from those attending awareness sessions, along with qualitative information related to the timely and accurate reporting

and the testing of the recovery plans. These identified qualitative KPIs were not present in the current academic debate. The study also found several CSFs which had not been identified in the existing literature.

The final part of the chapter focused on how the critical success factors and key performance indicators were used in disaster recovery management in the Dubai Civil Defence compared to existing theory. This led to the identification of recognised different approaches being used, such as the Plan-Do-Check-Act (PDCA) and the Business Continuity Plan, but also identified the lack of a strategy and operational holistic framework like the Balanced Scorecard. In summarising the discussion on the findings of the group discussions.

Chapter Six

Applying the Balanced Scorecard into the DCD operational environment

6.1 Introduction

This chapter is designed to reflect the essence of the professional doctorate. Informed by the Balanced Scorecard, a new model was constructed to create an operational leadership developmental disaster recovery planning framework which could be used for the Dubai Civil Defence (DCD). In completing this activity, the outcome meets the third research objective: *to provide a theoretical model as to the critical success factors (CSFs) and key performance indicators (KPIs) which the Dubai Civil Defence (DCD) could consider when improving the current disaster recovery plans in the event of future disasters*. The outcome also addresses the third research sub-question of *what is the suitability of operational disaster recovery planning approach using CSFs and KPIs in a theoretical model to improve for a successful performance?*

A conceptual framework was developed to link the previous chapter related to the findings and the discussion as presented in this Chapter, as to how the BSC can be applied in the DCD's operational environment.
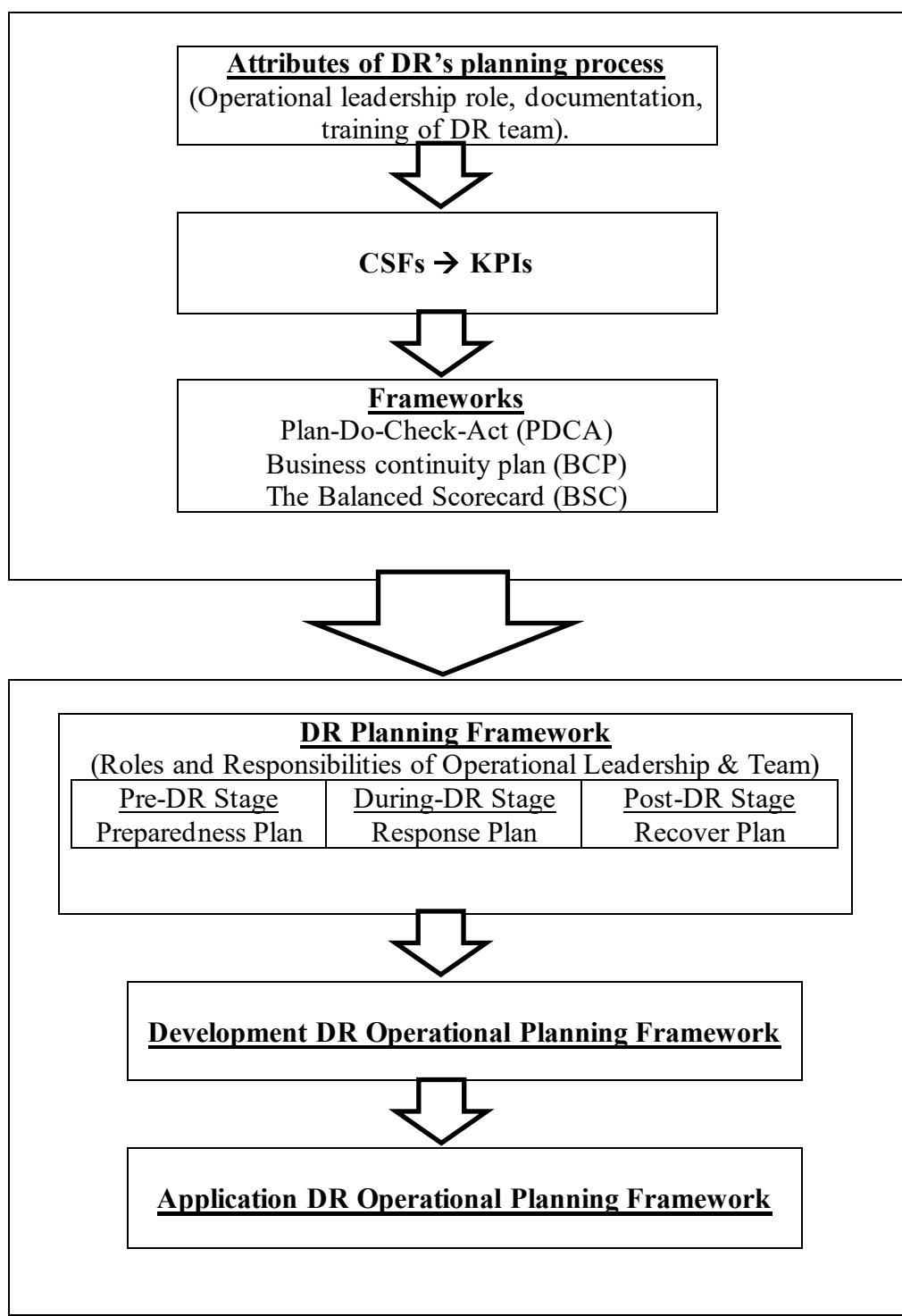
Figure 6.1: Conceptual Framework of linking Findings to DR approaches (Author's construction)

In constructing this framework based on the Balanced Scorecard was informed by the current debate as presented in the literature review together with the generated interview data. The framework while being based on the Balanced Scorecard has also been modified to align to the Dubai Civil Defence's remit to illustrate how

the construct can be effectively used to meet unexpected and unplanned events, and then enable the organization to recover from this occurrence.

6.2 The facets and components of disaster recovery framework

Based on the Balanced Scorecard, the concept was initially applied to the Dubai Civil Defence requirements, which were then aligned to the four core components of the framework: learning and growth, business processes, customers, and finance.

ENVIRONMENT (business processes)

SOCIAL (customers/ community)
Safety / Security / Health / Welfare

ASSETS
Physical and non-physical assets

ECONOMIC (Finance)
Individuals / Groups / Businesses / Organizations / Government Entities
[Micro >>> Macro]

Learning and growth
Training
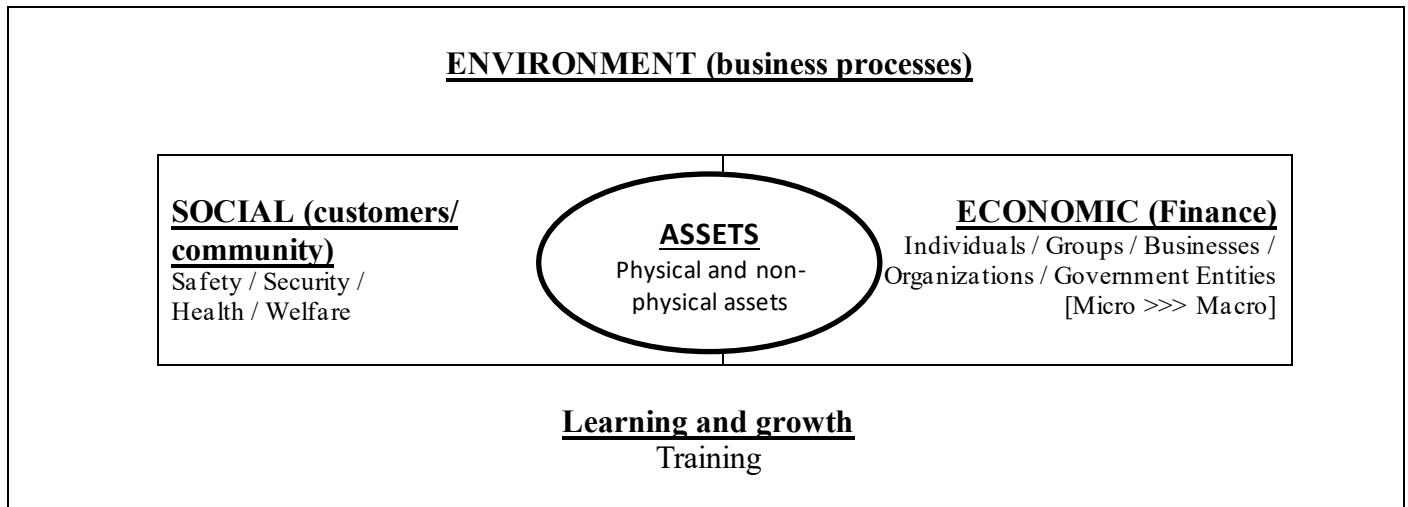
Figure 6.2: The components of the disaster recovery framework based on the Balanced Scorecard
(Author's construction)

6.3 Disaster Recovery Planning

The theme of disaster recovery planning is associated with conducting a systematic approach to provide and an appropriate strategic, operational, and/or tactical-level approach to meet the defined DR objectives. Therefore, the focus of this activity was designed around the usage of the Balanced Scorecard to capture the operational activities associated with designing disaster recovery plans and processes following a three-stage strategy: pre-phase, during the disaster, and finally the post-disaster stage. As introduced in Chapter Two, the three stages are interlinked, but need to be established independently to reflect the associated processes and activities involved. These stages are illustrated below.
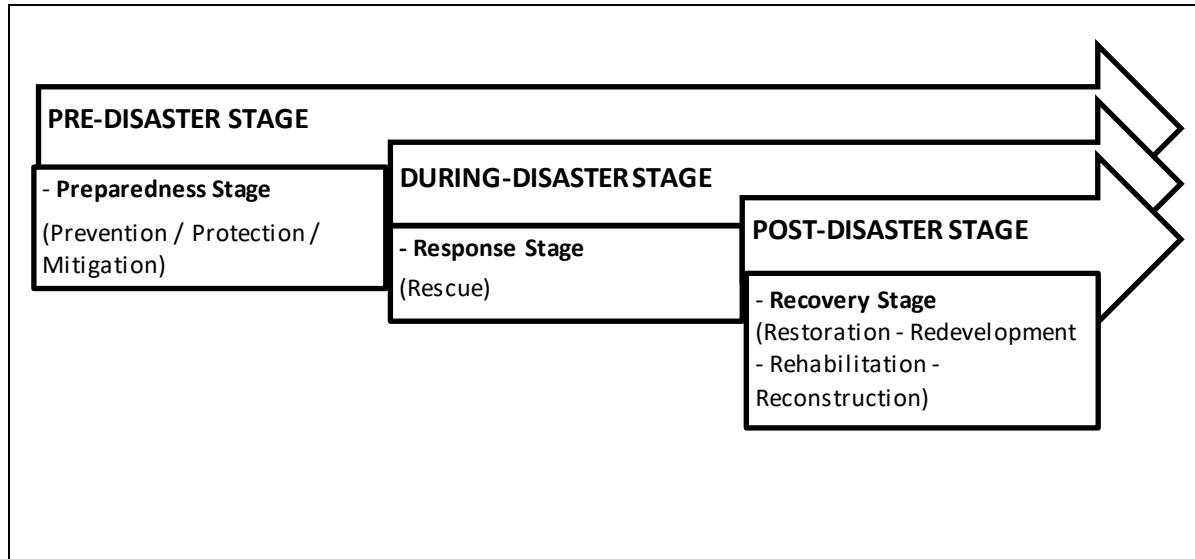
Figure 6.3: Stages of disaster recovery (Author's construction)

The pre-, during-, and post-disaster recovery planning stages need to be developed in a timely, robust, and considered manner. The starting point for the planning process is to develop suitable recovery strategies prior to and following a disaster which are aligned to the operational plans where the risks are determined and assessed, including how to mitigate or reduce the event occurring, along with how to restore services and amenities as soon as possible. The recovery planning process presents an opportunity to identify potential areas which are recognised as vulnerable to being impacted by potential disasters. By integrating the core concepts of the Balanced Scorecard into DR plans and strategies, this can assist in focusing on identifying and allocating resources accordingly. The next section will present these three stages independently aligned to the core components of the Balanced Scorecard, which are denoted in italics.

6.3.1 Pre-Disaster Recovery Stage [Preparedness Plan]

The preparedness process commences with a comprehensive risk assessment to identify which areas are most vulnerable and require attention to prevent, protect or mitigate against an unexpected or unplanned event occurring. The core of the risk assessment is to assess rigorously and continuously changes to potential risks occurring which could be adversely affected by an unforeseen or unplanned event. The risk assessment process is based on assessing the *environment* through determining the probability and frequency of a disaster occurring in identified areas, including which assets could be affected, and the consequences of this to the local community from a *social* and *economic* perspective. This process will then result in a prioritization of activities focused on reducing or minimising risks to prevent, protect, and mitigate by implementing planned recovery strategies. Part of the risk assessment includes the involvement of key *stakeholders* from the *community* to establish critical success factors and the associated key performance indicators. This involvement of the community can be aligned to the *customer* or *stakeholder* aspect of the Balanced Scorecard. Based on the outcome of the risk assessment, and reflecting the *financial* component of the Balanced

166

Scorecard, more focused investment in these areas can commence ensuring that financial resources are strategically targeted. Using the Balanced Scorecard can assist in the development of initiatives which can assist in the *internal recovery processes* throughout the DCD, but this requires senior management support along with on-going *training* to be conducted using real-life scenarios with the various recovery partners. Throughout the pre-planning stage, the usage of the Balanced Scorecard provides a template for all departments to use while ensuring that the overall mission and vision of the organization together with the various departments are met.

6.3.2 During-the disaster stage [Response Plan]

The disaster stage of the planning process relates to the response and actions which are instigated during and immediately after the unplanned or unexpected event has occurred. The actions taken in response tend to be planned, controlled, and coordinated based on the pre-planning stage with the purpose to minimize the effects of the event, whereby restoring the services and amenities to the agreed level of recovery. This *internal process* may include activities such as alerting, warning, and evacuating the community, searching for and rescuing individuals, along with providing immediate assistance when needed, following a planned and organised approach. Therefore, the aim of providing an immediate response is based on an emergency protocol to provide rapid assistance to protect all entities, but within the *economic* or *financial* guidelines or constraints. This activity is aligned closely to the *community* or *stakeholders'* requirements, which in the Balanced Scorecard is categorized as the *customer*. The recovery assistance provided may range from offering specific but limited aid, such as assisting with restoring transportation links, providing temporary shelter, food, and medical aid, but again is targeted and pre-defined based on the agreed and established requirements. The provision may also involve initial repairs to damaged infrastructure or restoring essential services like communication links. To achieve this, the DR responses must include the protocols set out to provide this initial response to recover or restore the *environment* to the pre-determined criteria. This will also include the prioritization of decisions needing to be made, and then to have the means to assess the response, which are then monitored through the usage of key performance indicators.

The response protocols also encompass the timeframe for these decisions and actions to be taken in. To achieve this, and to be able to respond in a timely manner requires training of employees which may include role plays and scenario or real-life exercises to occur, which are aligned through initiating a *learning and growth* strategy.

6.3.3 The post-disaster stage [Recovery plan]

After the event has occurred and following the initial restoration activities there is the need to restore all services and facilities back to normal. This may include restoring, repairing, redeveloping, or even reconstructing the physical *environment*. In this process of recovery there is the need to mitigate and measure potential risks, which are included in the DR rebuilding strategies and plans, in accordance with the

requirements of the *community* and *financial* constraints. The post-disaster recovery planning stage must support the post event decision-making *internal processes*, which could include the adaptation and implementation of the pre-disaster priorities and policies, which are informed and determined by the key *stakeholders'* and the *community*. Furthermore, the approaches and decisions made must be aligned to the strategic vision and goals of the organisation, department, and ultimately the community.

6.4 The roles and responsibilities of the operational team and leadership

The DR team often comprises of a group of individuals, which are led by a leader or leaders, who are tasked with developing, documenting, and executing processes and procedures for disaster preparation and recovery operations in the event of a disaster occuring, which are aligned to the *stakeholders* or *community's* needs. The team often consists of qualified and well-trained employees who represent the different functions and activities of the organisation and are capable of coordinating with other recovery partner agencies. This also includes the *training* and *development* of these teams to be able to respond proactively to the disaster or event. Therefore, successful recovery planning is dependent on all the stakeholders' requirements being captured and their involvement during the pre- during- and post-disaster stages are fully understood by all parties. Underpinning all the roles and responsibilities it is necessary that those involved in the disaster recovery processes, that the teams have a clear understanding of the CSFs and KPIs, as to their usage, meaning and relevance.

6.5 Critical activities

This section will focus on the critical activities associated with the operational disaster recovery processes, which will include operational activities but will commence with general or overarching protocols. These activities are aligned to the core components of the Balanced Scorecard, which are indicated in italics.

6.5.1 General critical activities related to the operation
- There is a need to convene the core personnel / agencies which oversee the DR planning *internal processes* and activities to reduce recovery risk, therefore increasing recovery time.
- To develop an approach or *internal processes* for investing in DR systems to withstand the effects of a disaster, then to respond effectively, which can then restore services and amenities quickly, while adapting to changing conditions, then able to manage future disasters.
- To complete an initial DR planning process that provides an overall strategy for recovery, including operational and tactical level approaches, together with providing on-going *training, and learning* opportunities for nominated personnel.
- To address all DR core capabilities and integrate all socio, *economic* and *environmental* aspects to protect all assets.

- To identify achievable, tangible DR recovery activities which meet the *stakeholders* and *community* requirements.

- To co-ordinate planning efforts within and across different jurisdictional boundaries in the UAE to meet the *vision* and *mission* of the country.

- To integrate *economic* recovery strategies with public information on themes such as health and social services, while restoring the physical infrastructure and resources from an operational and strategic perspective.

6.5.2 Operational critical activities

- To lead and manage the DR *internal* operational *processes* by developing and implementing effective recovery plans.

- To coordinate and provide suitable *economic* and *financial* resources to meet the disaster recovery objectives.

- To integrate the *stakeholders'* requirements into pre-, during- and post-disaster recovery plans, strategies, and initiatives.

- To ensure that there are coordinated activities which integrate information sharing amongst key *stakeholders*.

- To establish the mechanisms or *internal processes* to effectively engage with the entire *community* of partners and *stakeholders*.

- To improve future operational coordinated activities through continuous assessment and updating of *internal processes*, including the *learning and growth* strategies, and the allocation of *funds*.

6.6 The devised operational planning framework

Based on the previous section together with the core components of the Balanced Scorecard, this section will present the modified framework devised specifically for the Dubai Civil Defence to enable the organisation to be prepared to respond and recover from an unexpected or unplanned event. The various concepts in this new framework were devised to guide the operational planning strategies throughout the entire organisation, which included the roles and responsibilities of the various teams to ensure that the critical tasks which need to be conducted are aligned to the available resources. Reflecting this, the recovery planning strategies therefore need to include:

- Assessing through drawing on the Balanced Scorecard present and future risks.

- Determining those activities which are needed to be performed and at what level of the organisation are responsible for instigating the strategy or protocol.

- Assessing how to protect and minimise the impact to assets, and then recover those assets adversely affected to the desired pre-determined requirement.

- Determined the processes needed in the pre-, during-, and post-disaster planning stages, while indicating the roles and responsibilities of leadership, the DR teams, and third-party partnerships.

The key planning activities are outlined below in Table 6.3 in relation to the pre-, during-, and post-disaster of the operational planning process. It should be noted that in Table 6.3, the core components of the Balanced Scorecard: learning and growth, financial, customer or community and internal processes, are indicated in italics.

STRATEGIC DR PLANNING ACTIVITIES
Principles / Policy formulation / Priorities
(*but not within scope of this operational framework*)

⇩
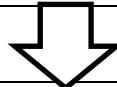
OPERATIONAL DR PLANNING KEY ACTIVITIES
DISASTER RECOVERY

The capabilities necessary to prepare, respond, and recover those services and facilities affected by an unplanned or unexpected event effectively and sustainably, socially and economically.

Defines the roles and responsibilities by focusing on identifying, coordinating, and integrating activities

Pre-disaster key activities	During-disaster key activities	Post-disaster key activities
Preparedness Plan	**Response Plan**	**Recovery Plan**
The capabilities necessary to be aware and prepared for together with necessary resources to manage the disaster.	**The capabilities necessary to save lives, protect property and the environment, meet the basic human needs and infrastructure after an incident has occurred.**	**The capabilities necessary to restore and resume after a disaster event, whether natural or human made.**
Prevention: The activities to avoid or prevent a possible disaster.	**The aim is to measure the responses taken to ensure that the activities are controlled, coordinated, effective and rapid at the outset of the disaster to minimize the impact.**	**The aim is to measure the activities to taken during recovery process to assist individuals, businesses, and communities back to normality.**
Protection: Precautions activities to secure the environment against disaster.		Restoration: The activities to bring back to a former position or condition.
Mitigation: Activities to reduce loss of life and damage to property by reducing the impact of the event.	Rescue: The activities to activate the emergency operations, reduce the disaster impacts, preserve all assets, relocate individual to safe and secure locality, provide medical care and welfare.	Redevelopment: The activities of replacing the existing infrastructure with new solutions.
(*Internal processes, Finance, and Learning and Growth*)		Rehabilitation: The activities used to optimize functionality in the affected area impacted.
		Reconstruction: The activities to rebuilding or repairing.

	(Internal processes, Finance, Customers/ Community, and Learning and Growth)	*(Internal processes, Finance, Customers/ Community, and Learning and Growth)*
- Establish clarity of leadership, operational coordination, and decision-making structures at all levels in the DCD. - Define and establish the roles and responsibilities of all DR personnel plus provide training (*learning and development*). - Develop pre-disaster partnerships to facilitate coordination of potential resources. - Identify and involve all key DR stakeholders including the general public/ community (*customers*). - Identify potential areas of weakness in the DR management capacity and strengthen with supplements, including resourcing, training, educating, and informing all involved and affected. (*learning and development, finance*). - Establish operations plans to ensure essential response and recovery services are deployable during and after the disaster. - Provide a platform to guide recovery decisions and activities speedily in a unified recovery effort. - Have mitigation and development planning, pre- during- and post-disaster recovery planning. - Prioritize recovery principles, policies, procedures, and practice based on operational protocols. - Integrate and coordinate planning initiatives within and among recovery partner agencies.	- Search and rescue life and property. - Save and protect human and property / assets. - Relieve suffering. - Respond to calls for help/ assistance when needed. - Contain, limit, and mitigate the adverse effects. - Provide the stakeholders / community with suitable alerts, warnings, advice, and information. - Provide health and medical aid. - Ensure safety and security of the DR responders and agencies. - Safeguard the environment. - Restore critical activities within reasonable timeframe. - Promote and facilitate self-help in the affected areas. - Coordinate with other rescue agencies (*environment*). - Preserve the scene to facilitate investigations. - Monitor and evaluate the ongoing response activities. - Identify and take action to implement lessons learnt.	- Adapt and adopt pre-existing DR plans and priorities, including pre-disaster recovery and mitigation plans. - Manage activities and processes designed to promote local decision-making process (*internal processes*) and ownership of the recovery planning and implementation effort. - Work collaboratively with all interested parties affected groups of people (*customers*) with inclusiveness and outreach programmes. - Encourage and participate with individuals and groups with additional support to restore and resume services and facilities. - Inform and make aware on all aspects of recovery through encouraging cooperation and collaboration across all DR partners. - Coordinate with structures and partnerships among and between other DR agencies. - Measure recovery activities by evaluating, monitoring, controlling, reporting, and reviewing if recovery is as planned. - Integrate mitigation measures into recovery rebuilding strategies and plans, then adapt to the changes and long-term risks (*environment*).

←———————————————— **Balanced Scorecard** ————————————————→

Figure 6.4: Operational Disaster Recovery (DR) Plan Framework (Author's own work)

6.6.1 The application of the framework

The framework presented above in Figure 6.4 and the parameters below in Table 6.1, illustrates how using the core components of the Balanced Scorecard can assist in creating an effective recovery process through establishing a holistic criterion to follow from an operational and strategic perspectives. The new framework developed for the DCD serves as a guide to the pre-, during-, and post-disaster planning processes designed around the specific needs of this civil defence organisation. The framework also provides a series of metrics to monitor and assess the DR activities. This is achieved by linking the DR's CSFs and KPIs with other strategic and operational strategies, which can enable the operational leadership to effectively monitor the recovery process.

6.6.2 CSFs and corresponding KPIs

An organization like the DCD needs the ability to determine and assess the recovery capability when responding and recovering from a disaster, which can be successfully achieved through using existing and new CSFs and corresponding KPIs, which have been revealed in this study. The CSFs can provide the means to achieve the DR mission of the organisation, then implementing KPIs to measure the various DR activities. The following table below, Table 6.1 presents the set of CSFs and corresponding KPIs which can be used to plan, develop, test, implement, and then monitor a disaster recovery strategy, then inform any post-review, and revision activities.

S/No.	CSFs	KPIs
1	Trained and skilled personnel (*Learning and growth*)	1a. Number of personnel trained and skilled (*Learning and growth*).
		1b. Quality of training and development (*Learning and growth)*
2	Cooperation and coordination with resources with external agencies.	2a. Level of integration
		2b. Degree of synergy between various agencies
3	Capabilities, capacities, and competencies to execute objective-based plans (*internal processes*)	3. Level of capacity utilization
4	Adequate resources (*finances*)	4. Efficiency of resources used
5	Proactive approach adopted by operations leadership and management	5. Effectiveness of results, outcome and output vis-à-vis goals and objectives
6	High quality processes and procedures (*internal process*)	6. Response times
7	Defence and protection of people and property (*customers*)	7a. Negligible destruction and damage
		7b. Speedy recovery to normalcy
		7c. People's satisfaction.

8	Effective communication and information sharing during disaster recovery (*internal processes*)	8. Response time for communication and coordination during disasters
9	Timely decision-making and response coordination (*internal processes*)	9. Accuracy and timeliness of decision-making during recovery
10	Continual monitoring and evaluation of disaster recovery plans (*internal processes*)	10. Frequency of disaster recovery plan updates and drills
11	Financial stability and budget allocation for recovery efforts (*finance*)	11. Percentage of budget allocated to disaster recovery
12	Public awareness and education on disaster preparedness (*customers, learning and growth*)	12. Effectiveness of public education campaigns on disaster preparedness

Table 6.1: CSFs and corresponding KPIs (Author's own work)

6.7 Chapter Conclusion

Being a professional doctorate, this chapter has created a new framework which has been informed by the interviews, the literature review and aligned to the core components of the Balanced Scorecard. The framework has provided a construct which captures the disaster recovery operational processes and associated activities needed to restore services and amenities, while minimising the impact to the various assets. To accurately represent the entire process, the framework has been constructed into three distinct stages: preparedness, response, and recovery. The framework is mainly applicable at a local level but can be potentially scaled upwards to provide a Federal or even regional solution.

The new construct draws directly from the four components of the Balanced Scorecard: learning and growth, internal processes, economic / finance, and the customer or community, which includes the roles and responsibilities of the DR teams, departments, and leadership. The model also provides CSFs and corresponding KPIs that can assist the teams and leadership to effectively respond to the event. The model also sees and sets out the importance of implementing, testing, and reviewing the content of the components, which includes the frequent updating of the construct through organising real-life scenarios and exercises. Finally, the new model also advocates the importance of providing a strategic and operational perspective to disaster recovery, making the outcome more holistic and not departmentally driven.

Chapter Seven
Conclusion

7.1 Introduction

Following the presentation of the results (chapter four) and the discussion (chapter five) of the findings generated in this study, this chapter will present a critical review and then a summary of the conclusions as to how the Dubai Civil Defence leadership team prepare and plan for an unexpected event or a disaster. This chapter will include setting out the intention of the study, and how the aim and objectives were achieved, the contribution to business practice, which is fundamental for a professional doctorate, together with how the research has informed academic understanding, before providing an insight into the limitations of the project and areas for future research. In achieving this, the chapter will also consider how the findings contribute to the body of knowledge and practice when planning for a disaster in a civil defence organisation. The next section will re-present the aim of the study.

7.2 Aim of the study

The aim of the study was *to critically investigate the experiences of operational leadership in the Dubai Civil Defence (DCD) as to the critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plans to respond to unforeseen adverse events and disasters, by drawing on their operational artefacts*. To achieve this, the following research objectives were created, which were aligned to the structure of the study:

7.2.1 Research objectives
Research objective one

To critically examine the current DCD disaster recovery plan, main critical success factors (CSFs) and key performance indicators (KPIs) which are used in the event of an unforeseen disaster.

Research objective two

To critically analyse the operational planning of the DCD and execution stages using main critical success factors (CSFs) and key performance indicators (KPIs) when responding to the unforeseen events that are disastrous.

Research objective three

To critically evaluate by comparing the current DCD's operational disaster recovery plans and associated business artefacts with other approaches, to provide a theoretical model as to the critical success factors (CSFs) and key performance indicators (KPIs) which the Dubai Civil Defence could consider when improving the current disaster recovery plans in the event of future disasters.

In achieving these research objectives and ultimately the aim, the intention of the study was to provide a new critical insight into the experiences of the leadership teams in the planning of disaster recovery processes and protocols in the Dubai Civil Defence. To understand this, the research has drawn from an array of disaster recovery planning theory, which was mainly from the disciplines of information technology and project management, as there were limited studies conducted in the field of civil defence. The study then adopted an interpretivist approach to generate subjective data as opposed to simply proving or falsifying a pre-determined hypothesis, therefore a new theoretical insight into the central theme of the study could be provided. To verify the outcome of the study, the project was extended to involve three discussion groups compromising of experts in the field of disaster recovery which confirmed the original findings. The rationale for this decision is presented in the next section.

7.3 Overview of the findings

To critically understand the experiences within this doctorate study, the focus was specifically on disaster recovery processes and protocols adopted in the UAE's civil defence. In achieving the aim of the project, the study adopted a social constructivist approach, to interpret the findings generated from conducting semi-structured interviews. The study was then extended to include three group discussions involving experts in disaster recovery. As set out in chapter four and five, both the findings and discussion chapters found that the planning process was conducted by only the leadership teams, and then instigated and reviewed by the same group of individuals. This strategy potentially made the process operationally and departmentally centric as opposed to being strategic and holistic. While being instigated by a small group of leaders, the study did find that there was an acknowledgement as to the importance of the commitment and support provided by this group of individuals. This included allocating and providing adequate resources and the allocation of time and personnel to undertake the various recovery activities. However, with the planning process being created, developed, and owned by the leadership team, meant that potentially certain operational activities could be neglected,

as often disaster recovery plans involve the entire participation within the organisation, including the usage of disaster recovery committees (Järveläinen, 2016; Wong et al., 1994). This outcome was confirmed by the expert group discussion as to the relevance of using both an operational and departmental perspective, but needing a strategic lens.

7.3.1 Overview of the individual interviews findings

The findings identified the importance that the recovery documentation needed to be seen as a living document, informed by ongoing risk assessments (Cook, 2015; Hawkins & Maurer, 2010), but also the need for the plans to be departmental but also organisational centric, which led to the identification of the possibility of needing to adopt a framework which encompasses the entire organisation, like the Balanced Scorecard (Moe, Gehbaurer, Sentiz & Mueller, 2007). The last key finding generated from the findings was related to the usage of critical success factors and key performance indicators. The outcome of the study indicated that several of the core mechanisms adopted in the UAE Civil Defence were advocated by existing studies (e.g., Neely et al., 2000; Strecker et al., 2012; Frank et al., 2009; Popova & Sharpanskykh, 2010), which also included from a civil defence perspective (e.g., Bahmani & Zhang, 2021). However, the findings of the study also indicated that there were some possible misunderstanding as to the usage of key performance indicators and critical success factors, together with the emergence of new success protocols (CSFs), which were related to communication and coordination of activities, the timeliness and accuracy of decision-making, financial stability and budget allocation and lastly as to effectiveness of public awareness and training. Finally, the study identified that the commonly academic shared view that performance indicators should be quantitative in nature (e.g., Kueng, 2000), was challenged by this study which found there were also qualitative measures, for example as to feedback from key stakeholders in relation to the recovery time.

7.3.2 Overview of the froup discussions findings

The group discussions provided a broader organizational perspective on disaster recovery planning, complementing the departmental insights from individual interviews. Unlike individual interviews, which captured specific departmental experiences, the group discussions facilitated discussions across different levels of leadership and operational staff, enabling a more holistic analysis of disaster recovery processes. A key finding from the group discussions was that while strategic plans exist, their operational feasibility is often overlooked. Leadership teams were found to be heavily involved in the policy formulation of disaster recovery plans,

but frontline teams responsible for actual disaster response often lacked clarity and engagement in the planning process.

The Key Observations from group discussions had several recurring themes emerged from the experts:

1. Leadership played a critical role in disaster recovery, but operational teams require greater involvement. While senior leadership primarily focuses on policy direction, the mid-level managers and frontline teams lack input in the planning phase. There is disconnect between policy design and on-the-ground implementation, leading to challenges in real-time execution.

2. Departmental approaches to disaster recovery are fragmented, requiring a more unified approach. While each department follows its own disaster recovery procedures, but there is no standardized framework ensuring interdepartmental coordination. Finance and IT teams have well-defined recovery plans, but the operations teams face challenges in aligning their strategies with centralized directives.

3. The adoption of a more structured framework, such as the Balanced Scorecard, is essential. Participants agreed that measuring performance through KPIs and CSFs would streamline resource allocation and improve coordination. A standardized framework would provide greater accountability and transparency in disaster recovery processes, which was constructed as part of the study.

7.4 Summary of the key findings

This section will outline how the research objectives were achieved and how the overall aim of the research: *to critically investigate the experiences of operational leadership in the Dubai Civil Defence (DCD) as to the critical success factors (CSF) and key performance indicators (KPIs) used when preparing disaster recovery operational plans to respond to unforeseen adverse events and disasters, by drawing on their operational artefacts*, was attained.

In achieving the first research objective: *to critically examine the current DCD disaster recovery plan, main critical success factors (CSFs) and key performance indicators (KPIs) which are used in the event of an unforeseen disaster*, the narrative literature review identified

as mentioned above that the main research around disaster recovery was mainly in the field of information technology and project management. However, to emerge from the literature review was the importance associated with the fundamental attributes linked to disaster recovery planning including the importance of senior management support and the associated commitments like finance and resources (Meechang & Watanabe, 2022), which was supported by the findings in this study. To ensure that senior leadership and management supported the recovery process, which needed to be aligned to the strategic objectives and mission of the organisation, this study however identified the need for an overarching framework. This strategic alignment and an overarching framework were missing in this study, but was identified from a theoretical perspective as important, which led to the emergence of the Balanced Scorecard being recognised as a potential recommendation for the Dubai Civil Defence.

For the recovery processes and plans to be effective, the existing theory indicated and recognised the need of ensuring the planning protocol was seen and treated as a living document, and that it is underpinned with accurate risk assessment and business impact analysis protocols, which are conducted frequently. Through these mechanisms being followed, the plans could then be accurately used to prioritize services and activities which need to be recovered based on predetermined timescales and priorities, which are aligned to time and cost (Asgary et al., 2012; Bloksijk, 2008). There was also the need for frequent testing and rehearsal of the plans and protocols (Jarvelainen, 2013), throughout the entire organisation, indicating the importance of on-going training, which was present in this study's findings.

The literature review indicated the importance of the recovery process to be effectively devised, designed, and implemented, and having some form of suitable framework to be used to consolidate the entire process, from both an operational and strategic perspectives. To emerge from the existing literature as to potential models previously used, was the usage of the technology, operation and environment or the TOE construct and the Balanced Scorecard. The Balanced Scorecard was seen as being able to incorporate the strategic and operational recovery processes effectively irrespective of the department, whereby providing a holistic planning and implementation solution, but this was not present in the findings, and the leadership teams were unaware of the model. Finally, the existing literature identified several core critical success factors designed around meeting operational activities in response to a disaster, together with key performance indicators, which could be used to assess or measure the performance. To

emerge from the literature were how these mechanisms were devised and the format which critical success factors and key performance indicators should follow, such as the quantitative nature of performance indicators (Kueng, 2000). But this outcome was challenged by the findings of this study.

To address the second research question: *to critically analyse the operational planning of the DCD and execution stages using main critical success factors (CSFs) and key performance indicators (KPIs) when responding to the unforeseen events that are disastrous*, the literature review revealed that there were several mechanisms which could be adopted to set out critical aspirations for the organisation or department to achieve, but required the means to measure the effectiveness or the performance of the recovery process. To emerge, as mentioned above, was that there was an extensive list of different types of critical success factors, which were designed around often short-term operational aspirations, with some not focused on performance outcomes. As a concept, critical success factors tend to be targeted or goals orientated, while other indicators may measure the performance of achieving them. In contextualising this, Rockart (1979) presented the concept of critical success factors at an organizational and industrial perspective, arguing that critical success factors can be used to focus on certain aspects of a business in which the performance can be accurately judged or assessed. To emerge from the findings of the study were several critical success factors which had not been identified previously from existing studies. These included firstly the emergence of needing to establish departmental and then ultimately at an organizational level the means to provide timely responsive and coordinated decisions and activities from both an operational and strategic perspectives. Secondly, the findings revealed the importance for the Dubai Civil Defence strategy of seeking financial stability and allocating budgetary funds for disaster recovery efforts, as this needed to be the responsibility beyond the finance team. Furthermore, the budgets and fund allocation needed not to be a departmental centric activity as this can create silo recovery plans. Another critical success factor identified from the findings, which was absent in the existing knowledge, was associated with public awareness and education programs being designed and delivered to the community. Interestingly, even though there have been several studies focused on community recovery planning strategies (e.g., Bahmani & Zhang, 2021), this critical success factor had not been identified or initiated before.

In relation to the usage of key performance indicators, the concept tends to be based on physical parameters that are usually determined in the pre-design phase of the disaster recovery process.

A key performance indicator tends to be quantitative, designed to evaluate the future activities and outcomes of the planning process. As noted above, the study found that the known and recognised key performance indicators were deployed and used to measure the efficiencies and performance of the plans. However, like with the critical success factors, there were several categories which were unique to the disaster recovery processes in the UAE. This included the response time and performance associated with communicating, responding, and coordinating activities conducted during a disaster, therefore this needs to be planned for. The civil defence in the UAE noted the need for the assessment of providing an accurate and timeliness mechanism for these decisions being made. Next was the importance of including the measurement of funds and budgets which are allocated to the disaster recovery process compared to the actual costs. This key performance indicator interestingly was not only related to the finance team, but again was departmentally centric. Finally, the study identified the need to assess the effectiveness of public education campaigns as to disaster preparedness, and whether the planned outcomes have been achieved.

As to the creation of these mechanisms, the leadership team, like the planning process, was created, developed, and analysed by a small group of leaders only. This challenged the existing theoretical stance of establishing and supporting a disaster recovery committee or committees (Järveläinen, 2016; Wong et al., 1994). Again, potentially the leadership team and the isolated involvement could potentially compromise the recovery process, which brings into question whether the UAE Dubai Civil Defence could adopt this strategy of establishing committees and involve various operational expertise.

To emerge from the findings, was the underlying evidence to suggest that certain critical success factors and key performance indicators was potentially misunderstood and misused as to the mechanisms and information generated. This potential misunderstanding which was identified from the interviews revealed that these plans and recovery processes could be compromised and may be with the establishment or creation of committees could address this. Finally, these two mechanisms were mainly departmentally focused and primarily short-term centric, as opposed to being aligned to the long-term direction of the civil defence's mission, which could also limit the effectiveness of these approaches.

To address the final and third research question, *to critically evaluate by comparing the current DCD's operational disaster recovery plans and associated business artefacts with other*

approaches, to provide a theoretical model as to the critical success factors (CSFs) and key performance indicators (KPIs) which the Dubai Civil Defence could consider when improving the current disaster recovery plans in the event of future disasters, the findings revealed that the emergence of a model like the Balanced Scorecard would be beneficial from both the one-to-one interviews and then the group expert discussions. The findings revealed that there was no overarching framework or model being used throughout the Dubai Civil Defence. Instead, there was a lack of awareness of models or constructs like the Balanced Scorecard which could be adopted in the disaster recovery planning process.

The findings revealed that the departments used different plans and methodologies, like the Plan-Do-Check-Act or PDCA approach or business continuity planning protocol, but was departmental centric and focused on the operational recovery process, and not specifically strategically- led or informed. Furthermore, while the technology, organisation and environment or TOE concept, while informative and has been extensively used in previous studies (e.g., Hoong & Marthandan, 2014) the construct is information technology centric, and therefore may have less relevance to other teams.

To emerge from the literature review was the usage of the Balanced Scorecard (Moe, Gehbaurer, Sentiz & Mueller, 2007). As an approach, the Balanced Scorecard was effectively used to assess the effectiveness of disaster recovery planning by measuring five generic phases of managing a disaster in Thailand. The concept is based around four core areas: finance, internal processes, the customer, or the community, and finally, learning and development, which are all aligned to the civil defence's mission and objectives. This model would permit the different departments to work on their dedicated plans, but also aligned to the organization's vision, and therefore makes the planners to consider how their planning activities impact or influence other parts of the organization, providing a more holistic recovery planning solution. Drawing on the different facets associated with CFSs and KPIs, which were originally presented in the introduction of this study, this project has provided a potential linkage of using CSFs and KPIs with a strategic framework to provide an effective DR strategy. In achieving this, this study has connected these components to enable the practical assessment and evaluation of DR recovery operations in the Dubai Civil Defence. Part of the findings include a qualitative tracking of performance and the associated improvements, along with identifying and mitigating against potential weaknesses and risks. This study has found that optimizing cross-functional activities and inter-agency drills lniked with information-sharing efficiency can assist in streamlining existing processes, whereby supporting a more effective DR plan.

Finally, through continuous improvement and the usage of feedback loops can be used in the Civil Defense departments combined with the KPI qualitative and quantitative data can assist in refining existing DR strategies along with continuous close assessment of the CSFs. Post-disaster reviews were found to offer critical feedback, which can inform the planning and improvements to future KPIs. These CSFs and KPIs were seen to be most effective when working in tandem in the civil defense disaster recovery planning process by the setting of clear objectives with the CSFs and then providing accurate data through the KPIs. The key findings from the group discussions underscore the need for a more structured, integrated, and practical disaster recovery planning approach. While leadership commitment was strong, the execution of recovery strategies was acknowledged as being inconsistent across the departments. The discussions revealed three major areas which were seen as important:

(i) **Strengthening Disaster Recovery Governance**: current governance structures were highly centralized, limiting the participation of operational teams in decision-making. The group discussions led the participants to emphasize that governance mechanisms should be more inclusive, incorporating insights from both strategic and operational stakeholders. To emerge from the group discussions was the key recommendation to establish disaster recovery committees involving mid-level managers to bridge any strategy-execution gap.

(ii) **Enhancing Training and Readiness**: there was a recognised lack of uniformity in disaster recovery training across departments. Some of the teams underwent frequent disaster response drills, while others had no formalized training programs. The introduction of mandatory interdepartmental disaster response exercises was seen as a benefitial improvement to enhance the organizational readiness.

(iii) **Establishing a Comprehensive Disaster Recovery Framework**: the absence of a centralized performance monitoring system was seen as limiting the organisation's ability to measure recovery effectiveness. To address this, the participants highlighted the Balanced Scorecard as a viable tool for tracking disaster recovery performance through defined KPIs and CSFs. The implementation of a unified recovery framework would ensure that all departments operate under a common set of objectives and evaluation metrics.

These findings reinforce that while the existing leadership provided a strong strategic foundation, operational teams must be more actively involved in the disaster recovery planning process. The lack of a standardized framework, inconsistencies in resource allocation, and variations in training programs were identified as key barriers to an efficient disaster recovery system. To address these challenges, the expert participants recommended the following:

creating an integrated governance structure that ensured mid-level and frontline teams are actively involved in disaster recovery planning. Implementing structured, cross-departmental training programs to enhance organizational preparedness, and adopt the Balanced Scorecard framework to monitor disaster recovery performance and drive continuous improvements.

7.5 Academic contribution

This section is dedicated to present the academic contribution of the study. As mentioned above, this study has identified that there were two main contributions to existing academic understanding. The **first contribution** is related to the emergence of a qualitative aspect to the usage of key performance indicators, which challenges writers such as Kueng (2000), who contended that there are six essential properties to be followed, including the need for a quantifiable format. In being quantifiable means deriving a number or a conclusion from a set of defined criteria, and the indicator's outcome needing to be presented in a quantifiable and logical format (Andrews, 2002). In this study, there were some indicators which sought the qualitative or richness of the outcomes associated with the disaster recovery processes. These qualitative key performance indicators assessed and captured the performance themes such as stakeholder satisfaction, resource utilization, recovery point validation, the outcomes of training programs and of those attending awareness sessions, along with qualitative information related to the timely and accurate reporting and the testing of recovery plans. This qualitative nature challenges also the linear nature of a performance indicator, which means that the concept can measure performance changes in line with the value of the variable or attribute being used to determine any pre-determined performance deviation or variance. However, the usage of a qualitative indicator in this study does agree with Keung (2000) who identified the need for a key performance indicator as being reliable, but not necessarily through the usage of algorithms to calculate the outcomes.

In presenting this qualitative aspect of a key performance indicator, the mechanism like a quantitative indicator needs to be sensitive, reflective, and responsive of change, which can be captured by this subjective format. Again, the outcome of this study also adhered to Andrews (2002) and Keung (2000) suggestion that the indicator needs to be informed and reflective of what is being assessed in the disaster recovery plan, therefore requires constant updating, which was acknowledged and present in this study. Finally, like a quantitative key performance

indicator, the qualitative mechanism needed to be efficient, in that it is intuitive, unambiguous, and easy to understand without any jargon so that the voice of the recipient can be accurately captured.

The **second academic contribution** was associated with the emergence of additional critical success factors and key performance indicators, which have not been documented in the fields of information technology, project management or from a civil society disaster recovery perspective. This study agrees that there are a range of different mechanisms which can be used, but interestingly from a civil defence viewpoint public awareness is essential, therefore needs to be captured in some form of critical success factor, as to the public awareness and education on disaster preparedness of the recovery processes. The same was related to setting out the need for financial stability and the allocation of funds and budgets assigned to the recovery process. Finally, the **third contribution**, and again omitted from current disaster recovery planning theory was the importance to set out the need for timeliness of decision-making and the associated response and coordinated activities. From a performance indicator perspective, the findings updated current academic knowledge related to measuring the performance associated with the public education campaigns, the assessment of budgeted funds being allocated and used for disaster recovery processes, and the accuracy of decision-making processes as to the timeliness. Finally, the development of an operational leadership developmental disaster recovery planning framework provided an academic insight into how the findings of the study usage of the Balanced Scorecard can be implemented in the Dubai Civil Defence and will be covered in greater depth in the next section.

7.6 Professional contribution

Being a professional doctorate, this section will present the study's key focus, the professional contribution. To emerge from the findings were four key contributions: the need for a more holistic approach to recovery planning in the Dubai Civil Defence, the documentation being more holistic from a strategic and operational perspectives, addressing the potential misunderstanding of key performance indicators and critical success factors, and finally the need for adopting an overarching framework to capture all disaster recovery plans.

7.6.1 Greater involvement in the disaster recovery planning process

The first contribution to professional practice for the Dubai Civil Defence is associated with the need to provide a broader perspective from both a strategic but also operational viewpoints. Although the leadership teams interviewed in the study contended that there was an awareness of operational activities, this study contends that those employees who are operational focused will have a deeper understanding of the areas needed to be incorporated into the recovery plans (Rostami, Karlsson & Kolkowska; 2020; Cook, 2015; Blokdijk, 2008; Blokdijk & Menken, 2008; Chow, 2000). To achieve this, this study recommends that the use of a disaster recovery committee would enable this to occur, and would ensure that all areas in the organisation and associated activities are accounted for. Furthermore, if the concept of the Balanced Scorecard is adopted as an overarching framework, then the entire organization can be fully involved, which is aligned to the usage of a disaster recovery committee, as opposed to the current potential silo ownership.

7.6.2 The need for strategic and operational documentation

The next contribution to the professional practice is related to ensuring that the documentation is holistic from a strategic and operational perspectives. To achieve this, this study sees the importance of firstly creating, developing, and then implementing the plans from both an operational and leadership viewpoint. To do this, this study recommends that the disaster recovery planning processes includes the usage of a model or framework which incorporates the operational activities of the recovery strategy along with a strategic focus. There is also the need for the plans to be developed independently based on specific departmental needs and requirements such as information services and finance but also then combined to form an overall holistic organisational plan. For this study, which will be expanded on later in this section, is the usage of the Balanced Scorecard as a suitable generic methodology, which can provide the two viewpoints from four core managerial aspects, finance, the internal process, the customer, or community and learning and development. This study however does recognise many of the best practices adopted in the Dubai Civil Defence, and how the existing departmental strategies of selected planning methods have included the proactive usage of risk analysis and scenario planning, but also recognises the need for a more organisational approach to the entire disaster recovery process.

7.6.3 The terminology usage of critical success factors and key performance indicators

While there is the recognition that this study has added new critical success factors and key performance indicators to existing academic knowledge along with the introduction of a

qualitative dimension in using key performance indicators, the third contribution was associated with the need to ensure that the critical success factors and key performance indicators are fully understood, and the terminology and interpretation is accurate. The findings of this study revealed that there was a potential misunderstanding therefore mis-usage of these mechanisms. To overcome and address this, this study highlighted the need for the inclusion of external perspectives and input, including the contribution from a disaster planning and recovery committee.

7.6.4 The usage of the Balanced Scorecard

The final contribution, and central to this professional doctorate project is the identified need for an overarching holistic framework to be adopted. Although the Balanced Scorecard was developed for business purposes and not disaster recovery, the methodology as shown by Moe, Gehbaurer, Sentiz and Mueller (2007), can be adopted for disaster recovery. Unlike other models like the TOE, Plan-Do-Check-Act or PDCA approach or the business continuity planning protocol, the Balanced Scorecard offers firstly a generic construct which is not information technology related or only operational centric. The construct offers a managerial and leadership perspective to the disaster recovery processes and approaches, capturing the core attributes of the management: finance, internal processes, the customer or community and learning and development. The model is centred on aligning the plans and processes to the vision and mission of the organisation, which is essential for the leadership team, but also flexible enough to enable departments to plan their own recovery activities, but then align these strategies to the entire organizational needs. The Balanced Scorecard also encourages the entire organization to be involved in the process, therefore providing a more holistic insight into the recovery processes.

As a concept the Balanced Scorecard can enable the effective production of disaster recovery reports in a concise format, while making sure various strategic criteria can be effectively measured through providing a comprehensive overview of the planning activities at both an organisational and departmental level. This identified benefit also aligns to the recognised need for accurate documentation. This study recognised the requirement of RAG ratings to be used as a measuring technique (Stewart, 2001), but based on the pre-determined criteria therefore easier for users to interpret.

This study found there was an emergence of new DR plan's strategic and operational activities, together with the unique CSFs and KPIs which differs from the existing knowledge and understanding. This included several strategic activities and principles, policy formulations, and priorities. The operational activities included the capabilities to prepare, respond, and recover those services and facilities affected by an unplanned or unexpected event. This can be achieved by defining the roles and responsibilities by focusing on identifying, coordinating, and integrating the core DR related activities. These core activities can be grouped into three distinct stages:

(i) **Pre-disaster key activities** which involve preparedness planning to ensure having the capabilities and resources necessary to manage the disaster.

(ii) Prevention: The activities needed to avoid or prevent a possible disaster.

(iii) Protection: having in place precaution activities and strategies to secure the environment against the unforeseen disaster.

(iv) and Mitigation: those activities designed to reduce loss of life and damage to property by reducing the impact of the event.

During the disaster, key activities such as having an effective response plan, with the resources and capabilities ready to save lives, protect property and the environment, meet basic human needs, along with protecting the existing and restoring the infrastructure after an incident has occurred. The purpose of these measures was to ensure that the responses and activities undertaken are controlled and coordinated to ensure a rapid response to minimize the impact. As for the associated rescue provision, these are activities which are activated at the time of the emergency to reduce the outcome of the disaster, preserve assets, minimise the relocation of individuals, provide medical care and welfare.

Post-disaster key activities, a recovery plan process must have the capabilities necessary to restore and resume activities and services after a disaster. The purpose here is to measure the activities which are undertaken during the recovery process to assist individuals, businesses, and communities. Part of this is the restoration of services, potentially through the redevelopment or rehabilitation of provisions. To assess this, the strategic and operational DR plans need to have the 12 CSFs and corresponding 16 KPIs embedded into the disaster recovery framework to monitor, evaluate and assess the progress.

7.7 Limitations of the study

There were several limitations associated with this interpretivist study. The first limitation is the potential bias of the researcher, as this study was a social constructivist project, which involved the interviewing of leaders in the Dubai Civil Defence, from which the data was analysed using an interpretivist approach, which meant that the researcher needed to ensure that the subjective bias of interpretation was minimised. To address this potential bias, the researcher needed to confirm that the interview data was captured and transcribed accurately to achieve trustworthiness, dependability, and authenticity. The researcher therefore regularly checked the transcripts several times during the analysis stage to ensure that the participants' voices were accurately captured and presented.

The next limitation is associated with the sample size. This research involved interviewing six participants for the one-to-one interviews who are normally inaccessible. However, it should be noted that the study was grounded in a subjective perspective, therefore the sample size was small as it was focused on generating the richness of their experiences as opposed to generating a generalised outcome. However, recognising this relatively small sample size, the study focused on providing a rich insight into the experiences of disaster recovery processes in the Dubai Civil Defence, but did ensure that data saturation was reached. To partly address this limitation, three group discussions involving DCD disaster recovery experts were undertaken to validate and confirm the findings of the study.

7.8 Future Research

The main recommendation for future research is to extend the current study to include the operational personnel as to the planning and recovery process, but only if the recommendations of establishing a disaster recovery committee followed. Linked to this, recommended is that future research could adopt a mixed method approach to capture the experiences of the leadership team from a subjective perspective, and the operational staff experiences based on conducting a questionnaire. Another area for further research would be to investigate how the Balanced Scorecard framework is used and the extent to which the plans have changed before and after the adoption of the construct.

7.9 Chapter Conclusion

The chapter has addressed how the research aim and objectives were achieved through the findings of the study. The study found that there was an acknowledgement of the importance associated with senior leadership and management support, but also the need for a more holistic

organizational involvement. The findings indicated the importance of ensuring that resources and the allocation of time and personnel to undertake the various recovery activities was carefully planned for. The findings identified the importance that the documentation needed to be seen not only as a living entity but also the need for the plans to be departmental but also organisational centric, which led to the identification of the possibility of needing to adopt a framework which encompasses the entire process. The last core finding generated from the findings was related to the usage of critical success factors and key performance indicators.

The findings of the study also indicated that there were some misunderstanding amongst the leadership team as to the usage of key performance indicators and critical success factors, together with the emergence of new protocols, related to communication and coordination of activities, the timeliness and accuracy of decision-making process, the need for financial stability, and budget allocation and lastly as to public awareness and the need for on-going training. The study also identified the need for both quantitative and qualitative KPIs, which challenges the existing academic understanding through adding additional criteria such as assessing the effectiveness of public training and awareness campaigns. The data generated from the group discussions found that the key aspects of the civil defence disaster recovery process needed to follow and adopt a series of steps when creating a disaster recovery plan. This included the need for clear objectives in the disaster recovery plan, recognising the importance of the role of leadership in the operational disaster recovery planning process which needs the inclusion of CSFs and KPIs to assess the effectiveness of a disaster recovery plan, and finally, the need for constant reviewing, updating and revision.

The academic contribution of this study included the relevance of the emergence of a qualitative aspect to the usage of key performance indicators when developing DR processes. This academic contribution was associated with the emergence of additional critical success factors and key performance indicators, which have not been documented in the field of information technology, project management or from a civil society disaster recovery perspective. Also, omitted from current disaster recovery planning theory was the importance to set out the need for timeliness of decision-making and the associated response and coordinated activities. From a performance indicator perspective, the findings updated current academic knowledge related to the need to measure the performance associated with public education campaigns, the assessment of budgeted funds being allocated and used for disaster recovery processes, and the accuracy of decision-making processes as to its timeliness.

The professional contribution, which is core to this study, included greater involvement in the disaster recovery planning process which needs to extend throughout the organisation, the need for strategic and operational documentation, clear and correct usage of terminology associated with critical success factors and key performance indicators, and the usage of the Balanced Scorecard. Finally, informed by the Balanced Scorecard, the study developed an operational leadership developmental disaster recovery planning framework to contextualise and illustrate the outcomes of the study.

The chapter also included the limitations of the study which included the potential bias of the researcher, as this study was a social constructivist project, which involved the interviewing of leaders in the Dubai Civil Defence, from which the data was analysed using an interpretivist approach. Another limitation was associated with the sample size. This research involved interviewing six participants for the one-to-one interviews, however these individuals are normally inaccessible. It however should be noted that the study was grounded in a subjective perspective, therefore the sample size was intentionally small as the focus was on generating the richness of their experiences as opposed to providing a generalized outcome. Finally, future research was presented including conducting further studies based on a larger sample size then investigate which framework(s) would be best suited for operational leadership when planning disaster recovery plans and processes.

References

Adam, C. (2013). Coping with adversity: The macroeconomic management of natural disasters. *Environmental science & policy*, *27*, S99-S111.

Al Ghasyah D.H., Duncan, A.M. & Chester, D.K. (2010) 'United Arab Emirates: disaster management with regard to rapid onset natural disasters', in Asimakopoulou,E. and Bessis, N. (eds.) *Advanced ICTs for disaster management and threat detection: collaborative and distributed frameworks*. Philadelphia: ICG Global, pp.65-79.

Aldrich, D. P. (2012), 'Social Capital in Post Disaster Recovery: Towards a Resilient and Compassionate East Asian Community', in Sawada, Y. and S. Oum (eds.), Economic and Welfare Impacts of Disasters in East Asia and Policy Responses. *ERIA Research Project Report* 2011-8, Jakarta: ERIA. pp.157-178.

Aldrich, D. P., & Meyer, M. A. (2019). Social capital and community resilience. *American behavioral scientist,* 59(2), 254-269.

Alexander, D. (2002). *Principles of emergency planning and management*. Oxford University Press.

Alexander, D. (2015). Disaster and emergency planning for preparedness, response, and recovery. *Oxford Research Encyclopedia of Natural Hazard Science*.

Alexander, D. (2021). *Post-recovery evaluation: Frameworks for improvement*. *Disasters* – 48 (2), 5-18

Alexander,D. J.C. Gaillard, Ilan Kelman, Fausto Marincioni, Edmund Penning-Rowsell, Dewald van Niekerk, Lauren J. & Vinnell. (2020). Academic publishing in disaster risk reduction: past, present, and future. *Disasters,* 45 (1) 5-18

Alshamsi, H. (2017). *Managing Major Emergencies: Recommendations to develop effective contingency planning in the United Arab Emirates*. University of Salford, Manchester.

Altay, N., & Green III, W. G. (2006). OR/MS research in disaster operations management. *European journal of operational research*, *175*(1), 475-493.

Alvesson, M., & Deetz, S. (2000). An introduction to critical research. In *Doing Critical Management Research* (pp. 2-22). SAGE Publications Ltd,

Al-Zahrani, A., Mohamed, M. B., Ahmed, M. I. O., Alonaizi, N. D. N., Qudsei, Z. M. B., & Hawsawi, A. M. (2017). *Nurses Perception, Attitude and Practices Regarding Disasters Management and Emergency Preparedness at Sabia General Hospital Saudi Arabia* 2017.

Andrews, P. (2002). *An Introduction to Mathematical Logic and Type Theory: To Truth Through Proof*. Berlin: Kluwer.

Angeles, R. (2014) 'Using the technology-organization-environment framework for analyzing Nike's 'considered index' green initiative, a decision support system-driven system', *Journal of Management and Sustainability*, 4, (1), pp.96–113

Ashrafi, R., & AlKindi, H. (2022). A framework for IS/IT disaster recovery planning. *International Journal of Business Continuity and Risk Management*, *12*(1), 1-21.

Arnell, N.W. (2022). The implications of climate change for emergency planning, *International Journal of Disaster Risk Reduction*, 83, 103425

Ayaz, A. (2010). Disaster Management through the New Millennium, Anmol Publications, 2010, New Delhi, p. 7.

Bakar, Z. A., Yaacob, N. A., & Udin, Z. M. (2015). The effect of business continuity management factors on organizational performance: A conceptual framework. *International Journal of Economics and Financial Issues*, *5*(1), 128-134.

Bahmani, H., & Zhang, W. (2021). Comprehensive success evaluation framework for socio-natural disaster recovery projects. *Buildings*, *11*(12), 647.

Balcik, B., Beamon, B. M., Krejci, C. C., Muramatsu, K. M., & Ramirez, M. (2010). Coordination in humanitarian relief chains: Practices, challenges and opportunities. *International Journal of production economics*, *126*(1), 22-34.

Barbour R.S. (2005) Making sense of focus groups. *Medical Education* 39, 742–750

Baxter, J. & Eyles, J. (1997) Evaluating qualitative research in social geography: Establishing "Rigor" in interview analysis. *Transactions of the Institute of British Geographers*, 22, 505-525.

Berke, P., & Campanella, T. (2006). Planning for post-disaster resiliency. *The Annals of the American Academy*, 604(1), 192–207.

Berler, A., Pavlopoulos, S., & Koutsouris, D. (2005). Using key performance indicators as knowledge management tools at a regional health-care authority level. IEEE Transactions on Information Technology in Biomedicine, 9(2):184–192

Bharosa, N. Janssen, M. Wijk, R. Niels, W. Haiko, V. Joris, H. & Yao-Hua, T. (2019). Tapping into existing information flows: The transformation to compliance by design in business-to-government information exchange. Vol - 30 Government Information Quarterly. P. 9-18.

Bigley, G. A., & Roberts, K. H. (2001). The incident command system: High-reliability organizing for complex and volatile task environments. *Academy of Management Journal*, 44(6), 1281–1299.

Birkmann, J., Schüttrumpf, H., Handmer, J., Thieken, A., Kuhlicke, C., Truedinger, A., ... & Kirschbauer, L. (2023). Strengthening resilience in reconstruction after extreme events–Insights from flood affected communities in Germany. *International journal of disaster risk reduction*, *96*, 103965.

Blaikie, N. (2007). *Approaches to social enquiry: Advancing knowledge*. Polity.

Blokdijk, G. (2008). *Disaster Recovery 100 Success Secrets-IT Business Continuity, Disaster Recovery planning and Services*. Lulu. com.

Blos, M. F., Quaddus, M., Wee, H. M., & Watanabe, K. (2009). Supply chain risk management (SCRM): a case study on the automotive and electronic industries in Brazil. *Supply Chain Management: An International Journal*, *14*(4), 247-252.

Blokdijk, G., & Menken, I. (2008). IT Service Continuity Management and Disaster Recovery Best Practice Handbook: Building, Running and Managing Effective IT Service Continuity Management... documents bringing ITIL Theory into Practice.

Blumer, H. (1956) Sociological Analysis and the Variable. *American Sociological Review,* 21, 683-690.

Bodas, M., Kirsch, T. D., & Peleg, K. (2020). Top hazards approach–Rethinking the appropriateness of the All-Hazards approach in disaster risk management. *International journal of disaster risk reduction*, *47*, 101559.

Boin, A., Hart, P., Stern, E., & Sundelius, B. (2016). *The politics of crisis management: Public leadership under pressure.* Cambridge University Press.

Boin, A., Stern, E., & Sundelius, B. (2016). *The politics of crisis management: Public leadership under pressure*. Cambridge University Press.

Christopher, M., & Tatham, P. (2018). *Humanitarian logistics: Meeting the challenge of preparing for and responding to disasters.* (3rd ed.). Kogan Page.

Col, J. M. (2007). Managing disasters: The role of local government. *Public Administration Review*, 67, 114–124.

Comfort, L. K. A Boin, & Demchak, CC. (2018). Crisis management in real time: A framework for analysis. *Public Administration Review,* 78(4), 539–551

Comfort, L. K., Waugh, W.L. & Cigleret, B.A. (2019). Crisis response time optimization. Manag Rev Q 73, 1179–1235 (2023). https://doi.org /10.1007/s11301-022-00272-x

Comfort, L. K., Sungu, Y. Johnson, D. & Dunn, M (2020). Crisis standard of care: Role of communication and information management. *Disaster Medicine and Public Health Preparedness*, 14(5), 630–637.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.

Brinkmann, S., & Kvale, S. (2005). Confronting the ethics of qualitative research. *Journal of Constructivist Psychology,* 18(2), 157–181.

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research*, 6(1), 97–113.

Bryman, A. (2012). *Social Research Methods* (4th Ed). Oxford. New York: Oxford University Press.

Bryman, A. (2015). *Social Research Methods* (5th ed.). Oxford University Press.

Bryman, A., & Bell, E. (2007). Business research methods. New York: Oxford University.

Bullock J.A, Haddow G.D., & Coppola D.P. (2013). Mitigation, Prevention, and Preparedness. *Introduction to Homeland Security*, 435–94.

Burr, V. (2003). *Social Constructionism* (2nd ed.). London: Routledge.

Cappola, D. P. (2015). *Introduction to international disaster management*. Butterworth-Heinemann.

Cavanagh, S. (1997) Content Analysis: Concepts, Methods and Applications. *Nurse Researcher,* 4, 5-13.

Cipriani, A., & Geddes, J. (2003). Comparison of systematic and narrative reviews: the example of the atypical antipsychotics. Epidemiology and psychiatric sciences, 12(3), 146-153.

Chadderton, C. (2015). *Civil defence pedagogies and narratives of democracy: disaster education.* Available at:
https://repository.uel.ac.uk/download/75e35d449e855d8cc02e13509ba6e87c16cec37a2f2a5ff731cbcf1a70dde5d2/338383/Disaster%20education%20in%20Germany%20final%20word%20version%20for%20publication.pdf

Chang, S. E., & Rose, A. Z. (2012). Towards a theory of economic recovery from disasters. *International Journal of Mass Emergencies & Disasters*, *30*(2), 171-181.

Chapman, C. L. (2017). *The influence of leadership on business continuity planning: A qualitative phenomenological study* (Doctoral dissertation, University of Phoenix).

Chow, W. S., & On Ha, W. (2009). Determinants of the critical success factor of disaster recovery planning for information systems. *Information Management & Computer Security*, *17*(3), 248-275.

Chowdhury, S., Emelogu, A., Marufuzzaman, M., Nurre, S. G., & Bian, L. (2017). Drones for disaster response and relief operations: A continuous approximation model. *International Journal of Production Economics*, *188*, 167-184.

Clarke, A. E. (2005). *Situational analysis: Grounded theory after the postmodern turn*. Sage Publications, Inc.

Collins, J. A., & Fauser, B. C. (2005). Balancing the strengths of systematic and narrative reviews. In: Oxford University Press.

Comfort, L. K. (2007). Crisis management in hindsight: Cognition, communication, coordination, and control. *Public Administration Review*, 67(S1), 189-197.

Cook, J. (2015). A six-stage business continuity and disaster recovery planning cycle. *SAM Advanced Management Journal*, *80*(3), 23.

Cook, D. J., Greengold, N. L., Ellrodt, A. G., & Weingarten, S. R. (1997). The relation between systematic reviews and practice guidelines. Annals of internal medicine, 127(3), 210-216.

Costello, T. (2012). Business Continuity: Beyond Disaster Recovery. Vol. 14 *IT Professional* pp. 67.

Creswell, J.W. (2013) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* 4th Edition, SAGE Publications, Inc., London.

Crotty, M. (1998). *The Foundations of Social Research: Meaning and Perspective in the Research Process.* London: SAGE Publications Inc.

Cuny, F. C. (2017). *Emergency relief operations for refugees: An overview*. Oaktrust Library.

Curnin, S., & O'Hara, D. (2019). Nonprofit and public sector interorganizational collaboration in disaster recovery: Lessons from the field. *Nonprofit Management and Leadership*, *30*(2), 277-297.

Daniel, D.R. (1961) Management Information Crisis. *Harvard Business Review*, 39, 111-121.

Davidson, C. H., Johnson, C., Lizarralde, G., Dikmen, N., & Sliwinski, A. (2007). Truths and myths about community participation in post-disaster housing projects. *Habitat international*, *31*(1), 100-115.

Davidson, C. H., Briggs, J. Nolan, E. Bush, J. & Håkansson, I. (2019). Disaster prevention and management. Davidson. *Urban Climate,* 33, 100666.

Davis, I. (2006). Learning from Disaster Recovery Guidance for Decision Makers. *International Recovery Platform (IRP)*, May. UNISDR.

DCD. (2024). *Vision, Mission and Values*. Available at: https://www.dcd.gov.ae/portal/en/about-us/dcd-vision.jsp

DGDCD (2023). *Vision, mission, objectives of DCD*. Directorate General of Dubai Civil Defence. Available at:

https://dcd.gov.ae/en/Employers/pages/Information.aspx?ID=15#:~:text=The%20objectives%20of%20DCD%20is,state%20war%2C%20emergency%20and%20public

Diallo, A., & Thuillier, D. (2004). The success dimensions of international development projects: the perceptions of African project coordinators. *International journal of project management*, *22*(1), 19-31.

DePietro, R., Wiarda, E. & Fleischer, M. (1990) 'The context for change: organization, technology and environment', in Tornatzky, L.G. and Fleischer, M. (Eds.): *The Processes of Technological Innovation*, Lexington Books: Lexington, MA, pp.151–175.

DiMaria, J. (2014) 'Getting Buy-In for a business continuity management system', *Disaster Recovery Journal,* Vol. 27, No. 2 [online] http://www.drj.com/journal/spring-2014- volume-27-issue-2/getting-buy-in-for-a-business-continuity-management-system.html

Dixon-Woods, M., et al. (2005) Synthesising Qualitative and Quantitative Evidence: A Review of Possible Methods. *Journal of Health Services Research & Policy*, 10, 45-53.

Downe-Wambolt, B. (1992) Content Analysis: Method, Applications and Issues. *Health Care for Women International,* 13, 313-321.

Duggleby W. (2005) What about focus group interaction data? *Qualitative Health Research* 15(6), 832–840

Easterby-Smith, M., Thorpe, R., & Holman, D. (1996), "Using repertory grids in management", *Journal of European Industrial Training*, Vol. 20, No. 3, pp.2-30.

Easterby-Smith, M., Thorpe, R., & Jackson, P. R. (2012). *Management research*. Sage.

El-Temtamy, O., Majdalawieh, M. and Pumphrey, L. (2016) 'Assessing IT disaster recovery plans: The case of publicly listed firms on Abu Dhabi/UAE security exchange', *Information and Computer Security,* Vol. 24, No. 5, pp.514–533

Enshasy, M. (2009). Evaluating Business continuity and Disaster recovery planning in information technology departments in Palestinian listed companies. *Gaza, Palestinian: Islamic Universit of Gaza*.

Faulkner, B., & Russell, R. (2001). Turbulence, chaos and complexity in tourism systems: A research direction for the new millennium. *Tourism in the twenty-first century: reflections on experience,* 328-349. CABI

FEMA. (2019). *National response framework*. Federal Emergency Management Agency.

FEMA. (2021). *Response time analysis framework*. Federal Emergency Management Agency.

Few, A. L. & Bell-Scott, P. (2002). Grounding our feet and hearts: Black women's coping strategies and the decision to leave. *Women and Therapy*, 25, 59-77.

Fielding N. (2014) Varieties of research interviews. *Nurse Researcher* 1(3), 4–13.

Ford, J. K., & Schmidt, A. M. (2020). Training for crisis preparedness. *Journal of Contingencies and Crisis Management.* and *Australian Journal of Emergency Management*, 39(4), 33-45.

Frank, U., Heise, D., and Kattenstroth, H. (2009). Use of a domain specific modeling language for realizing versatile dashboards. In: Tolvanen JP, Rossi M, Gray J, Sprinkle J (eds) *Proceedings of the 9th OOPSLA workshop on domain-specific modelling (DSM)*.

Galbusera, L., Cardarilli, M., & Giannopoulos, G. (2021). The ERNCIP survey on COVID-19: Emergency & Business Continuity for fostering resilience in critical infrastructures. *Safety Science*, *139*, 105161.

Galindo, G., & Batta, R. (2013). Prepositioning of supplies in preparation for a hurricane under potential destruction of prepositioned supplies. *Socio-Economic Planning Sciences*, *47*(1), 20-37.

Gibb, F. & Buchanan, S. (2006) A framework for business continuity management', *International Journal of Information Management*, 26, (2), pp.128–141

Gill, J. and Johnson, P. (2002) *Research Methods for Managers*. Third Edition, Sage Publications Ltd., New York.

Glaser, B., & Strauss, A. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Mill Valley, CA: Sociology Press.

Guba, E. G. (Ed.). (1990). *The paradigm dialog*. Sage Publications, Inc.

Guba, E. & Lincoln, Y. (1998), *"Naturalistic Inquiry"*. Newbury Park, CA: Sage.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Sage Publications, Inc.

Haghani, A., & Afshar, A. (2009). Supply chain management in disaster response. *Transportation Research Part E*, 45(6), 1–15.

Haji, J. (2016). Airline business continuity and IT disaster recovery sites. *Journal of Business Continuity & Emergency Planning*, *9*(3), 228-238.

Halcomb E.J. & Andrew S. (2005) Triangulation as a method for contemporary nursing research. *Nurse Researcher* 13(2), 71–82

Hallegatte, S. (2019). *Lifelines: The resilient infrastructure opportunity.* World Bank Publications.

Hamideh, S., Peacock, W. G., & Van Zandt, S. (2021). Housing type matters for pace of recovery: Evidence from Hurricane Ike. *International journal of disaster risk reduction*, *57*, 102149.

Hannah, S. T., Uhl-Bien, M., Avolio, B. J., & Cavarretta, F. L. (2009). A framework for examining leadership in extreme contexts. *The Leadership Quarterly*, 20(6), 897-919.

Harrald, J. (2006) 'Agility and discipline: critical success factors for disaster response', *The Annals of the American Academy of political and Social Science,* 604(1), pp.256–272 [online] https://www.jstor.org/stable/25097791?seq=1

Hatch, M. J., & Cunliffe, A. L. (2006). *Organization Theory: Modern, Symbolic, and Postmodern Perspectives* (2nd ed.). New York: Oxford University Press.

Hawkins, R. L., & Maurer, K. (2010). Bonding, bridging and linking: How social capital operated in New Orleans following Hurricane Katrina. *British Journal of Social Work*, *40*(6), 1777-1793.

Herbane, B. (2020). Business continuity management: Building an effective response. *Long Range Planning,* 37 (5), 435-457

Hillmann, J., & Guenther, E. (2021). Organizational resilience: a valuable construct for management research? *International Journal of Management Reviews*, *23*(1), 7-44.

Hiller, M., Bone, E. A., & Timmins, M. L. (2015). Healthcare system resiliency: The case for taking disaster plans further—Part 2. *Journal of business continuity & emergency planning*, *8*(4), 356-375.

Hochrainer-Stigler, S., Schinko, T. Hof, A. & Ward, P.J. (2017). Risk-financing for disaster resilience. *Climatic Change*, 133(1), 85–100.

Hoong, L. L., & Marthandan, G. (2014). Critical dimensions of disaster recovery planning. *International Journal of Business and Management*, *9*(12), 145.

Houston, J. B., Schraedley, M. K., Worley, M. E., Reed, K., & Saidi, J. (2019). Disaster journalism: fostering citizen and community disaster mitigation, preparedness, response, recovery, and resilience across the disaster cycle. *Disasters*, *43*(3), 591-611.

Brian Houston, J., Thorson, E., Kim, E., & Mantrala, M. K. (2021). COVID-19 communication ecology: Visualizing communication resource connections during a public health emergency using network analysis. *American Behavioral Scientist, 65*(7), 893-913.

ISO 22301. (2019). Security and resilience – *Business continuity management systems – Requirements.*

ISO 31000. (2018). *Risk management – Guidelines.*

Järveläinen, J. (2016). *Integrated business continuity planning and information security policy development approach.*

Johnson, D. W., & Johnson, R. T. (1989). *Cooperation and competition: Theory and research:* Interaction Book Company.

Kaneberg, E. (2018). Managing commercial actors in strategic networks in emergency preparedness: A study of multiple networks from Sweden. *Journal of Humanitarian Logistics and Supply Chain Management, 8*(2), 153-183.

Kaplan, R. and Norton, D. (1992) The Balanced Scorecard—Measures That Drive Performance. *Harvard Business Review*, 79.

Kaplan, R. S., & Norton, D. P. (2004). *Strategy maps: Converting intangible assets into tangible outcomes.* Harvard Business Press.

Kapucu, N. (2008). Collaborative emergency management: Better community organizing, better public preparedness and response. *Disasters, 32*(2), 239-262.

Kapucu, N. (2021). Network performance assessment in disaster management. *Disaster Prevention and Management*, 24, 201 - 220

Kapucu, N., & Van Wart, M. (2016). Dynamic leadership in emergency management. *Public Administration Review*, 76(4), 542–553.

Karim, A. J. (2011). Business disaster preparedness: An empirical study for measuring the factors of business continuity to face business disaster. *International Journal of Business and Social Science*, *2*(18).

Kidd P.S. & Parshall M.B. (2000) Getting the focus and the group: enhancing analytical rigor in focus group research. *Qualitative Health Research* 10(3), 293–308.

King, N. (1994). The qualitative research interview. In C. Cassell & G. Symon (Eds.), *Qualitative methods in organizational research: A practical guide* (pp. 14–36). Sage Publications, Inc.

King, N. (2004) Using Templates in Thematic Analysis of Text. In: *Essential Guide to Qualitative Methods in Organizational Research*, Sage Publications, London, 257-270.

King, D. Dalton, D. Daily, C. & Covin, J. (2004). Meta-analyses of post-acquisition performance: Indications of unidentified moderators VL - 25 *Management Faculty Research and Publications*

Kueng, P. (2000). Process performance measurement system - a tool to support process-based organizations. *TOTAL QUALITY MANAGEMENT*, 11(1):67–85.

Lambert, S. & Loiselle, C. (2008). Combining individual interviews and focus groups to enhance data richness. *Journal of advanced nursing*. 62, 228 - 37

Lehoux P., Blake P. & Daudelin G. (2006) Focus group research and ''the patient's view''. *Social Science and Medicine* 63, 2091–210 4

Leung C.M., Ho G.K.H., Foong M., Ho C.F., Lee P.K.K. & Mak, L.S.P. (2005) Small-group hypertension health education programme: a process and outcome evaluation. *Journal of Advanced Nursing* 52(6), 631–639

Leungbootnak, N., Charoenngam, C., & Sunindijo, R. Y. (2005, June). Post-tsunami disaster reconstruction management: A case study of thailand. In *Scientific Forum on the Tsunami, Its Impact and Recovery* (p. 144).

Li, X., Lam, N., Qiang, Y., Li, K., Yin, L., Liu, S., & Zheng, W. (2016). Measuring county resilience after the 2008 Wenchuan earthquake. *International Journal of Disaster Risk Science*, *7*, 393-412.

Li, C., Wang, M., & Liu, K. (2018). A decadal evolution of landslides and debris flows after the Wenchuan earthquake. *Geomorphology*, *323*, 1-12.

Lincoln, Y.S., Lynham, S.A. & Guba, E.G. (2011). Paradigmatic controversies, contra-dictions, and emerging confluences, revisited. In N.K. Denzin & Y.S. Lincoln (eds), *The Sage Handbook of Qualitative Research* (4th edn; pp. 97–128). Thousand Oaks, CA: Sage.

Lindell, M. K. Zeigler, DJ. Perry, RW. Greeneet, MR. (2019). Effective evacuation planning: Evacuation Planning in Emergency Management. *Geographical Review*. 73, 245. L

Lockwood, N. R., & SPHR, G. (2005). Crisis management in today's business environment. *SHRM Research Quarterly*, *4*, 1-9.

Lofland, J., & Lofland, L. H. (1984). *Analyzing Social Settings* (2nd ed.). Belmont, CA: Wadsworth.

Loiselle C.G., Profetto-McGrath J., Polit D.F. & Beck C. (2007) *Polit & Beck Canadian Essentials of Nursing Research,* 2nd edn. Lippincot Williams & Wilkins, Philadelphia, PA

Macdonald M.E. (2006) Qualitative interviewing: a few whats, hows and whys. Paper presented at a *Videoconference Meeting of the CIHR Strategic Training Program in Palliative Care Research,* Montreal, QC

Mansol, N. H., Alwi, N. H. M., & Ismail, W. (2014). Success factors towards implementation of business continuity management in organizations. *International Journal of Digital Society*, *5*(1), 909-911.

Masahiro T. Terao, M. Sogi, N. Shibata, T. Senzaki, K. & Rodeiques, R. (2024). *Disaster damage assessment using LLMs and image analysis*. NEC.

Mayer, B. (2019). A review of the literature on community resilience and disaster recovery. *Current environmental health reports*, *6*, 167-173.

Meyer M.A. (2018). Social capital in disaster research. In: *Handbook of disaster research.* Cham: Springer.

Meyer, C. M., & Torres, E. L. G. (2019). Success factors for supply chain management projects: an empirical analysis. *IFAC-PapersOnLine*, *52*(13), 153-158.

Meechang, K., & Watanabe, K. (2022). The Critical Success Factors of Area-Business Continuity Management: A Systematic Review and Outlooks from the Public and Private Sectors. *Journal of Disaster Research*, *17*(6), 923-932.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage Publications, Inc.

Moe, T., & Pathranarakul, P. (2006). An integrated approach to natural disaster management: public project management and its critical success factors. *Disaster Prevention and Management: An International Journal*, *15*(3), 396-413.

Moe, T. L., Gehbauer, F., Senitz, S., & Mueller, M. (2007). Balanced scorecard for natural disaster management projects. *Disaster Prevention and Management: An International Journal*, *16*(5), 785-806.

Montshiwa, A. L., Nagahira, A., & Ishida, S. (2016). Modifying business continuity plan (BCP) towards an effective auto-mobile business continuity management (BCM): A quantitative approach. *Journal of Disaster Research*, *11*(4), 691-698.

Nasiren, M. A., Abdullah, M. N., & Asmoni, M. (2016). Critical Success Factors on the BCM Implementation in SMEs. *Journal of Advanced Research in Business and Management Studies*, *3*(1), 105-122.

Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M., and Kennerley, M. (2000). Performance measurement system design: developing and testing a process-based approach. *International Journal of Operations and Production Management*, 20(10):1119 – 11452.

Nelson, K. (2006, January). Examining factors associated with IT disaster preparedness. In *Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06)* (Vol. 8, pp. 205b-205b). IEEE.

NIES. (2023). Towards the environmental restoration of disaster areas: Research on the recovery of environments contaminated with radioactive substances. *International recovery platform*.

Nolte I.M., & Boenigk S. (2018). Public–nonprofit partnership performance in a disaster context: the case of Haiti. *Public Adm.* 2011;89(4):1385-402. doi: 10.1111/j.1467-9299.2011.01950.x. PMID: 22312649.

Omar, A., Alijani, D., & Mason, R. (2011). Information technology disaster recovery plan: Case study. *Academy of Strategic Management Journal*, *10*(2), 127.

O'Brien, G., Federici, F. Cadwell, P. & Marloweet, J. (2020). Disaster law: International and national approaches. *International journal of disaster risk reduction*, 31, 627-636.

O'Rourke, T.D. (2007). Critical infrastructure, interedependencies and resilience. *The Bridge*, 22-29.

O'Rourke, T. D. (2020). Critical infrastructure resilience: Principles and practice. *Risk Analysis*, 40(S1), 2158–2168.

Parmenter, D. (2010). *Key Performance Indicators, Developing, Implementing and Using Winning KPIs.* John Wiley & Sons, New Jersey

Patil, S. K., & Kant, R. (2014). Ranking the barriers of knowledge management adoption in supply chain using fuzzy AHP method. *International Journal of Business Innovation and Research*, *8*(1), 52-75.

Paton, D., & Johnston, D. (2001). Disasters and communities: Vulnerability, resilience, and preparedness. *Disaster Prevention and Management: An International Journal*, 10(4), 270-277.

Perry, R. W., & Lindell, M. K. (2020). Emergency planning. *Journal of Contingencies and Crisis Management.* 72, 336 - 350

Peterson, C. A. (2009, September). Business continuity management & guidelines. In *2009 Information Security Curriculum Development Conference* (pp. 114-120).

Pinta, J. (2011). Disaster recovery planning as part of business continuity management. *Agris on-line Papers in Economics and Informatics*, *3*(665-2016-44815), 55-61.

Platt, S. (2018). Factors affecting the speed and quality of post-disaster recovery and resilience. *Earthquake Engineering and Structural Dynamics in Memory of Ragnar Sigbjörnsson: Selected Topics*, 369-403.

Pois, H., & Oak, S. (2007). WAR & military health. *American Journal of Public Health*, *97*(12), 2132-2142.

Popova, V. & Sharpanskykh, A. (2010). Modeling Organizational Performance Indicators. Vol. 35 *Information Systems*. Pp. 505 – 527.

Prideaux, B. & Beirman, D. (2024). Key issues in crisis and disaster management and research. April 2024. In book: *Handbook on Crisis and Disaster Management in Tourism* (pp.1-20)

Rees C.E., Ford J.E. & Sheard C.E. (2003) Patient information leaflets for prostate cancer: which leaflets should healthcare professionals recommend? *Patient Education and Counselling* 49,263–272.

Reynolds, B., & Seeger, M. W. (2017). Crisis and emergency risk communication. *Health Security,* 15(5), 543–551.

Ritchie, B. W. (2004). Chaos, crises and disasters: A strategic approach to crisis management in the tourism industry. *Tourism Management*, 25, 669–683

Ritchie, B. W. (2009). *Crisis and disaster management for tourism*. Multilingual Matters.

Robson, C. (2011). *Real world research* (3rd ed.). Chichester, UK: Wiley.

Rockart, J.F. (1979) Chief Executives Define Their Own Data Needs. *Harvard Business Review,* 57, 81-93.

Rodríguez-Pereira, J., Balcik, B., Rancourt, M. È., & Laporte, G. (2021). A cost-sharing mechanism for multi-country partnerships in disaster preparedness. *Production and Operations Management*, *30*(12), 4541-4565.

Roosli, R., & O'Keefe, P. (2013). Post-disaster housing and management in Malaysia: a literature review. *International Journal of Disaster Resilience in the Built Environment*, *4*(2), 168-181.

Rostami, E., Karlsson, F., & Kolkowska, E. (2020). The hunt for computerized support in information security policy management: a literature review. *Information & Computer Security*, *28*(2), 215-259.

Rouhanizadeh, B., Kermanshachi, S., & Nipa, T. J. (2020). Exploratory analysis of barriers to effective post-disaster recovery. *International Journal of Disaster Risk Reduction*, *50*, 101735.

Sahebjamnia, N., Torabi, S. A., & Mansouri, S. A. (2015). Integrated business continuity and disaster recovery planning: Towards organizational resilience. *European journal of operational research*, *242*(1), 261-273.

Sale JE, Lohfeld LH, Brazil K. Revisiting the Quantitative-Qualitative Debate: Implications for Mixed-Methods Research. *Qual Quant.* 2002 Feb;36(1):43-53.

Sarantakos, S. (1998). *Social Research.* Published by Macmillan Education, Melbourne (1998)

Sarantakos, S. (2012). *Social Research*. Macmillan International Higher Education.

Schütz, A. (1962). *The Problem of Social Reality: Collected Papers I*. The Hague: Martinus Nijhoff.

Scott, J. (2007) 'An e-transformation study using the technology-organization-environment framework', *20th Bled eConference eMergence: Merging and Emerging Technologies, Processes, and Institutions*, pp.50–61, Bled, Slovenia [online] https://core.ac.uk/download/pdf/301359173.pdF.

Seeger, M. W., Sellnow, T. L., Ulmer, R. R. (1998). Communication, organization, and crisis. *Communication Yearbook*, 21, 231–75.

Sellnow, D. D., Lane, D. R., Sellnow, T. L., & Littlefield, R. S. (2017). Development communication for effective risk communication. *Communication Studies*, 68(5), 552-567.

Sena, L. & Kifle WM. (2006). *Disaster Prevention and Preparedness*. USAid.

Silverman, D. (2013). *Doing Qualitative Research: A Practical Handbook*. Sage Publications.

Smith, G. P., & Wenger, D. (2007). Sustainable disaster recovery. *Environmental Hazards*, 7(1), 20–31.

Smith, G. P., & Wenger, D. E. (2021). Sustainable disaster recovery. January 2007 In book: *Handbook of Disaster Research* (pp.234-257)

Smith, K. (2021). *Environmental hazards: Assessing risk and reducing disaster* (8th ed.). Routledge.

Snedaker, S. (2013). *Business continuity and disaster recovery planning for IT professionals*. Newnes.

Speziale H.J. & Carpenter D. (2003) *Qualitative Research in Nursing: Advancing the Humanistic Imperative.* Lippincott, Philadelphia, PA.

Statewide Disaster Recovery Planning for Information Technology Systems (2010) The Montana

Stewart, W. E. (2001). 2000 International Student Paper Award Winner: Balanced Scorecard for Projects. *Project Management Journal,* 32(1), 38-53.

Strecker, S., Frank, U., Heise, D., & Kattenstroth, H. (2012). MetricM: A modelling method in support of the reflective design and use of performance measurement systems. Springer, *Information Systems and eBusiness Management,* 10:241–276

Solomon, C.M. (1994), "Bracing for emergencies", *Personnel Journal,* April, pp. 74-83

Talib, M. S., Abdul Hamid, A. B., & Thoo, A. C. (2015). Critical success factors of supply chain management: a literature survey and Pareto analysis. *EuroMed Journal of Business*, *10*(2), 234-263.

Taylor B. (2005) The experience of overseas nurses working in the NHS: result of a qualitative study. *Diversity in Health and Social Care* 2, 17–27

The Sphere Standards. (2018). *Humanitarian charter and minimum standards in humanitarian response.* Available at: https://spherestandards.org/wp-content/uploads/Sphere-Handbook-2018-EN.pdf

Tierney, K. (2014). *The social roots of risk: Producing disasters, promoting resilience*. Stanford University Press.

Tierney, K. J., Lindell, M. K., & Perry, R. W. (2001). *Facing the unexpected: Disaster preparedness and response in the United States*. Joseph Henry Press.

Tingsanchali, T. (2012). Urban flood disaster management, *Procedia Engineering*, Volume 32, 2012, Pages 25-37,

Tokpah, P. K. (2024). *Public health issues in disasters*. Available at: https://www.researchgate.net/publication/378846175_Public_Health_Issues_in_Disasters

Torabi, S. A., Soufi, H. R., & Sahebjamnia, N. (2014). A new framework for business impact analysis in business continuity management (with a case study). *Safety Science*, *68*, 309-323.

Torabi, S. A., Giahi, R., & Sahebjamnia, N. (2016). An enhanced risk assessment framework for business continuity management systems. *Safety science*, *89*, 201-218.

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207-222.

Moe, T. L., Gehbauer, F., Senitz, S., & Mueller, M. (2007). Balanced scorecard for natural disaster management projects. *Disaster Prevention and Management: An International Journal*, *16*(5), 785-806.

Tu, C.Z., Yuan, Y., Archer, N. & Connelly, C.E. (2018) 'Strategic value alignment for information security management: a critical success factor analysis', *Information & Computer Security,* Vol. 26, No. 2, pp.150–170

Turner, J. R., & Müller, R. (2004). Communication and co-operation on projects between the project owner as principal and the project manager as agent. *European management journal*, *22*(3), 327-336.

UNDRR. (2015). *Sendai framework for disaster risk reduction 2015–2030*. United Nations Office for Disaster Risk Reduction. Available at: https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

UNDRR. (2022). *Enhanced risk assessment framework*. United Nations Office for Disaster Risk Reduction. Available at: https://www.undrr.org/gar/gar2022-our-world-risk-gar

UNISDR (2009). United Nations International Strategy for Disaster Reduction *2009 UNISDR United Terminology on Disaster Risk Reduction.* [pdf]. Retrieved from www .unisdr .org/ files/ 7817 _UNIS DRTerminol ogyEnglish .pdf.

van Teijlingen E. & Pitchforth E. (2006) Focus group research infamily planning and reproductive health care. *Journal of Family Planning and Reproductive Health Care* 32(1), 30–32.

van Westen, C. (2013). Remote sensing and GIS for natural hazards assessment and disaster risk management. *Treatise on Geomorphology*, 3, 259–298.

van Westen, C., Naz, I., van den Bout, B., Flacke, J., Manzella, I., Atun, F., ... & Twayana, R. (2023, November). Development of a Platform for the Generation, Visualisation and Quantification of Disaster Impact Chains. In *International Conference on Energy and Environmental Science* (pp. 449-466). Cham: Springer Nature Switzerland.

Vogus, T. J., & Sutcliffe, K. M. (2007). Organizational resilience: Towards a theory and research agenda. *International Journal of Management Reviews*, 19(3), 341-362.

Vuong, J. (2015). Disaster recovery planning. In *Proceedings of the 2015 Information Security Curriculum Development Conference* (pp. 1-3).

Wang, W., & Yongchareon, S. (2020). Security-as-a-service: a literature review. *International Journal of Web Information Systems*, *16*(5), 493-517.

Wali, A., Deshmukh, S. and Gupta, A. (2003) 'Critical success factors of TQM: a select study of Indian organizations', *Production, Planning and Control*, Vol. 14, No. 1, pp.3–14.

Waugh, W. L., & Streib, G. (2006). Collaboration and leadership for effective emergency management. *Public Administration Review*, 66(1), 131-140.

Weick, K. E., & Sutcliffe, K. M. (2001). *Managing the unexpected: Assuring high performance in an age of complexity.* Jossey-Bass.

Willig, C. (2013). *Introducing Qualitative Research in Psychology*. McGraw-Hill Education.

Wong, B., Monaco, J. and Sellaro, C. (1994) Disaster recovery planning: Suggestions to top management and information systems managers, *Journal of Systems Management*, 45(5), pp.28–33

Wold, G. H. (2006). Disaster recovery planning process. *Disaster Recovery Journal*, *5*(1), 10-15.

World Bank. (2018). *Building back better: Achieving resilience through stronger, faster, and more inclusive post-disaster reconstruction*. Available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/420321528985115831/building-back-better-achieving-resilience-through-stronger-faster-and-more-inclusive-post-disaster-reconstruction

World Bank. (2020). *Disaster recovery financing frameworks*. Available at: https://documents1.worldbank.org/curated/en/692141603785003050/pdf/Disaster-Recovery-Framework-Guide.pdf

Wrobel, R. (2019). *Culture in Post-Crisis Situations*.

Xu, J., & Liu, F. (2020). The Impact of Intellectual Capital on Firm Performance: A Modified and Extended VAIC Model. *Journal of Competitiveness*, 12(1), 161–176.

Yadav, D. K., & Barve, A. (2015). Analysis of critical success factors of humanitarian supply chain: An application of Interpretive Structural Modeling. *International journal of disaster risk reduction*, *12*, 213-225.

Yang, C. L., Yuan, B. J., & Huang, C. Y. (2015). Key determinant derivations for information technology disaster recovery site selection by the multi-criterion decision making method. *Sustainability*, *7*(5), 6149-6188.

Yeo, J., Knox, C. C., & Hu, Q. (2022). Disaster recovery communication in the digital era: Social media and the 2016 southern Louisiana flood. *Risk analysis*, *42*(8), 1670-1685.

Youker, R. (1999). *Managing international development projects--lessons learned*. Newtown Square, PA: Project Management Institute.

Zhou, Q., Huang, W., & Zhang, Y. (2011). Identifying critical success factors in emergency management using a fuzzy DEMATEL method. *Safety science*, *49*(2), 243-252.

Zhang, P., C Wang, C. Jiang, C. & Hanet, Z. (2021). Business continuity and service reliability. Reliability Engineering & System Safety, 209, 107464

Annexure/Appendices

INTERVIEW CHECKLIST GUIDE

(For participants that have leadership roles in Disaster Management)

Introduction: A research study is being conducted for a doctoral programme of the University of Gloucestershire titled as: "An investigative study into operational leadership's disaster recovery planning at Dubai Civil Defence (DCD)". As you are holding a responsible leadership position in your organization involving operations in Disaster Management, you have been identified to participate in a face-to-face one-to-one interview with the researcher of this study. The interview will take approximately one hour. If you agree to participate, then please read and agree to participate in the interview by signing the consent form given below.
Name of the researcher: Essa Almutawa
Email-id: essa.almutawa92@gmail.com
Mobile: +971-50 809 9200.
Interview Consent Form
The interview will take (enter amount of time). We don't anticipate that there are any risks associated with your participation, but you have the right to stop the interview or withdraw from the research at any time.

Thank you for agreeing to be interviewed as part of the above research project. Ethical procedures for academic research undertaken from UK institutions require that interviewees explicitly agree to being interviewed and how the information contained in their interview will be used. This consent form is necessary for us to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation. Would you therefore read the accompanying information sheet and then sign this form to certify that you approve the following by (✔ as applicable)

☐ The interview can be recorded for purpose of data collection and a transcript will be produced.

☐ I want to view the transcript and given the opportunity to correct any factual errors

☐ The transcript of the interview can be analysed by the researcher.

☐ Access to the interview transcript will be limited to the researcher and those associated with the research study.

☐ Any summary interview content, or direct quotations from the interview, that are made available through academic publication or other academic outlets will be anonymized so no persons identification occurs.

☐ The actual recording and transcripts will be retained in a safe and secure repository and custody.

☐ Publication of the data and the study will be for academic use only.

☐ Any variation of the above conditions will only occur with specific approval

By signing this form I agree that;
1. I am voluntarily taking part in this project. I understand that I don't have to take part, and I can stop the interview at any time;
2. The transcribed interview or extracts from it may be used as described above;
3. I have read the Information sheet;
4. I don't expect to receive any benefit or payment for my participation;
5. I can request a copy of the transcript of my interview and may make edits I feel necessary to ensure the effectiveness of any agreement made about confidentiality;
6. I have been able to ask any questions I might have, and I understand that I am free to contact the researcher with any questions I may have in the future.

Participant's name: _____

Participant's organization name: _____

Participant's position: _____

Participant's current role: _____

Participant's current responsibilities: _____

Work experience in Disaster Management: _____

Participant's signature: _____ **Date:** _____

Researcher's name: Essa Almutawa

Researcher's signature: _____ **Date:** _____

Q 1) What are the key roles / responsibilities / duties as an operational leader in disaster management?

Q 2) What are the components / elements / variables of the disaster recovery plan?

Q 3) Are there any specific disaster recovery planning model/s used? If so, then please describe.

Q 4) What are the steps followed in disaster recovery planning process?

Q 5) Are there any specific leadership styles adopted in operational leadership of disaster recovery?

Q 6) What are the directions given by operational leaders in developing operational objectives of disaster recovery?

Q 7) What are the organization's main operational objectives of disaster recovery?

Q 8) What are the critical success factors (CSFs) considered in the disaster recovery planning process?

Q 9) What are the key performance indicators (KPIs) which are used to measure / evaluate the disaster recovery operations?

Q 10) What are the operational artefacts used in the disaster recovery operations management? (documents related to the recovery project from plan to implementation to assessment)

Q 11) Please express your views generally on operational leadership and disaster recovery planning?

Thank you for your participation in this interview.

Additional information was taken from the participants of the following:

1) The Critical Success Factors (CSFs) and their associated Key Performance Indicators (KPIs) that are implemented at Dubai Civil Defense (DCD) in Disaster Management from a list of CSFs and KPIs:

2) Other CSFs and KPIs implemented at DCD in Disaster Management.

Sample Transcript of an Interview

Q 1) What are the directions given by operational leadership in disaster management?

As an employee in the financial department of Dubai Civil Defense, I have first-hand experience working under the guidance of operational leadership during times of disaster management. Operational leadership plays a pivotal role in guiding and directing the efforts of all departments, including the financial department, to effectively respond to and recover from a disaster. One of the key directions given by operational leadership in disaster management is to establish clear and concise communication channels. During a crisis, effective communication is paramount for ensuring the smooth flow of information, coordination, and decision-making. Operational leader provides specific instructions on how to communicate within the Dubai Civil Defense and with external stakeholders, ensuring that accurate and timely information is shared. Operational leader also emphasizes the importance of preparedness. The leadership guides employees in the financial department to proactively assess and address potential risks and vulnerabilities, developing comprehensive financial controls in the disaster response plans. These plans outline the necessary steps to be taken during an emergency, including financial protocols and contingencies. Operational leaders direct the financial department to conduct risk assessments, identify critical financial functions, and establish backup procedures to ensure continuity of financial operations. Another critical direction given by operational leadership is to prioritize the safety and well-being of employees. During a disaster, the physical and emotional welfare of employees is paramount. Operational leader provides guidance on safety protocols and evacuation procedures, ensuring that employees are informed and prepared. The leadership also emphasize the importance of supporting employees' mental health and well-being during and after a crisis. Another important direction is on resource allocation and utilization. In the financial department, this involves strategic decision-making regarding the allocation of financial resources to support disaster response and recovery efforts. The leadership also directs the financial department to assess and reallocate budgets, secure additional funding if necessary, and monitor the financial impact of the disaster. They guide employees in identifying cost-effective measures and ensuring that financial resources are utilized efficiently. Furthermore, operational leadership emphasizes the need for collaboration and teamwork. During a disaster, different departments must work together seamlessly to achieve effective outcomes. The leadership encourage cross-functional collaboration and provide direction on how employees in the financial department can support other departments in their recovery efforts. They foster an environment of teamwork, encouraging employees to share their expertise and contribute to the overall disaster

management strategy. Operational leader also stresses on the importance of continuous learning and improvement. After a disaster, employees in the financial department participate in post-event evaluations and debriefings. These evaluations aim to identify strengths, weaknesses, and areas for improvement in the disaster response and recovery processes. The leadership encourages employees to provide feedback and recommendations, which can inform future disaster management strategies and enhance the financial department's preparedness. In conclusion, as an employee in the financial department of Dubai Civil Defense, the directions given by operational leadership in disaster management encompass various aspects. These include establishing effective communication channels, prioritizing employee safety, fostering preparedness, guiding resource allocation, promoting collaboration, and encouraging continuous learning and improvement. By following these directions, employees in the financial department contributes to the overall effectiveness and success of disaster management efforts, ensuring the Dubai Civil Defence's resilience and ability to recover from unforeseen events.

Q 2) What are the expectations you have from operational leadership in disaster management?

Operational leadership plays a vital role in guiding and directing the organization during times of crisis, and their actions and decisions have a significant impact on the financial department and its employees. As an employee in the financial department of Dubai Civil Defense, I have certain expectations from operational leadership in the realm of disaster management. First and foremost, I expect operational leadership to provide clear and timely communication. During a disaster, it is crucial for the leadership to keep the financial department informed about the situation, the Dubai Civil Defence's response plans, and any changes or updates that may affect our work. Clear communication helps us understand our roles and responsibilities, enabling us to align our financial efforts with the overall disaster management strategy. Additionally, regular updates and transparent communication help to alleviate uncertainty and maintain employee morale during challenging times. I also expect operational leaders to prioritize the safety and well-being of employees. In times of crisis, the physical and emotional welfare of the employees should be a top concern. I expect the leadership to establish and communicate safety protocols, evacuation procedures, and contingency plans that ensure our well-being during a disaster. They should demonstrate a genuine commitment to employee safety and create an environment where we feel supported and protected. Operational leadership should provide clear guidance on resource allocation and utilization. In the financial department, we

rely on operational leaders to make informed decisions regarding the allocation of financial resources during a disaster. I expect them to consider the unique financial challenges that arise during such times and provide guidance on how to best utilize the available resources. This includes directing us on budget adjustments, procurement strategies, and financial controls that can help ensure the efficient and responsible use of funds. Furthermore, I expect operational leaders to foster a collaborative and supportive environment. Effective disaster management requires teamwork and cooperation across different departments and functions. I expect operational leaders to encourage cross-functional collaboration, promote knowledge sharing, and facilitate open communication channels. By fostering a collaborative culture, operational leaders can harness the collective expertise and skills of the financial department and other teams, leading to more effective decision-making and a coordinated response. Lastly my expectation from the leadership is also to recognize the importance of continuous learning and improvement. After a disaster, it is crucial to evaluate our response efforts, identify areas for improvement, and incorporate lessons learned into our future disaster management plans. I expect operational leaders to facilitate post-event evaluations, encourage employee feedback, and support initiatives for professional development and training. By investing in our learning and growth, operational leaders demonstrate their commitment to enhancing our skills and capabilities in handling future disasters. In conclusion, as an employee in the financial department of Dubai Civil Defense, I have certain expectations from operational leadership in disaster management. These include clear and timely communication, prioritization of employee safety, guidance on resource allocation, fostering collaboration, and a commitment to continuous learning and improvement. By meeting these expectations, operational leaders can and should empower the financial department to contribute effectively to the organization's overall disaster management efforts and ensure the financial stability and resilience of Dubai Civil Defense.

Q 3) What are the main operational objectives in disaster recovery?

I understand the significance of disaster recovery and its impact on the organization's financial stability and resilience. From my perspective, there are several key operational objectives in disaster recovery that are crucial for the financial department's role and responsibilities. First and foremost, one of the primary operational objectives in disaster recovery is to ensure the continuity of financial operations. When a disaster strikes, it can disrupt the normal functioning of the organization, including its financial processes. As an employee in the financial department, our objective is to swiftly restore and maintain essential financial functions. This

includes activities such as payroll processing, invoice payments, financial reporting, and budget management. By ensuring the continuity of financial operations, we contribute to the overall stability and functionality of the organization during the recovery phase. Another important operational objective in disaster recovery is to assess and mitigate financial risks. Disasters can have significant financial implications, such as increased costs, revenue loss, and potential disruptions to funding sources. As an employee in the financial department, we are responsible for identifying and evaluating these risks. We analyze the financial impact of the disaster, review insurance coverage, and develop strategies to mitigate financial risks. This may involve revising budgets, exploring alternative funding sources, and implementing financial controls to minimize the impact on the organization's financial health. Operational leaders in disaster recovery also emphasize the importance of financial resource management. One of our key objectives is to effectively manage financial resources to support the recovery efforts. This involves allocating funds strategically, prioritizing critical needs, and ensuring that financial resources are utilized efficiently. As an employee in the financial department, we work closely with operational leaders to monitor and track financial expenditures, analyze financial data, and provide accurate and timely financial reports. By effectively managing financial resources, we contribute to the organization's ability to recover and rebuild after a disaster. Additionally, an essential operational objective in disaster recovery is to establish financial controls and compliance measures. During times of crisis, it is crucial to maintain transparency, accountability, and adherence to financial regulations. As an employee in the financial department, we play a role in implementing and enforcing financial controls, ensuring proper documentation, and adhering to compliance requirements. This includes managing financial records, conducting audits, and ensuring that financial transactions are accurately recorded and reported to the various stakeholders, Dubai Government Finance Department and Financial Audit Department. By upholding financial controls and compliance measures, we contribute to maintaining the Dubai Civil Defence's financial integrity and public trust. Furthermore, an operational objective in disaster recovery is to support the financial needs of other departments and stakeholders. As an employee in the financial department, we collaborate with various teams to understand their financial requirements and provide the necessary support. This may involve assisting in budget planning, processing financial requests, and providing financial guidance and advice. By supporting the financial needs of other departments, we contribute to their ability to carry out their recovery activities effectively and efficiently. In conclusion, as an employee in the financial department of Dubai Civil Defense, our main operational objectives in disaster recovery encompass ensuring the continuity of financial operations,

assessing and mitigating financial risks, managing financial resources, establishing financial controls and compliance measures, and supporting the financial needs of other departments. By focusing on these objectives, we contribute to the overall success of the organization's disaster recovery efforts, helping Dubai Civil Defense recover and rebuild in the face of adversity.

Q 4) What are the components / elements / variables of the disaster recovery plan?

I understand that the disaster recovery plan is a comprehensive framework designed to ensure the organization's resilience and ability to recover from a disaster. Dubai Civil Defence's plan consists of several key components, elements, and variables that are crucial for effective disaster recovery. The first step in developing a disaster recovery plan involves conducting a thorough asset-based risk assessment to identify potential hazards, vulnerabilities, and their potential impacts on operations and infrastructure. Business Impact Analysis helps to determine the critical functions and processes that must be restored as a priority in the event of a disaster, as well as the resources required to do so. The BIA also helps to estimate the financial and operational impacts of potential disruptions. Establish clear recovery objectives, which include Recovery Time Objectives (RTOs) and Recovery Point Objectives (RPOs). RTOs indicate the maximum acceptable time to restore critical functions and processes, while RPOs specify the maximum tolerable data loss. Develop and document strategies for the restoration of critical functions and processes, including alternative methods of operation, temporary relocation to alternate sites, and the use of backup systems and data. Allocate financial resources to support the implementation of recovery strategies, including personnel, equipment, facilities, and technology. This involves budgeting for disaster recovery expenses and ensuring that funding is available when needed. Create a communication plan to ensure that relevant stakeholders, including employees, partners, and the public, are informed about the disaster recovery process, roles and responsibilities, and the status of recovery efforts. Develop and implement training programs for employees and other stakeholders to ensure that they are familiar with the disaster recovery plan and understand their roles and responsibilities in the event of a disaster. Regularly test and validate the disaster recovery plan to ensure that it remains effective and up-to-date. This may involve conducting exercises and simulations to identify potential issues and areas for improvement. Regularly review and update the disaster recovery plan to account for changes in the organization's operations, infrastructure, and risk profile. This includes updating recovery strategies and objectives, as well as allocating resources based on current needs and priorities. Ensure that the disaster recovery plan complies

with relevant laws, regulations, and industry standards. This may involve liaising with regulatory authorities and conducting audits to verify compliance. By addressing these key components, elements, and variables, the Dubai Civil Defense develops and maintains a robust disaster recovery plan that is well-funded, effective, and adaptable to changing circumstances, ensuring our organization's resilience in the face of potential disasters.

Q 5) Are there any specific disaster recovery planning model/s used? If so, then please describe.

Dubai Civil Defense follows a widely recognized and industry-standard approach known as the "PDCA model" (Plan-Do-Check-Act) or the "Deming Cycle." The PDCA model is a continuous improvement framework that guides our disaster recovery planning process. It consists of four distinct phases: Plan, Do, Check, and Act. Each phase plays a crucial role in ensuring the effectiveness and efficiency of our disaster recovery efforts. The first phase, Plan, involves assessing risks, defining recovery objectives, and developing the strategies and procedures necessary for recovering IT systems and services. During this phase, we conduct a comprehensive risk assessment to understanding how, and to what degree, your Dubai Civil Defense will be able to continue its services its and maintain solvency in the event of a major shutdown of operations or other catastrophic event. We also define recovery time objectives (RTOs) and recovery point objectives (RPOs) to determine the maximum allowable downtime and data loss tolerances. The key to managing these losses is assessing the Dubai Civil Defence's (and each of its facility's) structure of variable and fixed costs and determining how they will likely be impacted following a partial or complete shutdown of operations. Based on this information, we develop a detailed plan that outlines the steps and actions required for successful disaster recovery. Developing an understanding of Dubai Government guidelines and implementing necessary procedures and controls before a disaster occurs can help ensure that maximum funding is secured in a timely manner, and can also help withstand audits by Financial Audit Department. A careful assessment of the amount and timing of potential recovery from insurance and other sources of funding, consideration of continuing costs and extra expenses to maintain operations, and the need for capital to rebuild operations can shed light on the requirements for cash reserves and access to credit during an extended operational shutdown. While insurers may provide advances following a catastrophe, final settlement often takes longer than expected. Planning in this area can help avoid unexpected cash shortages that put business continuity at risk. Once the planning phase is complete, we move on to the Do phase. This is the implementation phase where we put the disaster recovery plan into action.

Based on the availability of the financial resources the plan is executed. This involves coordinating with various teams and stakeholders to ensure the smooth execution of the recovery activities. Regular communication and coordination play a crucial role in this phase to ensure that everyone is aligned and working towards the common goal of restoring services. After the implementation is complete, we enter the Check phase. Here, we assess and evaluate the effectiveness of our disaster recovery efforts. We conduct thorough testing and evaluation of the recovery procedures to identify any gaps, weaknesses, or areas for improvement. This phase includes conducting simulated exercises, table-top drills, or full-scale recovery tests to validate the plan's effectiveness. By conducting these tests, we gain insights into potential issues and challenges that may arise during an actual disaster, allowing us to refine and enhance our recovery strategies accordingly. Based on the findings from the Check phase, we proceed to the Act phase. In this phase, we take corrective actions and make necessary adjustments to our disaster recovery plan. We address the identified weaknesses and areas for improvement, update our procedures and strategies, and enhance our infrastructure and systems to mitigate future risks. This phase is critical for the continuous improvement of our disaster recovery capabilities, as it allows us to learn from past experiences and adapt to evolving threats and technologies. In summary, our disaster recovery planning model at the Information Technology department in Dubai Civil Defense follows the PDCA (Plan-Do-Check-Act) model. This model ensures that we have a well-defined and structured approach to disaster recovery planning and execution. It enables us to assess risks, define recovery objectives, implement strategies, evaluate effectiveness, and make necessary improvements. By adhering to this model, we can enhance the resilience of our infrastructure, minimize downtime, and effectively respond to and recover from disasters or disruptive incidents.

Q 6) Are there sufficient resources and processes adopted in the development of disaster recovery operations?

The development of effective disaster recovery operations requires a robust framework, adequate resources, and streamlined processes to ensure the readiness and resilience of our organization. In Dubai Civil Defense, we recognize the criticality of disaster recovery planning and allocate resources accordingly. The financial department is committed to supporting the development of disaster recovery operations by providing the necessary financial resources. This includes budget allocations for infrastructure, technology systems, training programs, and the acquisition of specialized tools and equipment. Adequate financial resources are essential to establish and maintain an effective disaster recovery infrastructure, such as backup systems,

redundant hardware, and secure data storage facilities. Furthermore, our organization places a strong emphasis on the involvement of skilled personnel in the development of disaster recovery operations. The financial department collaborates closely with other departments, including IT, operations, and risk management, to ensure a multidisciplinary approach. This collaborative effort helps in identifying potential risks, assessing their impact on financial operations, and developing appropriate recovery strategies. We have a dedicated team responsible for disaster recovery planning, consisting of experienced professionals who possess the required expertise in financial management, risk assessment, and business continuity. In terms of processes, Dubai Civil Defense follows a systematic approach to disaster recovery planning. This involves conducting risk assessments to identify potential threats and vulnerabilities, performing business impact analyses to understand the financial implications of disruptions, and establishing recovery strategies and procedures. The financial department actively participates in these processes by providing valuable input on financial risks, dependencies, and recovery time objectives. To ensure the effectiveness of our disaster recovery operations, we regularly conduct training and awareness programs for employees. These programs are designed to enhance their understanding of disaster recovery processes, their roles and responsibilities, and the importance of adhering to established protocols. Through these initiatives, employees in the financial department and other relevant departments develop the necessary knowledge and skills to respond effectively during times of crisis. Additionally, Dubai Civil Defense recognizes the importance of continuous improvement in disaster recovery operations. We regularly review and update our plans and procedures to reflect changes in the organization's structure, technology landscape, and regulatory requirements. This ensures that our disaster recovery processes remain aligned with industry best practices and evolving threats. While Dubai Civil Defense strives to provide sufficient resources and adopt effective processes in the development of disaster recovery operations, it is important to note that the field of disaster recovery is dynamic and complex. The organization constantly assesses its capabilities and explores opportunities for improvement. Regular evaluations and audits are conducted to identify any gaps or areas for enhancement in our disaster recovery strategies. In conclusion, from the perspective of an employee in the financial department of Dubai Civil Defense, the organization demonstrates a strong commitment to the development of disaster recovery operations. Adequate financial resources are allocated, skilled personnel are involved, and systematic processes are adopted to ensure the readiness and resilience of our organization. Continuous training and improvement initiatives further contribute to the effectiveness of our disaster recovery

operations. However, it is essential to remain vigilant and adapt to the evolving nature of risks and challenges in order to maintain a high level of preparedness for any potential disasters.

Q 7) What are the steps followed in disaster recovery planning process?

I can provide insights into the steps followed in the disaster recovery planning process. Disaster recovery planning is a critical aspect of our organization's preparedness and resilience strategy. It involves a series of systematic steps that aim to identify potential risks, develop strategies to mitigate them, and ensure the continuity of our financial operations in the face of a disaster. The first step in the disaster recovery planning process is risk assessment. This involves conducting a comprehensive analysis of potential hazards and vulnerabilities that could impact our financial department. We identify various types of risks, such as natural disasters, technological failures, cyber threats, or human-induced disruptions. The risk assessment helps us understand the likelihood and potential impact of each risk, allowing us to prioritize our efforts and allocate appropriate resources. The next step is the business impact analysis (BIA). This step involves evaluating the potential consequences of different disaster scenarios on our financial operations. We assess the financial implications of disruptions, including the loss of data, interruption of critical systems, or delays in financial transactions. By understanding the potential impact, we can identify the key functions and processes that need to be prioritized for recovery and develop strategies to minimize financial losses and ensure business continuity. Once the risks and potential impacts are identified, we move on to developing the actual disaster recovery strategies. This involves determining the appropriate response actions for each risk scenario. For example, in the event of a natural disaster, our strategies may include relocating financial operations to an alternative site, establishing backup systems, and implementing data recovery processes. In the case of a cybersecurity breach, our strategies may involve incident response procedures, data backup and restoration, and strengthening security measures. After developing the strategies, the next step is to formulate detailed recovery plans. These plans outline the specific actions to be taken during a disaster and provide step-by-step instructions for recovering our financial operations. They include information such as roles and responsibilities, communication protocols, backup procedures, and recovery time objectives (RTOs) for different systems and processes. The plans are regularly reviewed and updated to incorporate any changes in the organization's structure, technology landscape, or regulatory requirements. Once the recovery plans are in place, the next step is to establish a testing and training program. This ensures that employees in the financial department are familiar with their roles and responsibilities during a disaster and are equipped with the necessary skills to

execute the recovery plans effectively. Regular drills, simulations, and tabletop exercises are conducted to assess the readiness of our financial department and identify any gaps or areas for improvement. Effective communication and coordination are essential during the disaster recovery planning process. As a financial manager, I collaborate with other departmental managers and senior leadership to ensure that financial considerations are integrated into the overall communication and coordination plan. This includes establishing channels for financial reporting and decision-making, providing regular updates on financial recovery progress, and coordinating with external stakeholders, such as insurers or financial institutions. Lastly, the disaster recovery planning process includes ongoing monitoring and maintenance. This involves regular reviews and updates of the plans and strategies to ensure their relevance and effectiveness. It also includes conducting periodic audits and assessments to identify any emerging risks or changes in the Dubai Civil Defence's environment that may require adjustments to the plans. Continuous monitoring and maintenance help us stay proactive in addressing potential vulnerabilities and evolving threats. Collaboration with internal and external auditors to assess the plan's compliance with financial controls and regulatory requirements. Any necessary updates or modifications are made to ensure the plan remains relevant and effective. In conclusion, as an employee in the financial department of Dubai Civil Defense, the steps followed in the disaster recovery planning process include risk assessment, business impact analysis, development of recovery strategies, formulation of detailed recovery plans, testing and training, and ongoing monitoring and maintenance. These steps ensure that our financial operations are well-prepared to withstand and recover from potential disasters, enabling us to maintain financial stability and provide uninterrupted services to our stakeholders.

Q 8) Have you observed any specific leadership styles adopted in operational leadership of disaster recovery?

Leadership plays a crucial role in guiding and directing the efforts of the organization during times of crisis and ensuring effective disaster recovery. As an employee in the financial department of Dubai Civil Defense, I have had the opportunity to observe various leadership styles adopted in the operational leadership of disaster recovery. One leadership style commonly observed in disaster recovery process in Dubai Civil Defense is the authoritative or directive style. In this style, leaders take charge and provide clear instructions and guidance to the team members. They make decisive decisions and set clear objectives and expectations. This leadership style is effective in situations where there is an immediate need for action and

228

a hierarchical structure is required to ensure swift and coordinated response. The authoritative style helps instill confidence and direction, allowing employees in the financial department to understand their roles and responsibilities during the recovery process. Another leadership style that I have observed is the transformational style. Transformational leaders inspire and motivate their team members through a shared vision and a sense of purpose. They encourage innovation, creativity, and collaboration, and they foster a supportive and empowering work environment. In the context of disaster recovery, transformational leaders inspire employees in the financial department to go above and beyond their regular duties, to think outside the box, and to contribute to finding innovative solutions. They promote a sense of unity and resilience, which is essential during times of crisis. In addition to these styles, I have also witnessed the participative leadership style in the operational leadership of disaster recovery. This particular style involves employees in decision-making processes, seeking their input and ideas. They promote open communication, collaboration, and teamwork. This style allows employees in the financial department to feel valued and empowered, as their opinions and expertise are considered in the decision-making process. Participative leaders create a sense of ownership and shared responsibility, which enhances the effectiveness of disaster recovery efforts. Furthermore, I have observed that adaptive leadership is crucial in the operational leadership of disaster recovery. Adaptive leaders are flexible and agile, able to navigate through uncertain and rapidly changing situations. They have the ability to assess the evolving circumstances, adjust strategies and plans accordingly, and make informed decisions. Adaptive leaders in the financial department recognize the need for continuous learning and improvement, and they encourage employees to adapt and embrace change. This style of leadership ensures that the organization effectively responds to unexpected challenges and emerging risks during the recovery process. In conclusion, as an employee in the financial department of Dubai Civil Defense, I have observed various leadership styles in the operational leadership of disaster recovery. These include authoritative, transformational, participative, and adaptive leadership styles. Each style brings its unique strengths and benefits, depending on the specific circumstances and needs of the organization. Effective leadership in disaster recovery is characterized by clear direction, inspiration, collaboration, adaptability, and the ability to empower employees to contribute their best efforts towards achieving the organization's recovery objectives.

Q 9) What are the critical success factors (CSFs) considered in the disaster recovery planning process?

I am aware of several critical success factors (CSFs) that are considered in the disaster recovery planning process. These CSFs play a significant role in ensuring the effectiveness and efficiency of our organization's disaster recovery efforts. First and foremost, one of the key CSFs is the establishment of a comprehensive and well-documented disaster recovery plan. This plan serves as a roadmap for guiding the financial department and the organization as a whole during the recovery process. It outlines the necessary procedures, protocols, and responsibilities to be undertaken to mitigate the impact of a disaster on our financial operations. The plan should be regularly updated and accessible to all relevant stakeholders to ensure its relevance and effectiveness in times of crisis. Another critical success factor is the allocation of sufficient financial resources to support the disaster recovery efforts. Adequate financial resources are essential for implementing the strategies outlined in the recovery plan. This includes budgeting for emergency supplies, equipment, technology infrastructure, and personnel training. The financial department plays a vital role in forecasting and securing the necessary funds to support these initiatives. Effective financial management and strategic budgeting are crucial in ensuring that the financial resources are utilized optimally during the recovery process. Effective communication and coordination among different departments and stakeholders are also critical success factors in disaster recovery planning. This involves establishing clear lines of communication, both within the financial department and across other relevant departments. Regular communication ensures that all stakeholders are informed about their roles and responsibilities, and that information flows smoothly throughout the recovery process. Collaboration and coordination with other departments, such as operations, human resources, and IT, are vital to ensure a synchronized and integrated approach to recovery. Furthermore, training and preparedness are essential CSFs in disaster recovery planning. Employees in the financial department should be trained on their roles and responsibilities during a disaster, including the specific financial processes and protocols to be followed. This includes training on financial documentation, expense tracking, insurance claims, and financial reporting in emergency situations. Regular drills and simulations help employees to be prepared and confident in executing their responsibilities when a disaster occurs. Training programs should be regularly updated to incorporate new insights, best practices, and lessons learned from previous recovery efforts. In addition, continuous monitoring and evaluation are critical success factors in the disaster recovery planning process. This involves establishing key performance indicators (KPIs) to assess the effectiveness and progress of the recovery efforts. The financial department should monitor financial indicators such as cost management, budget adherence, and financial performance during the recovery

period. Regular evaluations help identify areas for improvement and allow for adjustments to be made to the recovery plan as necessary. Lastly, the involvement and support of top management are crucial CSFs in disaster recovery planning. The commitment and active engagement of senior leaders in the organization demonstrate the importance placed on disaster recovery. Their support ensures that the financial department receives the necessary resources, authority, and guidance to effectively carry out their roles in the recovery process. Top management's commitment also fosters a culture of preparedness and resilience throughout the organization. In conclusion, as an employee in the financial department of Dubai Civil Defense, I recognize several critical success factors in the disaster recovery planning process. These include the establishment of a comprehensive recovery plan, allocation of sufficient financial resources, effective communication and coordination, training and preparedness, continuous monitoring and evaluation, and the involvement and support of top management. By considering and implementing these CSFs, our organization enhances its readiness and ability to respond effectively to disasters, safeguarding our financial operations and ensuring the continuity of our services to the community.

Q 10) What are the key performance indicators (KPIs) which are used to measure / evaluate the disaster recovery operations?

I am familiar with the key performance indicators (KPIs) that are used to measure and evaluate the effectiveness of disaster recovery operations. These KPIs play a crucial role in assessing the organization's ability to respond to and recover from disasters while ensuring the financial stability and resilience of our department. One of the primary KPIs used in measuring the success of disaster recovery operations is the Recovery Time Objective (RTO). RTO refers to the targeted timeframe within which the financial department aims to restore its critical functions and operations after a disaster. It provides a clear benchmark for assessing the speed and efficiency of the recovery process. By monitoring and tracking the actual time taken to recover, we can evaluate our ability to minimize downtime and resume normal financial activities promptly. Another essential KPI is the Recovery Point Objective (RPO). RPO defines the acceptable level of data loss that the financial department can tolerate during a disaster. It indicates the amount of data that can be lost or unrecoverable. Monitoring RPO allows us to assess the effectiveness of our data backup and recovery mechanisms. By ensuring that the RPO is within acceptable limits, we can minimize the potential financial losses and ensure the integrity of our financial data. The financial impact of a disaster is also a critical aspect that is evaluated through various financial KPIs. One such KPI is the Cost of Downtime (CoD), which

quantifies the financial losses incurred during the period of disrupted operations. CoD takes into account factors such as lost revenue, increased expenses, penalties, and reputation damage. Tracking the CoD enables us to assess the financial implications of the disaster and evaluate the effectiveness of our recovery efforts in minimizing the overall financial impact. Additionally, the accuracy and completeness of financial reporting during the recovery phase are important KPIs. Timely and accurate financial reporting ensures transparency and accountability in our operations, even during challenging times. By monitoring the timeliness of financial reports, we can assess our ability to maintain financial control and provide stakeholders with the necessary information for decision-making. The effectiveness of our communication and collaboration efforts during the recovery process is another crucial KPI. This includes assessing the response time and quality of communication with internal and external stakeholders, such as vendors, clients, and regulatory authorities. Prompt and effective communication ensures that all parties are informed and aligned, minimizing disruptions and facilitating a smooth recovery process. Furthermore, the level of compliance with regulatory requirements and industry standards is an important KPI in evaluating disaster recovery operations. Adhering to applicable regulations and standards ensures that our financial department operates in a secure and compliant manner, even during times of crisis. Compliance KPIs may include the completion of necessary audits, adherence to data protection regulations, and maintaining robust security protocols. Lastly, ongoing training and preparedness are essential KPIs to evaluate the effectiveness of our disaster recovery operations. Assessing the level of employee training, drills, and exercises helps us gauge our readiness and ability to respond to different disaster scenarios. Regular evaluations of training programs and the participation rate of employees provide insights into our preparedness and identify areas for improvement. In conclusion, as an employee in the financial department of Dubai Civil Defense, I am aware of several key performance indicators (KPIs) that are used to measure and evaluate the effectiveness of our disaster recovery operations. These KPIs include the Recovery Time Objective (RTO), Recovery Point Objective (RPO), Cost of Downtime (CoD), accuracy and timeliness of financial reporting, communication and collaboration effectiveness, compliance with regulations and standards, and training and preparedness. By monitoring and continuously improving these KPIs, we can ensure that our financial department is resilient, responsive, and well-prepared to handle any disaster situation, safeguarding our financial stability and supporting the overall mission of Dubai Civil Defense. Q 11) What are the operational artefacts used in the disaster recovery operations management? As an employee in the financial department of Dubai Civil Defense, I am familiar with the operational artifacts

that are used in the management of disaster recovery operations. These artifacts play a crucial role in facilitating the planning, execution, and monitoring of our disaster recovery efforts, ensuring the smooth functioning of our department during and after a disaster. One of the key operational artifacts used in disaster recovery operations management is the Disaster Recovery Plan (DRP). The DRP is a comprehensive document that outlines the strategies, procedures, and protocols to be followed in the event of a disaster. It provides a roadmap for our financial department to navigate through various stages of the recovery process, including response, restoration, and resumption of critical financial functions. The DRP includes information such as roles and responsibilities of personnel, communication protocols, data backup and recovery procedures, and a timeline for recovery activities. This artifact serves as a guiding framework for our disaster recovery efforts, ensuring that we have a structured and coordinated approach to handle different types of disasters. Another important operational artifact is the Business Impact Analysis (BIA). The BIA assesses the potential impact of a disaster on our financial department's operations, resources, and reputation. It identifies critical financial processes, systems, and data that must be protected and prioritizes them based on their importance and the potential consequences of their loss or disruption. The BIA helps us understand the financial implications of a disaster and guides the allocation of resources and prioritization of recovery efforts. It provides valuable insights into the dependencies between various financial functions and helps us develop appropriate strategies to minimize the impact of a disaster on our operations. In addition to the DRP and BIA, we utilize various other operational artifacts to support disaster recovery operations management. Recovery Time Objective (RTO) and Recovery Point Objective (RPO) documentation are some of the other artifacts define the desired time frame for restoring critical financial functions (RTO) and the acceptable level of data loss (RPO) during the recovery process. They provide clear benchmarks for measuring the effectiveness of our recovery efforts. Data backup and recovery plans outline the procedures for regular data backup, storage, and recovery. They specify the frequency of backups, the location of backup data, and the steps to restore data in the event of a disaster. These artifacts ensure the availability and integrity of financial data during the recovery process. Incident response and communication plans as another artifact outline the protocols to be followed in the event of a disaster, including the activation of the incident response team, communication channels, and escalation procedures. They ensure a coordinated and efficient response, both internally within our financial department and externally with other departments and stakeholders. Testing and exercise plans as artifacts define the schedule and scope of testing and exercise activities conducted to evaluate the readiness and effectiveness of our disaster

recovery plans. They include scenarios, objectives, and success criteria for each exercise, allowing us to identify any gaps or areas for improvement in our preparedness and response capabilities. Lastly, the documentations related to training and awareness programs capture the details of training programs conducted for employees in the financial department regarding disaster recovery procedures, roles, and responsibilities. They also document the dissemination of relevant information and awareness campaigns to ensure that all employees are well-informed and prepared to respond effectively during a disaster. These operational artifacts provide structure, guidance, and documentation for our disaster recovery operations management. They enable us to plan, execute, and evaluate our efforts to mitigate the impact of disasters on our financial department. By leveraging these artifacts, we enhance our preparedness, increase our responsiveness, and ensure the continuity of critical financial functions during challenging times.

Q 12) Please express your views generally on operational leadership and disaster recovery planning?

Operational leadership and disaster recovery planning play crucial roles in ensuring the effective management and response to disasters. Operational leadership involves the guidance, direction, and decision-making required to navigate through challenging situations, while disaster recovery planning entails the development of strategies and procedures to mitigate the impact of disasters and restore normal operations. Operational leadership is essential in disaster recovery planning as it sets the tone for how the financial department responds to and manages disasters. A strong and effective operational leader provides clear direction, establishes priorities, and fosters a culture of preparedness within the department. They promote proactive measures such as risk assessment, contingency planning, and training programs to ensure that employees are well-equipped to handle unforeseen events. Operational leaders inspire confidence, motivate employees, and facilitate effective collaboration and communication across different teams and departments. Disaster recovery planning, on the other hand, involves a systematic approach to identify potential risks and vulnerabilities, develop response strategies, and implement measures to mitigate the impact of disasters. It encompasses a range of activities, including risk assessment, business impact analysis, development of response protocols, testing and exercising, and continuous improvement. The financial department's disaster recovery plan serves as a roadmap for navigating through the various stages of a disaster, ensuring the continuity of critical financial functions and minimizing disruptions. Effective disaster recovery planning requires the active involvement of operational leaders who

can align the goals of the financial department with the overall objectives of Dubai Civil Defense. They ensure that disaster recovery plans are comprehensive, up-to-date, and aligned with industry best practices and regulatory requirements. Operational leaders also allocate resources, both financial and human, to support the implementation of disaster recovery strategies and initiatives. They provide guidance and support during crisis situations, making timely decisions and coordinating efforts to mitigate the impact of disasters on the financial department. Operational leadership and disaster recovery planning go hand in hand, as both are critical in preparing for and responding to disasters. Through effective leadership, employees in the financial department gain a sense of direction, confidence, and motivation to carry out their roles during challenging times. Disaster recovery planning provides a framework for systematic and organized response, enabling the financial department to navigate through uncertainties and restore normal operations efficiently. Furthermore, operational leadership and disaster recovery planning foster a culture of resilience within the financial department. They emphasize the importance of preparedness, proactive risk management, and continuous improvement. Employees are encouraged to stay updated on the latest industry trends, technologies, and best practices related to disaster recovery. Regular training and awareness programs enhance the knowledge and skills of employees, empowering them to respond effectively during emergencies and contribute to the overall resilience of the organization. In conclusion, as an employee in the financial department of Dubai Civil Defense, I recognize the significance of operational leadership and disaster recovery planning in ensuring our readiness and resilience in the face of disasters. Operational leaders provide guidance, motivation, and direction, while disaster recovery planning enables us to mitigate risks, respond effectively, and recover efficiently. By embracing these principles, we can safeguard critical financial operations, protect assets, and contribute to the overall mission of Dubai Civil Defense in ensuring the safety and well-being of the community.

Focus Group Discussion Brief and Consent Form

Research project title: An investigative study into operational leadership's disaster recovery (DR) planning at Dubai Civil Defence (DCD).

Purpose: For a doctorate research programme, from the University of Gloucestershire, a study is being conducted to understand the planning process, the strategies adopted and how the plans are implemented to determine the potential effectiveness of the disaster recovery planning process. As a researcher (Dr. Maj. Essa Almutawa) you are invited to participate to discuss the topic. The information so gathered will be used for academic and professional purposes

Procedures: If you participate in this study, you will be in a group of approximately four to six knowledgeable and experienced persons to discuss the topic. The focus group discussion will be conducted by a moderator duly facilitated by the researcher, with the session being recorded (audio/video as applicable). If you volunteer to participate in this focus group, you will be asked some questions relating to your experience in disaster management at a general level and disaster recovery planning at a specific level. As the participation is voluntary, you may withdraw from the session at freewill. The duration is expected to be about 2 hours.

Benefits: Your professional participation will benefit the advancement of information and knowledge with application to practice

Ethical considerations: Respect of persons and privacy will be maintained without any external disclosure and within the context of the discussion to keep all information private and confidential. Anonymous data from this study will be analyzed and carefully reported where no individual participant will be identified or linked to the results. All information obtained in this study will be kept strictly confidential. All materials will be stored in a secure location within the confines of the study and access to files will be restricted to selective academicians and professionals.

If you have any questions or concerns about this study, please contact the researcher.

Consent: By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this focus group.

(Please ✔ as applicable)

☐ I agree to participate in the study's focus group carried out by Dr. Maj. Essa Almutawa, of DCD and the University of Gloucestershire, to aid with the research of the study.

☐ I have read the information sheet related to the study and understand the purpose of the project.

☐ I am aware of the topic to be discussed in the focus group.

☐ I am fully aware that I will remain anonymous throughout data reported and that I have the right to leave the focus group at any point.

☐ I am fully aware that data collected will be stored securely, safely and in accordance with prevailing Data Collection Act of UAE.

☐ I am fully aware that I am not obliged or forced to answer any question, but that I do so at my own free will.

☐ I agree to have the focus group recorded (audio/video), so it can be translated, transliterated and transcribed after the focus group discussion.

☐ I am aware that I have the right to edit the transcript of the Focus Group once it has been completed.

☐ I am aware that I can make any reasonable changes to this consent form, if required.

_____

Participants Name / Signature   Date _____

_____

Researcher's Name / Signature   Date _____

Focus Group Discussion Guide

Welcome and thank you for being here today. Having read the information provided and the consent form signed and submitted by you the format of this discussion is a focus group. A focus group is a conversation that focuses on specific questions in a safe and confidential environment.

You will be guided through the discussion by asking questions that each of you can respond to. There are no right or wrong answers to these questions, only factual and honest views and answers are to be given. As it is a discussion, if you wish, you can also respond to each other's comments. It is my responsibility to make sure that everyone here gets to participate and that we stay on track of the topic.

Before we get started, I want to let you know two things. First, the information we gather today will be compiled into a final report. That report will include a summary of your views, comments and recommendations, if any. It will be shared by the researcher with the University and DCD. Secondly, you do not have to answer any questions or respond to any points that you do not feel comfortable with.

This focus group today is anonymous and confidential. "Anonymous" means that we will not be using your names and you will not be identified as an individual in our report of this project. "Confidential" means that what we say in this room should not be repeated outside of this room. I request each of you to respect one another's privacy and not disclose to anyone what was said by others here today.

Although we hope everyone here honors this confidentiality, please remember that what you say here today could be repeated by another focus group member. So please, do not say anything that you absolutely need to keep private. As you can see, we will be recording this focus group. The recording will only be used to make sure our notes are correct and will not be heard by anyone outside of this project.

Opening Question: What are your general views on disaster recovery?

Key Question 2: What are your views on the steps to be taken in creating a disaster recovery plan process?

(In case these are not mentioned - Risk assessment &/or Evaluate critical needs &/or Set disaster recovery plan objectives &/or Collect data and create the written document &/or Test and revise plan, then extend with probing question/s).

Probing question/s (if necessary)**:**

Key Question 3: What according to you are the objectives of a disaster recovery plan?

(In case none of these are mentioned - To minimize interruptions to normal operations; To limit the extent of disruption and damage; To minimize the bad-effects impact of the interruption; To establish alternative means of operation in advance; To train personnel with emergency

procedures; To provide for smooth and rapid restoration of service, then proceed with probing question/s).

Probing question/s (if necessary)**:**

Key Question 4: How does leadership as a role get involved in preparing an operational disaster recovery plan?

(In case none of these are mentioned – Setting objectives; Giving directions; Engaging; Communicating; Making decisions; Building a team; Delegating; Prioritizing; Inspiring: Training; Being relational, then proceed with probing question/s).

Probing Question/s (if necessary)**:**

Key Question 5: What do you consider are CSFs critical success factors in implementing a disaster recovery plan?

(In case these are not mentioned – Training; Early warning; Simulated exercises; Response time; Setting priorities; Establishing reliable supplier relationships; Identifying essential equipment; Setting restoration timescales; Creating a sound communication plan then proceed with probing question/s).

Probing Question/s (if necessary):

Key Question 6: What do you consider are KPIs key performance indicators in assessing a disaster recovery plan?

(In case if these are not mentioned – Content and context of Training; Effective Early warning systems; Results of Simulated exercises; Quick Response time; Well ranked priorities; Reliability in supplier relationships; Effective and efficient equipment; Quick restoration timescales; Clarity in communication then proceed with probing question/s).

Probing Question/s (if necessary):

Concluding Question 7: What improvements can be done to DR Planning?

Thank you for participating in this focus group discussion that has given interesting insights into disaster recovery planning as practiced at DCD and as desired.

THE END

Group Discussion Transcript (FGD-1)

Facilitator: Essa Almutawa

Participants:
- **Senior A** (Public Safety & Fire Prevention)
- **Junior A** (Disaster Management & Emergency Response)
- **Senior B** (HR - Training)
- **Junior B** (Public Engagement)
- **Senior C** (Planning & Policy)
- **Junior C** (Resources Deployment)

Essa: Welcome, everyone. Thank you all for taking the time to join this focus group discussion today. We're here to talk about disaster recovery planning within Dubai Civil Defense. Your insights are very important, and I appreciate your willingness to share your thoughts and experiences. Remember, this is a safe space, so please feel free to speak openly. There are no right or wrong answers—just your honest opinions. Let's start by introducing ourselves. Please tell us your role and department.

Senior A: Thank you, Essa. I'm Senior A from the Public Safety & Fire Prevention. I've been with Dubai Civil Defense for over 25 years, mainly working in the central operations center. My role involves overseeing the coordination of emergency response teams and managing information flow during incidents.

Junior A: Hello everyone, I'm Junior A, from Disaster Management & Emergency Response. I've been part of the central operations team for about four years now. I handle incoming emergency calls, dispatch units, and assist in incident management.

Senior B: Good afternoon, I'm Senior B from HR - Training. I've been with Civil Defense for 20 years, focusing on HR planning, budgeting, and making sure they are allocated properly during emergencies.

Junior B: Hi, I'm Junior B. I've been working Public Engagement for three years. I do interface between the public and DCD, prepare reports, and help manage during both normal operations and disaster situations.

Senior C: Greetings, everyone. I'm Senior C from Planning & Policy. With over 18 years here, I oversee planning processes of various departments and activities through coordination and interaction with all. especially during emergencies.

Junior C: Hello, I'm Junior C, also from Resources Deployment. I've been with the team for about two years. I work on resources system maintenance, provide information and technical support to all departments, and implement new technologies to improve our disaster response.

Essa: Thank you all for the introductions. It's great to have such a diverse group here. Let's begin our discussion.

Opening Question: What are your general views on disaster recovery?

Essa: So, to start off our discussion today, I'd like to hear your general thoughts on disaster recovery. From your perspectives in your respective departments, what does disaster recovery mean to you, and why is it important?

Senior A: Thank you, Essa. Disaster recovery, in my view, is the cornerstone of our preparedness and readiness, particularly within the central control where we handle all incident calls, disaster recovery isn't just a plan we have on paper—it's a critical component of our daily functioning. It ensures that when emergencies occur, as they inevitably do, we can respond swiftly and effectively without any interruptions. The safety of the public relies on our ability to maintain continuous operations, even in the face of unforeseen events.

Junior A: I completely agree with Senior A. Working on the front lines in the central contril, I see firsthand how any disruption can have a cascading effect on our ability to serve the community. Disaster recovery planning is not just about responding after something goes wrong; it's about anticipating potential issues and having measures in place to prevent them or mitigate their impact. For us, it's essential to ensure that our communication lines remain open, our dispatch systems are functioning, and our teams are coordinated—even under the most challenging circumstances.

Senior B: From the HR perspective, disaster recovery is all about resources resilience and continuity. Disasters often come with significant implications—not just immediately but also long-term economic impacts. Our role is to ensure that personnel are available when needed, for implelmentatio to be condicted and proceeded without delay, and that we maintain quality and accountability throughout. Without a robust disaster recovery plan, we risk many kinds of bottlenecks that could hinder emergency response efforts.

Junior B: Adding to that, we also consider the integrity and responsibility towards the community. During a disaster, the demand for rapid decision-making increases, and so does the risk of errors or fraudulent activities as our actions affect the masses. Our disaster recovery planning involves not only securing resources but also safeguarding the people and systems to ensure they remain operational and secure. This allows us to support other departments effectively and maintain trust with our stakeholders and the public in general.

Senior C: In planning for disaster recovery, it has to be efficient and effective when implemented with resilience. Our planning is the starting point that supports every aspect of the Civil Defense operations—from systems in the central operations cintrol to management across all departments. Any downtime can severely disrupt these operations. Therefore, our disaster recovery planning focuses on ensuring all supoort availability. We implement redundancies, backups, and detailed recovery procedures to minimize the impact of any disruptions.

Junior C: Exactly. We proactively identify potential vulnerabilities,and ensure resources to tackle the challenges. Our disaster recovery plan includes resources that are human and

machienes with regular testing of backup systems, cybersecurity measures, and staff training to handle emergencies. By doing so, we aim to provide seamless resources support to all departments, especially during critical times.

Essa: Thank you all for sharing your perspectives. It's clear that disaster recovery plays a vital role across all departments, albeit in different ways. I'd like to delve deeper into how disaster recovery planning is integrated into your daily operations. Could you provide some specific examples of how it affects your work?

Senior A: Certainly. In safety and prevention of incidents, our daily routines are inherently tied to preparedness. For example, we conduct regular system checks on our equipment to ensure they're functioning optimally. We have protocols for immediate switch-over to backup systems if our primary systems fail. This includes alternative communication channels like satellite phones or radio networks. Moreover, our staff undergo regular training to handle high-call volumes during peak times or crisis situations, ensuring that no emergency call goes unanswered.

Junior A: Adding to that, we also simulate various disaster scenarios to test our readiness. For instance, we might simulate a scenario where our primary dispatch system fails. During these drills, we practice using our backup systems and manual procedures to dispatch units. This not only tests our technical capabilities but also helps staff become familiar with the processes under pressure. It's about building muscle memory so that in real situations, we can respond efficiently.

Senior B: In disaster recovery planning is incorporated through HR contingency planning. We maintain emergency support and contractual resources that can be accessed quickly without the usual bureaucratic delays. We also have pre-approved labour supplier agreements and protocols that allow us to expedite procurement processes during emergencies. Additionally, our systems are backed up regularly, and we have measures in place to switch to backup systems if needed, ensuring continuity in operations.

Junior B: On a daily basis, we monitor interactions and transactions internally and externally for any irregularities, which is crucial during disasters when the volume can spike. We also conduct regular audits and reconcile to maintain integrity. Training sessions are held to familiarize the DCD team with emergency procedures, so everyone knows their role when a disaster strikes, especially while dealing with the public. This ensures that we can provide the necessary support promptly.

Senior C: For us disaster recovery is a continuous process. We perform regular backups of plans, maintain reserves, and monitor system performance in real-time. Our planning system network is designed with failover capabilities, so if one part of the network goes down, activities are promptly rerouted to alternative paths. We also stay updated on the latest environmental threats and implement make-good patches and updates promptly to protect against potential disruptions.

Junior C: We also work closely with other departments to understand their specific needs and tailor our disaster recovery resources accordingly. For example, we know that the Operations Department cannot afford any downtime, so we prioritize their systems in our recovery efforts by providing the required resources. Regular training sessions are conducted for staff to keep them abreast of new recovery techniques. We also run disaster simulations to test our response times and procedures.

Essa: It's evident that disaster recovery planning is deeply embedded in your operations. Considering your experiences, what do you believe are the key components that make a disaster recovery plan effective in your respective departments?

Senior A: Since the effectiveness of a disaster recovery plan hinges on three main components: redundancy, training, and communication. Redundancy ensures that we have backup systems and resources. Training prepares our staff to handle emergencies confidently. Communication keeps everyone informed and coordinated. Without any of these components, the plan would be less effective.

Junior A: I'd like to emphasize the importance of training here. Regular drills and simulations help us identify weaknesses in our plan and improve upon them. It's one thing to have a plan on paper, but practicing it reveals practical challenges we might not anticipate otherwise. Also, involving all team members in these exercises ensures that everyone is on the same page.

Senior B: For us clear protocols and flexibility are key. We have well-defined procedures that can be executed quickly, but we also need the flexibility to adapt to the specific circumstances of a disaster. Having pre-established relationships with suppliers and other institutions also enhances our ability to respond effectively.

Junior B: Transparency and accountability are also crucial. During disasters, there's often increased scrutiny on how resources are utilized. By maintaining transparent records and adhering to strict financial controls, we maintain trust with stakeholders and can avoid complications during inspections.

Senior C: For, adaptability, scalability and security are paramount to be able to handle sudden increases in demand during a disaster. At the same time, we must ensure that speed and security is not compromised. Regularly updating and testing our disaster recovery procedures ensures that we can restore systems quickly while safeguarding operational integrity.

Junior C: Additionally, collaboration with other departments enhances the effectiveness of our disaster recovery efforts. By understanding their critical functions and priorities, we can tailor our resources support to meet their needs. This interdepartmental cooperation is vital for a cohesive response during emergencies.

Essa: Collaboration seems to be a recurring theme. Can you elaborate on how interdepartmental collaboration enhances disaster recovery efforts?

Senior A: Certainly. Effective disaster recovery requires a coordinated approach. For instance, if we are aware of any department's procedures for emergency requirement then allocation is made swiftly, we can make more informed requests and ensure that resources are directed where they're needed most. Similarly, understanding capabilities and limitations helps us set realistic expectations and work together to find solutions.

Junior A: We've had instances where close collaborations have allowed us to implement new tools and techniques that significantly improved our response times. By involving us in the planning stages, all concerned ensured that the tools and techniques met our practical needs, and we were able to provide feedback that led to further improvements.

Senior B: From our perspective, collaborating within DCD the various departments and externally with various ahencies allows us to anticipate needs better. If we know that disaster recovery plans then to upgrade certain equipment and for implementing new systems is done promptly, thereby avoid any delays during emergencies.

Junior B: It also helps us understand the urgency of certain critical resources during a disaster. When we have a clear picture of the operational challenges, we can prioritize other support processes to support those areas most effectively.

Senior C: For us, collaboration ensures that the solutions provided jointly between us and the agencies are practical and user-friendly. By working closely with other departments and agencies, we can customize our disaster recovery strategies to support their critical functions. This also fosters a sense of teamwork and shared responsibility for disaster preparedness.

Junior C: Moreover, regular meetings and communication channels between departments help us stay updated on any changes or new requirements. This proactive approach reduces the likelihood of surprises during a disaster and allows for a more seamless response.

Essa: These insights highlight the importance of teamwork and communication. Let's discuss the challenges you face in disaster recovery planning. What obstacles have you encountered, and how have you addressed them?

Senior A: One of the significant challenges is the unpredictability of disasters. No matter how thorough our planning is, unexpected situations can arise. To address this, we focus on building flexibility into our plans. We train our staff to adapt quickly and make decisions under pressure. We also conduct after-action reviews following incidents to learn from our experiences and update our plans accordingly.

Junior A: Another challenge is resource limitations. During large-scale disasters, the demand for emergency services can exceed our capacity. To mitigate this, we have mutual aid agreements with neighboring jurisdictions and other agencies. We also cross-train our staff to handle multiple roles, increasing our operational flexibility.

Senior B: A major challenge faced is ensuring the rapid availability of certain resources without compromising controls. During emergencies, the need for speed can conflict with the need for oversight. We've addressed this by establishing pre-approved actions and limits and emergency procedures that allow for expedited processing while maintaining quality and accountability.

Junior B: Another obstacle is maintaining accurate records under pressure of quick actions. High activity volumes and stress can lead to errors. We tackle this by using robust management control systems that automate many processes and by providing training to staff on handling emergency situations.

Senior C: For us, staying ahead of evolving natural or manmade threats is a constant challenge. Disasters can create opportunities for malicious actors to exploit vulnerabilities. We address this by implementing comprehensive security protocols, conducting regular vulnerability assessments, and keeping our systems updated with the latest alternatives and solutions avalaible.

Junior C: Additionally, ensuring that all staff are trained on new technologies and recovery procedures can be difficult, especially with limited time and resources. We prioritize training sessions and create easy-to-follow documentation to assist staff during emergencies.

Essa: How do you balance the need for rapid response with the necessity of maintaining standards and protocols during a disaster?

Senior A: It's a delicate balance. Speed is essential in emergency response, but acting without proper procedures can lead to mistakes that worsen the situation. We emphasize the importance of adhering to protocols through regular training and drills. Our staff are trained to execute procedures efficiently, which helps us maintain standards without unnecessary delays.

Junior A: In high-pressure situations, clear communication and leadership are crucial. Team leaders play a key role in guiding staff and making quick decisions that align with our protocols. We also use checklists and streamlined procedures to facilitate rapid action.

Senior B: We've designed our emergency procedures to be both efficient and compliant with regulations. By simplifying approval processes and delegating authority appropriately, we can expedite interactions and transactions while maintaining necessary controls.

Junior B: Automation helps as well. By reducing manual processes, we decrease the risk of errors and speed up activities and processes. Regular inspections, drills, audits and monitoring ensure that standards are upheld even during emergencies.

Senior C: For us, automation and predefined recovery scripts enable us to restore systems quickly without compromising security or stability. We also have tiered response plans that prioritize critical systems, ensuring that essential services are restored first while less critical systems follow established protocols.

Junior C: Continuous monitoring and alert systems help us detect issues early and respond promptly. By having clear escalation paths and predefined roles, we can act swiftly while adhering to our standards.

Essa: Technology plays a significant role in disaster recovery. How has technological advancement impacted your disaster recovery planning and execution?

Senior A: Technological advancements have greatly enhanced our capabilities in Operations. Advanced communication systems, GIS mapping, and real-time data analytics allow us to coordinate more effectively. However, they also require us to stay updated and trained on new systems, which is an ongoing effort.

Junior A: The integration of mobile technology and apps has enabled better communication with field units. For example, we can send detailed incident information directly to responders' devices. This improves situational awareness but also means we need to ensure these technologies are reliable and secure.

Senior B: In our operations, technology has streamlined our processes. Electronic and automated systems instead manual have sped up operations at almost all levels.

Junior B: Data analytics tools help us forecast needs during disasters and allocate resources more effectively. Embracing technology has improved our efficiency but also requires continuous learning and adaptation.

Senior C: For us, technological advancements are both an opportunity and a challenge. Tht have enhanced our disaster recovery strategies. We can implement more robust backup solutions and scale resources as needed.

Junior C: On the flip side, rapidly changing technology landscapes mean we need to constantly update our skills and infrastructure. Keeping up with new threats and ensuring compatibility across systems requires significant effort.

Essa: How do you ensure that staff across departments are adequately trained on new technologies and procedures related to disaster recovery?

Senior A: We have a structured training program that includes regular workshops, simulations, and hands-on training with new equipment. Collaboration with cross functions ensures that our staff are proficient with the technologies they use.

Junior A: We also have mentorship programs where experienced staff guide newer team members. This helps transfer knowledge and build competence.

Senior B: We conduct training sessions whenever new systems or procedures are implemented. We also encourage staff to pursue professional development opportunities related to management and technology for better performance.

Junior B: Onsite and Online training modules and certification programs are useful tools. We also hold regular meetings to discuss challenges and share knowledge.

Senior C: For our staff, continuous learning is part of our culture. We allocate time and resources for training on new technologies, attending conferences, and obtaining certifications.

Junior C: Cross-departmental training is also important. We sometimes hold joint sessions with other departments to ensure everyone understands how to use new systems and follows proper procedures.

Essa: Considering the human element, how do you address the stress and emotional impact on staff during and after disasters?

Senior A: Employee well-being is a priority. We provide access to counseling services and encourage staff to take breaks when possible. Debriefing sessions after incidents allow staff to share their experiences and feelings.

Junior A: Peer support is also valuable. Knowing that colleagues understand and support each other helps mitigate stress.

Senior B: We recognize that staff may also experience stress due to increased workloads and pressure. We try to manage workloads and provide support where needed.

Junior B: Flexible work arrangements and promoting a supportive team environment help reduce stress.

Senior C: In the pressure to restore systems quickly can be intense. We ensure that staff are not overworked by rotating shifts and providing necessary resources.

Junior C: Open communication with management about workloads and challenges allows us to address issues proactively.

Essa: As we approach the end of our discussion on this question, what recommendations would you make to further strengthen disaster recovery planning in your departments?

Senior A: I recommend increasing interdepartmental exercises to improve coordination. Additionally, investing in new technologies that enhance our capabilities would be beneficial.

Junior A: Regular updates to protocols and involving staff in planning can enhance ownership and effectiveness.

Senior B: Streamlining procedures further and incorporating advanced analytics can improve our responsiveness.

Junior B: Enhancing measures to protect resources is also crucial.

Senior C: Continued investment in technology and staff development will strengthen our disaster recovery efforts.

Junior C: Fostering a culture of continuous improvement and adaptability will help us meet future challenges.

Essa: Thank you all for your valuable contributions. This has been an insightful discussion on your general views of disaster recovery. Your experiences and suggestions provide a solid foundation for understanding the complexities involved. Let's take a short break before moving on to our next question.

Key Question 2: What are your views on the steps to be taken in creating a disaster recovery plan process?

Essa: Welcome back, everyone. Now that we've discussed your general views on disaster recovery, I'd like to delve deeper into the actual process of creating a disaster recovery plan.

Specifically, I'd like to hear your thoughts on the essential steps involved in developing an effective disaster recovery plan for our organization. From your departmental perspectives, what do you believe are the critical components and actions we need to consider?

Senior A: Thank you, Essa. From the Operations perspective, the first and foremost step is conducting a comprehensive **risk assessment and hazard identification**. We need to thoroughly understand the range of disasters and emergencies that could impact our operations. This includes natural disasters like floods, earthquakes, and sandstorms, as well as man-made incidents such as fires, chemical spills, infrastructure failures, and even cyber-attacks that could disrupt our communication systems.

Junior A: I completely agree with Senior A. In addition to identifying potential hazards, we should also evaluate the **likelihood and potential impact** of each risk. This helps us prioritize which risks require the most attention in our planning. For example, while an earthquake might be less likely in our region compared to floods, the impact could be catastrophic, so it still demands significant consideration in our disaster recovery plan.

Senior B: From our viewpoint and standpoint, after identifying the risks, the next crucial step is to conduct a **Business Impact Analysis (BIA)**. This analysis helps us determine how different types of disasters could affect our financial operations. We need to identify critical functions and assess how disruptions in these areas could affect the organization as a whole.

Junior B: Exactly. The BIA also allows us to quantify the **potential losses** associated with different disaster scenarios. By understanding the implications, we can make informed decisions about where to allocate resources in our disaster recovery planning. For instance, we might decide to invest more in backup systems if we know about likely significant losses or compliance issues.

Senior C: For us, once we've identified the risks and conducted a BIA, we perform a detailed **assessment of our resources**. This involves mapping out all critical resources and assets and determining their vulnerabilities. We need to understand the interdependencies between systems, so we know how the failure of one component could affect others.

Junior C: Additionally, we should evaluate our current **recovery capabilities**. Do we have sufficient data backups? Are our backup frequencies appropriate for our Recovery Point Objectives (RPOs)? Can we restore critical systems within our Recovery Time Objectives (RTOs)? Understanding our current state helps us identify gaps that need to be addressed in our disaster recovery plan.

Essa: These initial assessments are indeed vital. Once we've completed the risk assessments and business impact analyses, what would be the next steps in developing the disaster recovery plan?

Senior A: The next step is to establish our **Recovery Objectives**. This means setting clear RTOs and RPOs for each critical function. In Operations, for example, our RTO for emergency communication systems is virtually zero—we cannot afford any downtime. Our RPOs for data, such as incident logs and communication records, are also very low, as losing this information could impede our response efforts and legal compliance.

Junior A: We also need to **prioritize our services** based on their criticality during a disaster. While all our services are important, some are absolutely essential for immediate response. By categorizing services into tiers—critical, essential, and non-essential—we can focus our resources on ensuring that the most critical services remain operational or are restored first.

Senior B: Establishing recovery objectives involves determining acceptable downtime for our systems and processes. For instance, processing might have an RTO of 24 hours, hence the need to align these objectives with organizational needs and regulatory requirements.

Junior B: It's also important to set **Recovery Point Objectives**. For critical records, our RPO might be zero or near-zero, meaning we cannot afford to lose anything. This requires us to have real-time or near-real-time data replication and backup processes in place of the activities either to proact, act or react.

Senior C: For us, setting RTOs and RPOs is a collaborative effort with all departments. We need to understand the recovery priorities of each department to ensure that the recovery efforts support their needs. For critical systems like the emergency used by field Operations, we might aim for an RTO of less than 15 minutes and an RPO of zero.

Junior C: We also need to consider the **scalability** of our recovery solutions. During a disaster, systems usage may spike. Our disaster recovery plan should account for increased loads on systems and networks, ensuring that performance remains optimal even under stress.

Essa: With recovery objectives in place, how do we proceed to develop specific strategies and actions to meet these objectives?

Senior A: We need to develop **detailed response and recovery strategies**. This includes creating **Standard Operating Procedures (SOPs)** for various disaster scenarios. Each SOP should outline step-by-step actions for staff to take during a disaster, including who to contact, what resources to mobilize, and how to maintain operations. We should also identify **alternate facilities** in case our primary operations center becomes unusable.

Junior A: Training is critical here. Staff must be familiar with these procedures and know their roles. Regular **drills and simulations** help reinforce this knowledge and test the effectiveness of our procedures. We should also establish **mutual aid agreements** with neighboring jurisdictions and agencies to provide additional support when needed.

Senior B: Our strategies involve setting up **emergency procedures**. This includes establishing **emergency actions** that can be accessed quickly, simplifying processes for urgent actions, and identifying alternative methods for processing if our primary systems are down.

Junior B: We should also develop relationships with key **external partners** — suppliers, and agencies to ensure they understand our needs during a disaster and can respond accordingly. Pre-negotiated agreements can expedite processes when time is of the essence.

Senior C: Our strategies include implementing **redundant systems**, **off-site backups**, and **failover mechanisms**. We need to ensure that critical data is backed up regularly and stored securely in multiple locations. Our network infrastructure should be designed to reroute traffic automatically if a primary pathway fails.

Junior C: Safety and security are other crucial aspects. Disasters can increase our vulnerability to risks especially in times of speedy actions. We need to include strategies to protect against potential threats, such as enhanced monitoring during disasters, multi-factor authentication, and employee training on identifying attempts and other malicious activities.

Essa: Communication is a recurring theme in disaster recovery. How should communication be addressed in our disaster recovery plan?

Senior A: Effective communication is the backbone of disaster response. Our plan should establish **redundant communication channels**—landlines, mobile phones, radios, satellite phones, and internet-based communication platforms. We need to define clear **communication protocols**, specifying who is responsible for communicating with staff, external agencies, the public, and the media.

Junior A: Information management is also key. We should have procedures for collecting, verifying, and disseminating information to ensure that everyone has accurate and timely data. Miscommunication can lead to confusion and hinder our response efforts.

Senior B: For us, secure and reliable communication is essential for coordinating with internal teams and external partners. We should have **encrypted communication channels** for sensitive information and establish **contact lists** with multiple points of contact for each key partner.

Junior B: Regular **status updates** are important to keep everyone informed about resources, functions, and any issues that arise. This transparency helps in decision-making and maintaining trust among stakeholders.

Senior C: We need to ensure that our communication infrastructure is resilient. This includes **network redundancy**, backup communication systems, and ensuring that our communication platforms can handle increased traffic during a disaster.

Junior C: We should also plan for **emergency communication tools**, such as mass notification systems, to quickly disseminate important information to all employees. Training staff on how to use these tools effectively is essential.

Essa: Training and testing are crucial for the effectiveness of the disaster recovery plan. How should we incorporate these elements into the planning process?

Senior A: Regular training programs should be implemented for all staff, covering their specific roles in the disaster recovery plan. This includes hands-on exercises, workshops, and simulations of various disaster scenarios. Training should not be a one-time event but an ongoing process to keep skills sharp.

Junior A: We should conduct **full-scale drills** that involve all departments and simulate real disaster conditions. These drills help us test the plan's effectiveness, coordination between teams, and the functionality of our systems under stress.

Senior B: We can use **tabletop exercises** to simulate decision-making during a disaster. This helps staff practice rapid problem-solving and familiarizes them with emergency procedures.

Junior B: Cross-training is beneficial so that team members can cover multiple roles if necessary. This flexibility is important when staff availability may be uncertain during a disaster.

Senior C: **Disaster recovery testing** should be scheduled regularly. This includes testing backups, system restorations, and failover procedures. We need to ensure that recovery time and recovery point objectives can be met in practice, not just in theory.

Junior C: Security drills, such as simulated attacks, can help prepare staff to recognize and respond to threats. Keeping everyone aware of best practices reduces our overall risk.

Essa: How do we ensure that the disaster recovery plan remains up-to-date and effective over time?

Senior A: The plan should be reviewed and updated at least annually or whenever significant changes occur in our operations, infrastructure, or external environment. **After-action reviews** following drills and actual incidents provide valuable insights for improvements.

Junior A: Feedback mechanisms should be in place for staff to report issues or suggestions related to the disaster recovery plan. Engaging employees in this way encourages continuous improvement.

Senior B: Monitoring **regulatory changes** and adjusting our procedures accordingly ensures compliance and effectiveness. We should also stay informed about industry best practices in disaster recovery and incorporate relevant advancements.

Junior B: Inspection and Audit results can highlight areas where our disaster recovery procedures may need enhancement. Addressing these findings promptly keeps our plan robust.

Senior C: Given the rapid pace of technological change, we need to **stay current with emerging technologies** and threats. This includes updating hardware and software, revising security protocols, and training staff on new tools.

Junior C: Vendor relationships should be maintained and reviewed regularly. Ensuring that our suppliers and service providers are also prepared for disasters helps in maintaining continuity.

Essa: Documentation is an essential part of the disaster recovery plan. What are your thoughts on this?

Senior A: Comprehensive and accessible **documentation** is vital. All procedures, contact lists, resource inventories, and roles and responsibilities should be clearly documented. These documents should be stored securely but be readily available when needed.

Junior A: Version control is important to ensure everyone is working from the most recent documents. Outdated information can cause confusion during a disaster.

Senior B: For us, documentation supports transparency and compliance. Detailed records of decisions, transactions, and processes are necessary for compliance and regulatory reviews.

Junior B: We should also document lessons learned from drills and actual incidents. This institutional knowledge helps us avoid repeating mistakes and improves our response over time.

Senior C: Technical documentation for systems, including recovery procedures, system configurations, and network diagrams, is essential. This information enables the staff to restore systems efficiently.

Junior C: Access controls should be in place to protect sensitive documentation, but we need to ensure that authorized personnel can access what they need during a disaster.

Essa: Finally, how can we foster a culture of preparedness and resilience within the organization to support the disaster recovery plan?

Senior A: Leadership must champion the importance of disaster recovery. By demonstrating commitment and allocating resources, we set the tone for the entire organization. Encouraging open communication about risks and involving staff in planning fosters ownership.

Junior A: Recognizing and rewarding staff contributions to preparedness efforts can motivate continued engagement. Making disaster readiness part of performance evaluations might also reinforce its importance.

Senior B: For us, promoting a mindset that considers risk management and disaster preparedness in daily activities helps integrate these concepts into our organizational culture.

Junior B: Offering professional development opportunities related to disaster recovery and resilience can enhance skills and commitment among staff.

Senior C: Encouraging innovation and continuous learning keeps the team engaged and prepared for new challenges. Sharing success stories of effective disaster responses can also boost morale.

Junior C: Interdepartmental collaboration promotes a sense of shared responsibility. Joint training exercises and planning sessions build relationships and improve coordination during actual events.

Essa: These are excellent suggestions. Before we conclude this topic, does anyone have any final thoughts or recommendations?

Senior A: I would stress the importance of **community engagement**. Working with external stakeholders, such as local authorities and emergency services, enhances our overall preparedness.

Junior A: Agreed. **Public awareness campaigns** can also help the community understand their role during disasters, which in turn supports our efforts.

Senior B: Operational resilience extends beyond our organization. Supporting suppliers and partners in their disaster recovery planning can reduce disruptions in our supply chain.

Junior B: Transparency with stakeholders about our disaster recovery capabilities can build trust and confidence.

Senior C: Embracing **emerging technologies**, such as artificial intelligence and machine learning, may offer new ways to enhance our disaster recovery efforts.

Junior C: Lastly, maintaining a **positive attitude** and **team spirit** is crucial. Disasters test not only our systems but also our people. A supportive environment can make all the difference.

Essa: Thank you all for your comprehensive insights and thoughtful contributions. Your expertise is invaluable in shaping an effective disaster recovery plan for our organization. Let's take a short break before moving on to our next question.

Key Question 3: What, according to you, are the objectives of a disaster recovery plan?

Essa: Welcome back, everyone. Having discussed the steps involved in creating a disaster recovery plan, I'd like us to now focus on the objectives of such a plan. From your perspectives, what are the primary goals we should aim to achieve with our disaster recovery plan?

Senior A: Thank you, Essa. From the Operations standpoint, the foremost objective of a disaster recovery plan is to **ensure the continuity of critical services**. In our case, this means maintaining our ability to respond to emergencies without interruption. People's lives depend on our responsiveness, so our primary goal is to prevent any disruption to emergency services, even in the face of disasters.

Junior A: I agree with Senior A. Another key objective is to **minimize the impact of disasters on our operations**. This involves not only keeping our systems running but also ensuring that our personnel are safe and able to perform their duties effectively. Protecting our staff and providing them with the necessary resources during a disaster is essential.

Senior B: From our perspective, a critical objective is to **maintain operational and functional stability and integrity** during and after a disaster. This means ensuring that we can continue to process actions, interactions, transactions, and provide the necessary resources for emergency operations. Process continuity supports the entire organization's ability to function during crises.

Junior B: Additionally, we aim to **protect resources,** including data and assets. Disasters can pose risks to resources, whether through physical damage or virtual threats. Our objective is to safeguard the resiurces, including information to prevent losses and maintain compliance with regulatory requirements.

Senior C: Our primary objective is to **ensure the availability and integrity of systems**. This includes restoring critical systems quickly, preventing losses, and maintaining network

collaborations and partnerships. Our role supports all other departments, so our objective is to provide the required foundation and platform they need to operate effectively during a disaster.

Junior C: Another important objective is to **protect against risks and threats** that may be heightened during disasters. There could be factors that often exploit chaotic situations, so our plan must include robust measures to defend against potential disruptions.

Essa: These are all vital objectives. Let's delve deeper into how these objectives translate into specific goals and actions within your departments. Senior A, could you elaborate on how Operations works towards ensuring the continuity of critical services?

Senior A: Certainly. To achieve continuity, we establish **redundant communication systems**. For example, if our primary dispatch system fails, we have backup systems in place that we can switch to immediately. We also train our staff extensively so they are prepared to handle emergencies under any circumstances. Regular drills simulate various disaster scenarios, helping us identify potential weaknesses and improve our responses.

Junior A: We also focus on **resource allocation**. During a disaster, we may need to reassign personnel or equipment to areas of greatest need. Our objective is to do this efficiently to maintain service levels. Additionally, we have **mutual aid agreements** with other agencies to supplement our resources if necessary.

Essa: And how do you work towards minimizing the impact of disasters on your operations and personnel?

Senior A: We prioritize the **safety and well-being of our staff**. This includes providing protective equipment, ensuring safe working environments, and offering support services such as counseling if needed. By taking care of our personnel, we enable them to perform their duties effectively, which in turn minimizes operational impact.

Junior A: We also implement **stress management programs** and provide training on resilience. Disasters can be emotionally taxing, so equipping our staff with coping strategies is part of our objective to maintain operational effectiveness.

Essa: Excellent. Senior B, could you discuss how you maintain stability, continuity and integrity during disasters?

Senior B: Our objective is achieved through several actions. First, we maintain **emergency resources** that can be accessed quickly to support urgent needs. We also have **contingency**

plans for operations, such as alternative methods and simplified approval processes, to ensure that interactions and transactions can continue without significant delays.

Junior B: Protecting resources is also critical. We use **secure backup systems** and ensure that resources can replicated in real-time to off-site locations. This safeguards against any loss and allows us to restore systems quickly if needed.

Essa: How do you ensure compliance with regulatory requirements during a disaster?

Senior B: Compliance is maintained by **adhering to established standards and controls** even during emergencies. We train our staff on these controls and have procedures in place that allow for expedited processes without compromising integrity. Regular inspections, audits and oversight are part of our objective to uphold regulatory standards.

Junior B: We also maintain **open communication with regulatory bodies**. If a disaster impacts our ability to meet certain obligations, we proactively inform them and work collaboratively to address any issues.

Essa: Senior C, could you elaborate on your objectives and how they are pursued?

Senior C: Certainly. To ensure the availability and integrity of our systems, we have detailed **disaster recovery procedures** that guide our team in restoring systems efficiently.

Junior C: Regular testing of our recovery procedures is crucial. By simulating system failures and practicing restorations, we refine our processes and reduce recovery times. Additionally, we monitor systems continuously to detect and address issues proactively.

Essa: Regarding security, how do you enhance protection during disasters?

Senior C: We recognize that disasters can create opportunities for many kinds of threats. Our objective is met by implementing **advanced safety and security measures**, with **safety and security awareness programs** for all staff to prevent incidents caused by human error.

Junior C: During a disaster, we may **heighten security protocols**, such as increasing monitoring or restricting certain system accesses, to protect against potential attacks. Coordination with cybersecurity agencies and staying informed about emerging threats support this objective.

Essa: These actions are indeed comprehensive. Let's discuss how these departmental objectives align with the overall organizational goals. How does achieving these objectives contribute to the organization's mission?

Senior A: Our mission is to protect lives and property. By ensuring continuity of critical services and minimizing operational impact, we directly contribute to this mission. Effective disaster recovery planning allows us to fulfill our duties even under adverse conditions, maintaining public trust and safety.

Junior A: Additionally, by protecting our personnel, we sustain our capacity to serve the community. Our objectives support not only operational functionality but also the morale and resilience of our workforce.

Senior B: From our perspective, maintaining continuity and stability ensures that all departments have the necessary resources to carry out their functions. Our objectives support the organization's mission by enabling uninterrupted operations and prudent operational and strategic management, which is essential for both short-term and long-term sustainability.

Junior B: Protecting resources and goodwill and compliance also preserves the organization's reputation and legal standing, which are vital for maintaining stakeholder confidence and support.

Senior C: Our objectives are functional and foundational to the organization's mission. All modern operations rely on technology, so ensuring system availability and data integrity is critical. By providing secure and reliable services, we empower other departments to perform their duties effectively.

Junior C: Safety and security efforts protect the organization from threats that could undermine operations or compromise sensitive information. This defense is essential for maintaining public trust and safeguarding the organization's assets.

Essa: It's clear that your departmental objectives are interconnected and contribute significantly to the overall mission. Let's explore the challenges you might face in achieving these objectives and how you address them.

Senior A: One challenge is the **unpredictability of disasters**. Despite thorough planning, unforeseen circumstances can arise. We address this by building **flexibility** into our plans and training our staff to adapt quickly to changing situations.

Junior A: Resource constraints can also pose challenges. During large-scale disasters, demands may exceed our immediate capacity. We mitigate this by leveraging **mutual aid agreements** and having contingency plans for resource allocation.

Senior B: For us, balancing the need for rapid responses with maintaining controls can be difficult. We overcome this by **simplifying processes** without eliminating necessary checks, and by empowering trusted personnel to make quick decisions within defined parameters.

Junior B: Communication breakdowns during disasters can impede our objectives. To address this, we establish **redundant communication channels** and clear protocols to ensure information flows smoothly.

Senior C: For us, the **rapid evolution of technology, risks and threats** is a constant challenge. We tackle this by committing to **continuous learning and updating** our systems and security measures regularly.

Junior C: Limited resources and budget constraints can also hinder our ability to implement the latest technologies. We prioritize investments based on risk assessments and seek cost-effective solutions, such as leveraging cloud services or open-source technologies.

Essa: How do you measure the success of achieving your disaster recovery objectives?

Senior A: We use **Key Performance Indicators (KPIs)** such as response times, service availability, and the number of incidents successfully managed without disruption. Regular reviews of these metrics help us assess our effectiveness.

Junior A: Staff feedback and incident debriefs also provide insights into how well our objectives are being met and where improvements are needed.

Senior B: We measure success by our ability to process activities promptly, maintain controls, and meet regulatory requirements during a disaster. **Results** and **performance metrics** are indicators of our success.

Junior B: Stakeholder satisfaction is another measure. If other departments can access the resources they need without delays, it's a sign that our objectives are being achieved.

Senior C: For us, success is measured by **system uptime**, **recovery times**, and **the absence of security breaches** during disasters. We also monitor user satisfaction and support requests to gauge our performance.

Junior C: Post-incident reviews help us understand what went well and where we can improve. Metrics like the speed of system operations, especially after disruptions and the effectiveness of our safety and security measures are key indicators.

Essa: Let's consider the role of leadership in achieving these objectives. How does leadership support or hinder your efforts?

Senior A: Leadership plays a crucial role by **setting priorities**, allocating resources, and fostering a culture that values preparedness. Supportive leadership ensures that we have the tools and training needed to meet our objectives.

Junior A: Conversely, if leadership does not prioritize disaster recovery, it can lead to insufficient resources or lack of engagement among staff, hindering our ability to achieve our goals.

Senior B: For us, leadership's commitment to **overall resilience** is essential. By investing in robust systems and approving necessary actions for disaster preparedness, they enable us to perform effectively.

Junior B: Leadership also influences the **tone at the top** regarding compliance and ethical behavior, which impacts how management controls are maintained during crises.

Senior C: For us, leadership support is vital for securing resources and oiverall development. Leaders who understand the importance in disaster recovery advocate for necessary resources.

Junior C: Leadership can also facilitate **cross-departmental collaboration**, which is essential for integrated disaster recovery efforts. Encouraging communication and cooperation enhances our ability to meet objectives.

Essa: How do you engage with other departments to achieve your disaster recovery objectives?

Senior A: Collaboration is key. We work closely with all departments to ensure our systems are reliable and for necessary resources. Regular interdepartmental meetings and joint training exercises strengthen these relationships.

Junior A: Sharing information and participating in **joint planning sessions** helps align our objectives and ensures everyone understands their roles in the disaster recovery plan.

Senior B: We engage with all departments to understand their needs and constraints. This helps us plan accordingly and provide timely support during disasters.

Junior B: Providing training on operational procedures to other departments ensures they know how to access resources and process transactions during emergencies.

Senior C: We support other departments by understanding their needs and ensuring our systems are tailored to support their objectives. We offer technical training and support to enhance their capabilities.

Junior C: User feedback from other departments helps us improve our systems and services. Open communication channels facilitate this exchange.

Essa: Considering the external environment, how do regulatory requirements and industry standards influence your disaster recovery objectives?

Senior A: Regulatory requirements dictate certain standards for emergency response times and service levels. Compliance with these regulations is a key objective, ensuring we meet legal obligations and provide high-quality services.

Junior A: Industry standards and best practices guide our operational procedures. Adhering to these helps us maintain excellence in our services.

Senior B: Compliance with applicable regulations is non-negotiable. Our objectives include meeting all legal requirements for reporting, protecting, and transacting, processing, especially during disasters as top priority.

Junior B: Following industry standards, such as those set by accounting bodies, ensures our practices are sound and reputable.

Senior C: In IT, standards like ISO for safety and security management influence our objectives. Compliance demonstrates our commitment to security and can enhance stakeholder trust.

Junior C: Regulatory requirements related to how we manage and protect resources. Our objectives include ensuring compliance to avoid legal penalties and protect our reputation.

Essa: Finally, how do you anticipate and incorporate emerging trends or future challenges into your disaster recovery objectives?

Senior A: We engage in **continuous improvement** by monitoring emerging threats and trends in emergency management. This proactive approach allows us to adjust our objectives and strategies accordingly.

Junior A: Participating in industry conferences and collaborating with other organizations provides insights into new practices and technologies we can adopt.

Senior B: We stay informed about trends, technological advancements, and changes in regulations. This helps us anticipate challenges and update our objectives to remain effective.

Junior B: We also invest in **professional development** for our staff to ensure they have the skills needed to address future challenges.

Senior C: The rapid pace of technological change requires us to be forward-thinking. We explore emerging technologies like artificial intelligence and blockchain to see how they can enhance our disaster recovery efforts.

Junior C: Threat intelligence, safety and security trends are monitored closely. Incorporating this information into our objectives ensures we are prepared for new types of threats.

Essa: Thank you all for your thorough and insightful contributions. Understanding the objectives of our disaster recovery plan from each department's perspective is invaluable. Before we conclude this topic, does anyone have any final thoughts or recommendations?

Senior A: I would emphasize the importance of **alignment** across departments. Ensuring our objectives support each other enhances our overall resilience.

Junior A: Continuous engagement with staff at all levels keeps our objectives grounded in reality and practical for implementation.

Senior B: Regular **review and adaptation** of our objectives ensure they remain relevant in a changing environment.

Junior B: Building strong relationships with external partners, like institutions, inspectors and auditors, supports our objectives.

Senior C: Investing in our people is as important as investing in technology. Skilled and motivated staff are essential for achieving our objectives.

Junior C: Encouraging a culture of innovation and openness to change helps us stay ahead of future challenges.

Essa: These are excellent closing points. Thank you once again for your valuable insights. Let's take a short break before moving on to our next question.

Key Question 4: How does leadership as a role get involved in preparing an operational disaster recovery plan?

Essa: Welcome back, everyone. We've had insightful discussions so far about disaster recovery planning and its objectives. Now, I'd like us to focus on the role of leadership in this process. Specifically, how does leadership get involved in preparing an operational disaster recovery plan within your departments? What are the key responsibilities and actions that leaders must undertake to ensure the plan's effectiveness?

Senior A: Thank you, Essa. Leadership plays a pivotal role in disaster recovery planning, especially in Operations. As leaders, we are responsible for **setting the vision and strategic direction** for the disaster recovery plan. This involves defining clear objectives, priorities, and expectations for our teams. We must ensure that the plan aligns with the organization's overall mission and that it addresses the specific needs of our department.

Junior A: Adding to that, leaders are instrumental in **allocating resources**—both human and material—to support the disaster recovery efforts. They must assess what is required to implement the plan effectively and ensure that these resources are made available. This

includes budgeting for training, equipment, and technology that enhance our preparedness and response capabilities.

Senior B: As a senior leader, I know the importance of the commitment of leadership to provide support and the resources needed to achieve the individual departmental and organisational disaster recovery activities. Without leadership support the plans and strategies, no matter how extensive, will not work.

Junior B: Without the commitment of the leadership the disaster recovery plans and protocols we have put in place will not work. Resources such as funding, colleague availability and allocation, the ability to respond rapidly can only be achieve with our leadership commitment to our DR plans

Senior C: As a senior leader our role is to ensure that these plans are fully supported. This support includes providing funds through to ensuring that any obstacles are removed in the event of a disaster, but also enabling the disaster recovery protocols to be rehearsed, while ensuring that DR is at the forefront of all our leadership activities

Junior C: Leaders also foster a culture of **continuous improvement and learning**. They encourage their teams to stay updated with the latest technologies and best practices in disaster recovery. By promoting professional development, leaders ensure that the departments remain capable of supporting the organization's needs during and after a disaster.

Essa: These are important points. Let's delve deeper into the specific actions leaders take during the planning process. How do leaders facilitate the development of the disaster recovery plan in your departments?

Senior A: Leaders facilitate the planning process by **bringing together key stakeholders** to collaborate on the plan's development. We organize meetings and workshops that include representatives from different levels and functions within the department. This inclusive approach ensures that the plan benefits from diverse perspectives and that all team members feel a sense of ownership.

Junior A: We are a unique department which is different from most of my colleagues here. We have our targets and strategies which is aligned to ensuring that the Dubai Civil Defence services are recovered, but there are some distinct differences which need to be carefully considered and planned for.

Senior B: Leaders are involved in **developing and approving policies** that govern operations during a disaster. They work closely with legal and compliance teams to ensure that the

procedures meet regulatory standards. Leaders also engage with external partners, and suppliers, to establish agreements that facilitate interactions during emergencies.

Junior B: Leaders conduct **risk assessments** to identify financial vulnerabilities and prioritize areas that require attention. They use this information to guide the allocation of resources and to develop strategies that strengthen financial resilience.

Senior C: Leaders oversee the **imporatnt aspects** of the disaster recovery plan. They ensure that recovery strategies are feasible and that the necessary infrastructure is in place. Leaders also coordinate with other departments to understand their needs and incorporate them into the disaster recovery plan.

Junior A: Yes, I can see that although we all have different activities to be performed, ultimately, we are all focused on the Dubai Civil Defence to recover our services, and not only one department's recovery. An overarching or holistic approach could be beneficial and also learn from each other

Senior C: I think a shared or a united disaster recovery strategy would be beneficial, but one size does not fit all. Therefore, there is a need for a holistic approach but also to be sufficiently flexible and adaptable.

Junior C: Additionally, leaders manage **vendor relationships**. They negotiate contracts and service level agreements with third-party providers to ensure that external services critical to our operations are reliable and recoverable during disasters.

Essa: Communication is a key aspect of leadership. How do leaders communicate the importance of disaster recovery planning to their teams and the broader organization?

Senior A: Leaders must **articulate the vision and importance** of disaster recovery planning clearly and consistently. We do this through regular communications—meetings, emails, and presentations—highlighting how the plan supports our mission and the potential consequences of not being prepared.

Junior A: We also **celebrate milestones and successes** related to disaster recovery planning. Recognizing the efforts of team members who contribute significantly to the plan encourages ongoing engagement and commitment.

Senior B: Leaders ensure transparency by sharing information about risks and the measures being taken to mitigate them. Open communication fosters trust and ensures that all team members understand their roles in maintaining continuity and stability during disasters.

Junior B: Leaders also **provide training and resources** to staff, emphasizing the importance of being prepared and the impact their work has on the organization's overall resilience.

Senior C: Leaders communicate the key aspects of the disaster recovery plan in a way that is understandable to the stakeholders. This helps secure buy-in and support from other departments and senior management.

Junior C: We also use **metrics and reports** to demonstrate the effectiveness of our disaster recovery efforts, highlighting areas of improvement and success stories to keep the team motivated.

Essa: How do leaders ensure that their teams are adequately trained and prepared for disaster recovery?

Senior A: Leaders are responsible for **developing training programs** that equip staff with the necessary skills and knowledge. This includes organizing regular drills and simulations that test the disaster recovery plan and staff readiness.

Junior A: Leaders also identify **training needs** by assessing performance during drills and actual incidents. They allocate resources for professional development and ensure that staff have access to relevant training opportunities.

Senior B: Leaders promote a culture of continuous learning. They encourage staff to pursue certifications and attend workshops related to disaster recovery and resilience.

Junior B: Leaders also facilitate **cross-training**, allowing staff to understand different roles within the department. This flexibility ensures that critical functions can continue even if some team members are unavailable during a disaster.

Senior C: Leaders invest in **specialized training** for their teams, focusing on the latest technologies and recovery techniques. They also promote awareness of challenges, threats and best practices.

Junior C: Leaders may also arrange for **external experts** to provide specialized training or insights into emerging trends and threats, keeping the team at the forefront of disaster recovery strategies.

Essa: Leadership often involves decision-making under pressure. How do leaders prepare themselves and their teams to make effective decisions during a disaster?

Senior A: Leaders must develop **decision-making frameworks** that can be applied during crises. This involves setting clear priorities and guidelines that can guide actions when time is of the essence.

Junior A: We practice **scenario-based training** where leaders and staff are presented with challenging situations that require quick decisions. This helps build confidence and improves judgment under pressure.

Senior B: Leaders establish **delegation of authority** protocols. By empowering certain team members to make decisions within defined limits, we can respond swiftly without bottlenecks.

Junior B: Leaders also encourage a culture where staff feel comfortable **escalating issues** and seeking guidance when faced with unfamiliar challenges.

Senior C: Leaders develop **incident response plans** that outline steps to be taken during different types of disasters. By having predefined actions, decision-making becomes more straightforward.

Junior C: Regular **incident response drills** help leaders and teams practice making decisions collaboratively, enhancing coordination and effectiveness.

Essa: How do leaders foster collaboration and coordination between departments during disaster recovery planning?

Senior A: Leaders facilitate **interdepartmental meetings** to discuss disaster recovery strategies and identify areas where collaboration is needed. This helps align efforts and ensures that all departments are working towards common goals.

Junior A: Joint training exercises involving multiple departments can improve understanding and cooperation. Leaders play a key role in organizing and supporting these initiatives.

Senior B: Leaders work with counterparts in other departments to understand their needs and constraints. By maintaining open lines of communication, we can better support each other during a disaster.

Junior B: Leaders also participate in **cross-functional committees** that oversee disaster recovery planning, ensuring that functional and operational considerations are integrated into broader organizational strategies.

Senior C: Leaders collaborate with other departments to understand their technological dependencies and requirements. This information is critical for developing an disaster recovery plan that supports the entire organization.

Junior C: Leaders also promote the use of **collaborative tools and platforms** that facilitate resources and information sharing and coordination during a disaster.

Essa: Let's discuss the role of leadership in managing resources during disaster recovery planning. How do leaders ensure that the necessary resources are available and used effectively?

Senior A: Leaders are responsible for **budgeting and resource allocation**. We need to justify the resources required for disaster recovery planning and ensure that they are used efficiently. This includes personnel, equipment, and facilities.

Junior A: Leaders also monitor resource utilization and make adjustments as needed. For example, if certain equipment is underused, we might reallocate it to where it's needed more.

Senior B: In Finance, leaders oversee the **financial resources** allocated for disaster recovery. They ensure that funds are spent appropriately and that financial controls are in place to prevent misuse.

Junior B: Leaders also seek opportunities for **cost savings** without compromising the effectiveness of the disaster recovery plan. This might involve negotiating better terms with suppliers or investing in more efficient technologies.

Senior C: IT leaders prioritize investments in infrastructure and technologies that provide the best return on investment in terms of resilience and recovery capabilities.

Junior C: Leaders also explore **alternative solutions**, such as cloud services or outsourcing certain functions, to optimize resource utilization.

Essa: How do leaders handle the challenges of change management when implementing new disaster recovery initiatives?

Senior A: Leaders must be effective **change agents**. We communicate the reasons behind changes, the benefits they bring, and how they align with our mission. This helps reduce resistance and gain buy-in from staff.

Junior A: Providing training and support during transitions is important. Leaders ensure that staff are comfortable with new procedures or technologies before they're fully implemented.

Senior B: Changes might involve new systems or processes. Leaders manage these changes by involving staff in the planning stages and addressing their concerns proactively.

Junior B: Leaders also monitor the impact of changes and are willing to make adjustments if issues arise. This flexibility helps ensure that changes lead to improvements rather than disruptions.

Senior C: Leaders manage change by **planning implementations carefully**, testing new systems thoroughly before deployment, and providing comprehensive training to users.

Junior C: Leaders also maintain **open communication channels** to receive feedback and address any problems quickly.

Essa: Leadership also involves fostering a positive organizational culture. How do leaders promote a culture that supports disaster recovery planning and resilience?

Senior A (Operations): Leaders set the tone by **modeling the behaviors** they expect from others. By demonstrating commitment to preparedness and resilience, leaders encourage similar attitudes among staff.

Junior A: Recognizing and rewarding efforts related to disaster recovery planning reinforces its importance. Leaders can highlight success stories and acknowledge individuals or teams who contribute significantly.

Senior B: Leaders promote a culture of **accountability and transparency**. This supports disaster recovery by ensuring that everyone understands their responsibilities and the importance of adhering to procedures.

Junior B: Leaders also encourage **open dialogue** about risks and challenges. This helps identify potential issues early and fosters a collaborative approach to problem-solving.

Senior C: Leaders emphasize the importance of **innovation and continuous improvement**. Encouraging staff to propose new ideas and solutions keeps the team engaged and proactive in enhancing disaster recovery capabilities.

Junior C: Leaders also promote **teamwork and collaboration**, recognizing that disaster recovery is a collective effort that requires input from everyone.

Essa: Considering external relationships, how do leaders engage with external stakeholders, such as suppliers, regulators, or partner organizations, in the context of disaster recovery planning?

Senior A: Leaders establish and maintain **partnerships with external agencies**, such as emergency services, government bodies, and community organizations. These relationships are crucial for coordinated responses during disasters.

Junior A: Leaders also represent the organization in **inter-agency forums and committees**, contributing to broader disaster preparedness efforts and staying informed about regional plans.

Senior B: Leaders engage with **financial institutions**, suppliers, and auditors. They negotiate terms that support disaster recovery, such as flexible payment arrangements or priority services during emergencies.

Junior B: Leaders also ensure compliance by maintaining open communication with **regulatory bodies**, informing them of our disaster recovery plans and any challenges we face.

Senior C: Leaders work with **technology vendors and service providers** to ensure they have robust disaster recovery plans that align with ours. This includes reviewing their capabilities and integrating them into our own plans.

Junior C: Leaders may also participate in **industry groups** focused on disaster recovery, safety and security, sharing knowledge and learning from others.

Essa: How do leaders measure and evaluate the effectiveness of disaster recovery planning in their departments?

Senior A: Leaders establish **Key Performance Indicators (KPIs)** related to disaster recovery, such as response times, system availability, and compliance with procedures during drills. Regular reviews of these KPIs help assess performance.

Junior A: Leaders also solicit **feedback from staff** after drills and actual incidents to identify areas for improvement.

Senior B: Leaders review metrics like the timeliness of activities during a disaster, adherence to controls, inspectiins and audit results.

Junior B: Stakeholder satisfaction is another important measure. Leaders assess how well we supported other departments and address any concerns.

Senior C: Leaders monitor systems working, recovery times, and the effectiveness of measures. They also track **incident reports** to identify patterns or recurring issues.

Junior C: Leaders use information to make informed decisions about where to focus resources and efforts for continuous improvement.

Essa: Finally, how do leaders ensure that the disaster recovery plan remains relevant and up-to-date?

Senior A: Leaders schedule **regular reviews** of the disaster recovery plan, incorporating changes in operations, technology, or the external environment. This ensures the plan evolves with the organization.

Junior A: Leaders also stay informed about **emerging threats** and best practices, updating the plan accordingly.

Senior B: Leaders monitor changes in **regulations and industry standards**, adjusting policies and procedures to maintain compliance and effectiveness.

Junior B: Leaders also encourage staff to share insights from training or conferences that could enhance our disaster recovery efforts.

Senior C: Leaders keep abreast of **technological advancements** and safety and security trends, integrating new solutions that improve resilience.

Junior C: Leaders also **test the plan regularly**, using the results to refine strategies and address any gaps.

Essa: Thank you all for sharing these detailed insights into the role of leadership in disaster recovery planning. It's clear that effective leadership is critical at every stage, from planning and resource allocation to communication and continuous improvement. Before we conclude this topic, does anyone have any final thoughts or recommendations?

Senior A: I would emphasize the importance of **leadership commitment**. When leaders prioritize disaster recovery, it permeates the entire organization, leading to better preparedness and resilience.

Junior A: Also, leaders should remain **approachable and open to feedback**. This encourages staff to voice concerns and contribute ideas, strengthening the disaster recovery plan.

Senior B: Leaders must balance **strategic vision with practical implementation**. It's important to set ambitious goals but also ensure they are achievable with the available resources.

Junior B: Transparency from leadership builds trust, which is essential during times of crisis.

Senior C: Investing in leadership development ensures that future leaders are equipped to continue advancing our disaster recovery capabilities.

Junior C: Finally, leaders should foster a culture of **resilience and adaptability**, preparing the organization not just to survive disasters but to emerge stronger.

Essa: These are valuable closing thoughts. Thank you all for your contributions. Your perspectives highlight the multifaceted role of leadership in disaster recovery planning and the importance of leadership at all levels. Let's take a short break before moving on to our next question.

Key Question 5: What do you consider are critical success factors (CSFs) in implementing a disaster recovery plan?

Essa: Welcome back, everyone. We've had some fruitful discussions on disaster recovery planning, its objectives, and the role of leadership. Now, I'd like us to focus on identifying the

critical success factors—or CSFs—that are essential for the successful implementation of a disaster recovery plan. From your perspectives, what are the key factors that determine whether a disaster recovery plan will be effective?

Senior A: Thank you, Essa. From the Operations standpoint, one of the most critical success factors is **comprehensive and realistic planning**. This means that the disaster recovery plan must be thorough, covering all possible scenarios that could impact our operations. It should be based on accurate risk assessments and include detailed procedures that are practical and actionable.

Junior A: I agree with Senior A. Additionally, **staff training and preparedness** are vital. Even the most well-crafted plan will fail if the people responsible for executing it are not adequately trained. Regular drills and simulations help ensure that everyone knows their roles and can perform them effectively under pressure.

Senior B: From our perspective, **strong controls and flexibility** are critical success factors. We need to have systems in place that allow us to access and allocate funds quickly during a disaster, while still maintaining proper oversight to prevent misuse. This balance between speed and control is essential.

Junior B: Also, **effective communication channels** are crucial. Clear and timely communication within the team and with other departments ensures that resources are directed where they are needed most. Miscommunication can lead to delays or misallocation of resoutces, which can hinder the overall disaster recovery effort.

Senior C: R**obust and resilient infrastructure** is a key success factor. Our systems must be designed to withstand disruptions and recover quickly. This includes having reliable backups, and secure networks. Without a strong foundation, other departments may struggle to perform their functions during a disaster.

Junior C: Additionally, **preparedness and readiness** is increasingly important. Disasters can create vulnerabilities that criminals may exploit. Ensuring that our security measures are up-to-date and effective is essential to protect our systems and data during a crisis.

Essa: These are excellent points. Let's explore each of these success factors in more detail. Senior A, could you elaborate on what makes a disaster recovery plan comprehensive and realistic?

Senior A: Certainly. A comprehensive plan should **address all critical functions** of the organization, not just a subset. It must consider a wide range of potential disasters—natural,

technological, and human-made—and outline specific responses for each. The plan should include detailed procedures, resource requirements, and contingency measures.

A realistic plan takes into account the **actual capabilities and limitations** of the organization. It avoids assumptions that may not hold true in a crisis, such as unlimited access to resources or perfect coordination. By grounding the plan in reality, we increase the likelihood that it can be executed effectively when needed.

Junior A: To add to that, involving personnel from all levels in the planning process helps ensure that the plan is realistic. Frontline staff can provide insights into practical challenges and resource constraints that may not be apparent to management. This inclusive approach leads to a more effective plan.

Essa: Thank you. Moving on to training and preparedness, how do these factors contribute to the success of the disaster recovery plan?

Senior A: Training ensures that staff are **familiar with their roles and responsibilities** within the plan. Regular drills simulate the pressures of a real disaster, helping personnel build confidence and competence. This preparedness reduces the likelihood of errors and enhances the overall efficiency of the response.

Junior A: Preparedness also involves **cross-training** staff so that they can perform multiple roles if necessary. This flexibility is important because disasters can disrupt normal staffing levels. By having a versatile workforce, we can adapt more easily to unexpected situations.

Essa: Senior B, you mentioned strong controls and flexibility. Could you explain how these factors impact the implementation of the disaster recovery plan?

Senior B: Of course. Strong controls are essential to ensure that resources are used appropriately during a disaster. This involves having clear procedures, tracking, and preventing wrongs. However, we also need **flexibility** to expedite actions when time is critical. Simplifying approval processes and empowering certain individuals to make decisions within defined limits can speed up resource allocation without sacrificing control.

Junior B: Flexibility also means being able to **reallocate resources quickly** to address emerging needs. During a disaster, priorities can shift rapidly. Our systems must be agile enough to respond to these changes, ensuring that critical operations are funded adequately.

Essa: Communication has been highlighted as a critical success factor. How does effective communication influence the success of the disaster recovery plan?

Senior B: Effective communication ensures that **information flows smoothly** between all parties involved. In Finance, this means that we are aware of the needs of other departments and can respond accordingly. It also involves keeping stakeholders informed about financial matters, which helps manage expectations and maintain trust.

Junior B: Poor communication can lead to misunderstandings, delays, and errors. By establishing clear communication protocols and using reliable channels, we reduce these risks. Regular updates and open dialogue are key components of effective communication.

Essa: Senior C, could you discuss how a robust and resilient technological infrastructure contributes to the success of the disaster recovery plan?

Senior C: Certainly. A robust infrastructure is the backbone of modern operations. It supports communication, data management, and critical systems across all departments. By ensuring that our infrastructure is **resilient to disruptions**, we enable other departments to continue functioning during a disaster. This involves implementing redundant systems, such as backup servers and alternative network pathways, to prevent single points of failure.

Junior C: Regular **maintenance and testing** of these systems are also important. We need to verify that backups are working correctly, that failover mechanisms activate as intended, and that recovery procedures are effective. Proactive management of our infrastructure minimizes downtime and enhances the overall resilience of the organization.

Essa: Safety and security readiness is increasingly important. How does this factor into the success of the disaster recovery plan?

Senior C: Disasters can create opportunities for risks and threats. Systems may be more vulnerable due to disruptions, and staff may be more susceptible to wromg attempts or other attacks due to stress or distraction. By maintaining strong cybersecurity measures, we protect our systems and data from being compromised during a critical time.

Junior C: This includes implementing **advanced safety and security technologies**, conducting regular vulnerability assessments, and providing safety and security training to staff. Awareness is key; if employees recognize potential threats, they can help prevent security breaches that could exacerbate the disaster's impact.

Essa: Let's consider the role of **interdepartmental collaboration** as a critical success factor. How does collaboration enhance the effectiveness of the disaster recovery plan?

Senior A: Collaboration ensures that all departments are **aligned in their efforts**. By working together, we can coordinate resources, share information, and support each other's objectives. This unified approach strengthens our overall response and recovery capabilities.

Junior A: For example, close collaboration between Operations and IT ensures that our communication systems are prioritized and maintained during a disaster. Similarly, working with Finance helps us secure the necessary funds and resources promptly.

Senior B: In Finance, collaboration with other departments helps us understand their needs and challenges. This enables us to provide better support and make informed financial decisions that benefit the entire organization.

Junior B: Interdepartmental collaboration also facilitates **streamlined processes**. By developing joint procedures and protocols, we reduce redundancies and improve efficiency.

Senior C: Collaboration allows IT to tailor technological solutions to the specific needs of each department. By understanding their critical functions and priorities, we can focus our efforts where they are most needed.

Junior C: It also fosters a sense of **shared responsibility**. When all departments contribute to disaster recovery planning, the plan becomes more robust and comprehensive.

Essa: How does leadership contribute to these critical success factors?

Senior A: Leadership sets the tone and provides direction. By prioritizing disaster recovery planning and allocating the necessary resources, leaders enable the success factors we've discussed. They also promote a culture that values preparedness and resilience.

Junior A: Leaders facilitate communication and collaboration by encouraging openness and cooperation across departments. They also recognize and reward efforts that contribute to disaster recovery objectives.

Senior B: Leadership ensures that policies and procedures support flexibility and control. They also advocate for introducing ad and developing systems and training that enhance our capabilities.

Junior B: Leaders also play a role in risk management, guiding the organization in balancing risks and opportunities in financial decision-making.

Senior C: Leaders drive technological innovation and resilience. They make strategic decisions about infrastructure and prioritize key activities with measures.

Junior C: Leadership also fosters a culture of continuous improvement, encouraging teams to learn from experiences and seek out new solutions.

Senior A: Yes, this is our department's strategy. As a leadership team we know what is required at a departmental and strategic level, therefore we are responsible for this activity. Whether this is the best solution in working in *isolation*, we do seek external colleagues' advice but have not considered forming committees as your research has recommended.

Senior C: I am not against committees, and I can see the benefits, however ultimately we are as the departmental leaderships responsible for DR planning, but the Dubai Civil Defence recovery needs to be our joint goal.

Junior B: I can see the benefits of forming a committee, seeking their more operational viewpoint and expertise, then this can inform the ultimate DR plan."

Junior A: …clearly, the usage of the committee will generate new insights and opinions which will provide us with a more comprehensive departmental plan. This strategy of creating committees will also mean that we can gain a departmental buy in from all our colleagues.

Junior C: I think the concept of using a committee will provide us with new insights from a more operational viewpoint, but we need to ultimately ensure that the disaster recovery planning process is linked to the overall strategic objectives of the UAE Dubia Civil Defence.

Senior B: …you could use the idea of committees which are made up of a composition of all departments and levels, but then divided into small discussion groups like this format.

Essa: Let's discuss the importance of **continuous improvement** as a critical success factor. How does this contribute to the effectiveness of the disaster recovery plan?

Senior A: Continuous improvement ensures that the disaster recovery plan remains relevant and effective over time. By regularly reviewing and updating the plan, we can incorporate lessons learned from drills and actual incidents, adjust to changes in our operations, and address new risks.

Junior A: This process involves seeking feedback from staff, analyzing performance metrics, and staying informed about best practices in disaster recovery.

Senior B: Continuous improvement allows us to refine our controls and procedures. We can identify inefficiencies, enhance compliance, and adapt to regulatory changes.

Junior B: It also enables us to improve our systems and technologies, increasing efficiency and resilience.

Senior C: Continuous improvement is essential due to the rapid pace of technological change. Regularly updating our infrastructure and security measures keeps us ahead of potential threats and enhances our recovery capabilities.

Junior C: We also invest in training and professional development to ensure our team has the skills needed to implement new technologies effectively.

Essa: Considering the **engagement of external partners** as a critical success factor, how do relationships with external entities contribute to the success of the disaster recovery plan?

Senior A: External partners, such as other emergency services, government agencies, and community organizations, can provide additional resources and support during a disaster. Building strong relationships with these entities enhances coordination and effectiveness.

Junior A: Mutual aid agreements and joint training exercises help ensure that we can work seamlessly with external partners when needed.

Senior B: Relationships with agencies, suppliers, and auditors are important. They can provide flexibility in arrangements, expedite actions, and offer support during emergencies.

Junior B: Open communication and trust with external partners enable us to address challenges collaboratively and find mutually beneficial solutions.

Senior C: Vendors and service providers play a critical role. Ensuring that they have robust disaster recovery plans and that their services are reliable is essential.

Junior C: Collaborating with external organizations can also enhance our defenses against threats.

Essa: Let's discuss the role of **regulatory compliance** as a critical success factor. How does compliance impact the disaster recovery plan's effectiveness?

Senior B: Regulatory compliance is non-negotiable. Failure to comply with financial regulations during a disaster can result in legal penalties, financial losses, and damage to our reputation. By integrating compliance into our disaster recovery plan, we ensure that our actions meet legal standards even under challenging circumstances.

Junior B: Compliance also promotes transparency and accountability, which are important for maintaining stakeholder trust.

Senior C: Compliance with protection and privacy regulations is crucial. Protecting sensitive information during a disaster prevents legal issues and preserves public confidence.

Junior C: Adhering to safety and security standards reduces the risk of breaches and enhances our overall posture.

Essa: How does **employee engagement and morale** influence the success of the disaster recovery plan?

Senior A: Engaged employees are more likely to be committed to the disaster recovery plan and perform effectively during a disaster. Morale affects motivation, teamwork, and the ability to cope with stress.

Junior A: Leaders can boost engagement by involving employees in planning, providing support and resources, and recognizing their contributions.

Senior B: In Finance, a positive work environment encourages staff to take initiative and collaborate, which enhances our ability to respond to financial challenges during a disaster.

Junior B: Addressing employee concerns and providing clear communication helps maintain morale during difficult times.

Senior C: High morale contributes to creativity and problem-solving abilities, which are valuable when addressing complex technical issues under pressure.

Junior C: Supporting employee well-being, including mental health resources, ensures that staff can perform at their best.

Essa: Finally, let's consider the importance of **testing and validation** as a critical success factor. How does testing contribute to the plan's success?

Senior A: Testing validates the effectiveness of the disaster recovery plan. Through drills and simulations, we can identify weaknesses, assess readiness, and make necessary adjustments.

Junior A: Regular testing also keeps the plan fresh in everyone's mind, ensuring that procedures are followed correctly during an actual disaster.

Senior B: Testing our systems and procedures helps ensure that actions can be processed under adverse conditions. It also verifies that controls are effective.

Junior B: Testing can reveal unexpected issues, such as system incompatibilities or procedural gaps, allowing us to address them proactively.

Senior C: Testing recovery procedures is essential. It confirms that backups are recoverable, that systems can be restored within required timeframes, and that our infrastructure can handle increased loads.

Junior C: Testing also helps train staff, building confidence and competence in executing recovery tasks.

Essa: These comprehensive insights into the critical success factors are invaluable. To summarize, we've discussed comprehensive and realistic planning, staff training and preparedness, strong financial controls and flexibility, effective communication, robust technological infrastructure, cybersecurity readiness, interdepartmental collaboration,

continuous improvement, engagement of external partners, regulatory compliance, employee engagement and morale, and testing and validation.

Before we conclude this topic, does anyone have any final thoughts or additional critical success factors to mention?

Senior A: I'd like to add the importance of **culture of resilience**. Fostering a mindset that embraces adaptability and proactive problem-solving enhances our ability to handle unexpected challenges.

Junior A: Also, **leadership support at all levels** is crucial. When leaders at every tier are committed to disaster recovery, it reinforces its importance throughout the organization.

Senior B: Data integrity and accuracy are critical. Ensuring that information used for decision-making is reliable supports effective responses.

Junior B: Stakeholder engagement is another factor. Keeping stakeholders informed and involved builds trust and support for our disaster recovery efforts.

Senior C: Scalability of our systems and procedures is important. The ability to scale our responses to the magnitude of the disaster ensures we are neither underprepared nor overcommitted.

Junior C: We are a large organisation, but I can see that there may be too many CSFs and KPIs, as you call them. May be a more unified approach or set can be agreed upon and then applied at departmental and then at an organisational level

Essa: These are excellent additions. Thank you all for your thorough and insightful contributions. Your expertise provides a solid foundation for understanding the critical success factors necessary for effective disaster recovery planning. Let's take a short break before moving on to our final question.

Key Question 6: What do you consider are key performance indicators (KPIs) in assessing a disaster recovery plan?

Essa: Welcome back, everyone. We've had some in-depth discussions on disaster recovery planning, its objectives, the role of leadership, and the critical success factors involved. Now, I'd like us to focus on how we measure the effectiveness of our disaster recovery plan. Specifically, what key performance indicators—or KPIs—do you consider essential for evaluating and assessing our disaster recovery plan? How do these KPIs apply within your departments, and how can they guide us toward continuous improvement?

Senior A: Thank you, Essa. In the Operations Department, one of the most crucial KPIs is the **Response Time (RT)**. This measures how quickly we can react to a disaster or disruption from the moment it's identified. It's vital because delays in our response can have significant consequences on public safety and operational continuity.

Junior A: Adding to that, we also monitor the **Recovery Time Objective (RTO)**, which is the targeted duration of time within which we aim to restore a specific business process or system after a disaster. For our critical functions, the RTO is minimal—ideally zero downtime. Tracking our performance against the RTO helps us assess the effectiveness of our recovery strategies.

Senior B: Processing Time is a key KPI. It measures the time taken to process actions during normal operations versus during a disaster. A significant increase in processing time during a disaster indicates bottlenecks in our systems that need to be addressed.

Junior B: We also look at the **Accuracy Rate Records**. Disasters can increase the risk of errors due to stress and high volumes. Maintaining a high accuracy rate is essential for compliance and integrity.

Senior C: System Uptime Percentage is a critical KPI. It measures the availability of our systems during a specific period. Our goal is to maintain as close to 100% uptime as possible, even during disasters. This KPI reflects the resilience of our infrastructure.

Junior C: Another important KPI is the **Data Recovery Point Objective (RPO)**. This indicates the maximum acceptable amount of data loss measured in time. For instance, an RPO of 15 minutes means we can tolerate losing no more than 15 minutes' worth of data. Tracking our actual data loss against the RPO during incidents helps us evaluate the effectiveness of our backup and recovery processes.

Essa: These are all valuable KPIs. Let's delve deeper into how these KPIs are measured and applied. Senior A, can you elaborate on how the Response Time is tracked and what factors influence it?

Senior A: Certainly. We track Response Time by recording the timestamp of when an incident is reported and when our first responders are dispatched. Factors influencing RT include the efficiency of our communication systems, the availability of personnel, and the clarity of our procedures. We use dispatch software that logs these times automatically, allowing us to analyze trends and identify areas for improvement.

Junior A: Training and preparedness also play a significant role. Well-trained staff can process information and make decisions more quickly. We regularly review our RT data to see if additional training or procedural adjustments are needed.

Essa: How do you set targets for Response Time, and what benchmarks do you use?

Senior A: Targets are set based on regulatory standards, historical performance, and best practices in emergency response. For example, we may aim to dispatch responders within two minutes of receiving a high-priority call. We benchmark against international standards and comparable organizations to ensure we're meeting or exceeding industry expectations.

Essa: Thank you. Senior B, regarding Transaction Processing Time, how is this KPI measured during a disaster compared to normal operations?

Senior B: We measure the time from when a action request is initiated to when it's completed. During normal operations, we have established processing times—for instance, invoices are processed within three business days. During a disaster, we aim to maintain or reduce these times to ensure resources are available promptly.

Junior B: We also categorize transactions based on priority. Emergency expenditures might have a target processing time of a few hours, whereas less critical transactions can follow standard timelines. Comparing actual processing times against these targets helps us assess our performance.

Essa: How do you ensure accuracy in records during a disaster, and what methods are used to measure this KPI?

Senior B: We implement rigorous controls and trails, even during emergencies. Automated systems help reduce manual errors, and we conduct spot checks to verify integrity. The Accuracy Rate is calculated by dividing the number of accurate transactions by the total number of activities processed.

Junior B: Any discrepancies are investigated promptly, and corrective actions are taken. Maintaining high accuracy is essential to prevent financial losses and maintain compliance.

Essa: Moving to Senior C, can you explain how System Uptime is controlled?

Senior C: System Uptime we monitor system performance using network management tools that provide real-time and historical data.

Junior C: We also categorize systems based on their criticality and set different uptime targets accordingly. Non-critical systems might have lower uptime requirements, allowing us to prioritize resources where they're most needed.

Essa: Regarding the Recovery Point Objective (RPO), how is this KPI monitored during a disaster?

Senior C: We monitor the frequency of data backups and the actual data loss experienced during recovery.

Junior C: Regular testing of systems restoration from backups is also essential. It ensures that our backups are not only being created but are also usable when needed.

Essa: These KPIs seem to be interconnected with the critical success factors we discussed earlier. How do you use these KPIs to drive improvements in your disaster recovery planning?

Senior A: By analyzing KPI trends over time, we can identify patterns or recurring issues. For instance, if Response Time is consistently longer during certain times of the day, we might adjust staffing levels or review our procedures during those periods. KPIs provide objective data that informs decision-making.

Junior A: We also use KPIs to set performance goals for teams and individuals, which helps motivate continuous improvement. Regular feedback sessions based on KPI results keep everyone aligned with our objectives.

Senior B: KPIs highlight areas where our systems or processes may be underperforming. If Activities Processing Times are increasing, we might investigate whether system performance issues, training gaps, or procedural bottlenecks are the cause.

Junior B: KPIs also help us demonstrate accountability to stakeholders. By showing that we're meeting or exceeding our targets, we build confidence in our management during crises.

Senior C: KPIs guide our decisions. If Uptime is below target, we might need to invest in more reliable systems, or improved maintenance procedures.

Junior C: Similarly, if our RPOs are not being met, we may need to enhance our backup solutions, perhaps by increasing backup frequency or adopting more robust technologies.

Essa: Are there any KPIs related to communication effectiveness during a disaster?

Senior A: Yes, we measure the **Information Dissemination Time**, which tracks how quickly critical information is communicated to relevant parties after it's received. This includes

notifying field units, other departments, and external agencies. Effective communication is vital for coordinated response.

Junior A: We also monitor **Communication Reliability**, assessing the percentage of successful communications versus attempts. This helps identify issues with our communication infrastructure.

Senior B: We measure **Stakeholder Communication Satisfaction** through feedback surveys. This KPI reflects how well we keep internal and external stakeholders informed about financial matters during a disaster.

Junior B: We also track **Response Time to Inquiries**, ensuring that questions or requests from other departments are addressed promptly.

Senior C: User Support Response Time is a KPI that measures how quickly we respond to technical issues reported by users during a disaster. Providing timely support helps maintain overall operational efficiency.

Junior C: We also assess **System Alert Resolution Time**, tracking how quickly staff address system alerts or failures that could impact communication and operations.

Essa: How do you ensure the data collected for these KPIs is accurate and reliable?

Senior A: We use automated systems where possible to record data, reducing the risk of human error. For example, our dispatch software logs times automatically. We also conduct regular audits and data validation checks.

Junior A: Training staff on the importance of accurate data entry and reporting is also essential. Clear guidelines and accountability help maintain data integrity.

Senior B: We rely on our financial management systems to capture transaction data. These systems have built-in controls and validation mechanisms. Periodic reconciliations and audits help identify any discrepancies.

Junior B: We also encourage a culture of transparency, where staff feel comfortable reporting errors or issues so they can be addressed promptly.

Senior C: Our systems generate reports that provide details on performance and incidents. We use monitoring tools that aggregate this data and present it in dashboards for easy analysis.

Junior C: Regular system audits and security assessments help verify the accuracy of the data and the effectiveness of our monitoring tools.

Essa: Are there any KPIs that assess the effectiveness of training and preparedness activities?

Senior A: Yes, we track the **Training Completion Rate**, measuring the percentage of staff who have completed required training programs. We also assess **Drill Performance Scores**, evaluating how well teams perform during simulations.

Junior A: Time to Competency is another KPI, tracking how long it takes new staff to reach a defined level of proficiency. This helps us assess the effectiveness of our training programs.

Senior B: We measure **Compliance Audit Scores**, which reflect how well staff adhere to financial policies and procedures during drills and actual events.

Junior B: We also track **Training Feedback Scores**, gathering input from participants to improve our training content and delivery methods.

Senior C: Recovery Test Success Rate is a KPI that indicates how often our disaster recovery tests achieve their objectives without issues.

Junior C: Staff Certification Levels are also tracked, ensuring that team members hold relevant certifications in areas like safety and security, network management, and system administration.

Essa: How do you use these KPIs to enhance staff engagement and motivation?

Senior A: We share KPI results with our teams to keep them informed about our performance. Recognizing high performers and improvements fosters a sense of accomplishment and encourages continued effort.

Junior A: Setting clear goals linked to KPIs gives staff a tangible target to strive for. Incentive programs can reward teams or individuals who meet or exceed these targets.

Senior B: In Finance, we use KPIs to identify training needs and professional development opportunities. Investing in our staff's growth enhances their engagement and capability.

Junior B: Regular feedback sessions based on KPI results help staff understand their contributions to the organization's success, increasing job satisfaction.

Senior C: Celebrating successes in meeting or surpassing KPI targets boosts morale. It reinforces the importance of each team member's role in maintaining system reliability and security.

Junior C: Providing opportunities for staff to contribute ideas on how to improve KPIs encourages ownership and innovation.

Essa: Are there any KPIs that measure the effectiveness of interdepartmental collaboration during a disaster?

Senior A: Yes, we assess the **Interdepartmental Coordination Efficiency**, which measures how effectively we work with other departments during a disaster. This can be evaluated through joint drill performance, response times involving multiple departments, and feedback from collaborative efforts.

Junior A: Shared Resource Utilization Rate is another KPI, tracking how well we manage and allocate resources that are used by multiple departments.

Senior B: We monitor **Cross-Departmental Support Satisfaction**, gathering feedback from other departments on how well their needs were met during a disaster.

Junior B: Interdepartmental Communication Response Time is also tracked, measuring how quickly inquiries from other departments are addressed.

Senior C: For IT, **User Satisfaction Scores** reflect how well our services meet the needs of other departments during a disaster.

Junior C: Incident Resolution Time Across Departments measures how quickly issues that affect multiple departments are resolved.

Essa: How do you benchmark your KPIs against industry standards or best practices?

Senior A: We participate in industry forums and networks to share data and learn from other organizations. Benchmarking against similar agencies helps us understand where we stand and identify areas for improvement.

Junior A: We also review reports and studies from regulatory bodies and professional associations that provide performance metrics and standards.

Senior B: We consult with external inspectors and auditors and experts to compare our KPIs with industry averages. This helps ensure we're meeting regulatory expectations and maintaining competitiveness.

Junior B: We stay updated on best practices through continuous education and involvement in professional organizations.

Senior C: We reference standards such as ISO certifications to align our KPIs with internationally recognized frameworks.

Junior C: Engaging with vendors and technology partners provides insights into emerging trends and benchmarks.

Essa: How do you address situations where KPIs indicate underperformance or negative trends?

Senior A: We conduct root cause analyses to identify underlying issues. This may involve reviewing procedures, retraining staff, or upgrading equipment. Action plans are developed to address the specific problems identified.

Junior A: Regular monitoring allows us to catch issues early. We involve team members in developing solutions, fostering a collaborative approach to improvement.

Senior B: We might revise policies or processes that are contributing to underperformance. Additional training or resource allocation may be necessary.

Junior B: Communication is key. We ensure that stakeholders are aware of the issues and the steps being taken to address them.

Senior C: We may need to invest in new technologies or enhance our infrastructure. Incident reviews help us learn from failures and prevent recurrence.

Junior C: We also reassess our KPIs periodically to ensure they remain relevant and achievable, adjusting targets as necessary.

Essa: How do you ensure that KPIs remain aligned with the organization's strategic objectives and evolving needs?

Senior A: We regularly review our KPIs in the context of our organizational goals. Changes in strategy, technology, or external factors may require us to adjust our KPIs to stay aligned.

Junior A: Involving leadership and key stakeholders in KPI reviews ensures that they reflect current priorities and expectations.

Senior B: We integrate KPIs into our strategic planning processes. This alignment helps us contribute effectively to the organization's overall success.

Junior B: We also solicit feedback from other departments to understand how our KPIs impact them and adjust accordingly.

Senior C: In IT, we monitor emerging trends and technologies that may affect our KPIs. Strategic initiatives, such as digital transformation projects, may necessitate new or revised KPIs.

Junior C: Continuous communication with other departments helps us understand their evolving needs and ensures our KPIs support the broader organizational objectives.

Essa: Thank you all for your detailed explanations and insights on KPIs. It's clear that these indicators play a vital role in assessing and enhancing our disaster recovery plan.

Concluding Question: What improvements can be made to disaster recovery planning?

Essa: As we approach the end of our discussion, I'd like each of you to share your thoughts on how we can enhance our disaster recovery planning. Based on our previous discussions, what specific improvements or initiatives would you recommend to strengthen our resilience and effectiveness in the face of disasters?

Senior A: I believe we should **expand our risk assessment methodologies** to include more comprehensive and dynamic analyses. This could involve adopting advanced modeling tools that consider a wider range of scenarios, including low-probability but high-impact events.

Junior A: Enhancing our **community engagement efforts** can also improve our disaster readiness. By educating the public and involving them in preparedness activities, we can reduce the overall impact of disasters and improve cooperation during response efforts.

Senior B: Investing in **advanced technologies**, such as blockchain for secure interactions and transactions or AI for predictive analytics, could improve our efficiency and security. These technologies can help us process transactions faster and detect anomalies in real-time.

Junior B: We should also consider **strengthening our partnerships with external institutions**. Establishing agreements for emergency networks and lines or flexible terms during disasters can be ensured when we need it most.

Senior C: From our, adopting **cloud-based disaster recovery solutions** can enhance our scalability and flexibility. Rechnology platforms can offer faster recovery times and can be more cost-effective than traditional methods.

Junior C: Implementing a **zero-trust safety and security model** can improve our posture. This approach assumes that threats can come from anywhere and requires strict verification reducing the risk of breaches during disasters.

Essa: These are insightful suggestions. How can we enhance our training and preparedness programs across departments?

Senior A: We could **incorporate virtual reality (VR) simulations** into our training programs. VR can provide immersive, realistic scenarios that better prepare staff for actual disasters without the risks associated with live drills.

Junior A: Cross-departmental training can improve understanding and coordination between teams. By learning about each other's roles and challenges, we can foster better collaboration during crises.

Senior B: Offering **certification programs** in disaster management can enhance our team's expertise and credibility.

Junior B: E-learning platforms can make training more accessible and flexible, allowing staff to learn at their own pace and revisit materials as needed.

Senior C: Establishing a **safety and security awareness program** for all employees, and external public, can reduce the risk of errors in implementing the disaster recovery plan,.

Junior C: Gamification of training can increase engagement and retention of information, making learning more effective.

Essa: How can we improve communication and information sharing during disasters?

Senior A: Implementing a **centralized communication platform** that integrates all channels—voice, text, email, and alerts—can streamline communication and reduce delays.

Junior A: Real-time collaboration tools can enhance coordination, allowing teams to share information and updates instantly.

Senior B: Developing a **communication plan** that includes predefined messages and protocols can ensure consistency and clarity during emergencies.

Junior B: Utilizing **social media and mobile apps** can improve outreach to stakeholders and the public, providing timely updates and instructions.

Senior C: Automating alerts and notifications for system statuses can keep all relevant parties informed about IT issues and resolutions.

Junior C: Implementing AI-powered chatbots can assist in handling routine inquiries, freeing up staff to focus on critical tasks.

Essa: What role does innovation play in enhancing our disaster recovery planning?

Senior A: Embracing **emerging technologies**, such as drones for reconnaissance or AI for predictive analytics, can enhance our operational capabilities.

Junior A: Data analytics can help us identify patterns and trends in incidents, informing better decision-making and resource allocation.

Senior B: Robotic Process Automation (RPA) can automate repetitive financial tasks, increasing efficiency and reducing errors.

Junior B: Predictive financial modeling can help us anticipate funding needs and allocate resources proactively.

Senior C: Artificial Intelligence and Machine Learning can enhance cybersecurity defenses by detecting and responding to threats more quickly.

Junior C: Internet of Things (IoT) devices can provide real-time data on environmental conditions, equipment status, and more, improving situational awareness.

Essa: How can leadership further support these improvements?

Senior A: Leadership can **champion innovation**, encouraging a culture that values new ideas and is willing to invest in promising technologies.

Junior A: Providing **clear strategic direction** and aligning resources with priorities ensures that efforts are focused and effective.

Senior B: Leaders can **advocate for necessary funding** to support enhancements in disaster recovery planning.

Junior B: Encouraging **collaborative decision-making** involves staff at all levels, fostering ownership and commitment to the plan.

Senior C: Leadership can **support professional development**, ensuring staff have the skills needed to implement and manage new technologies.

Junior C: Promoting **interdepartmental collaboration** from the top down helps break down silos and enhances overall organizational resilience.

Essa: As we conclude, are there any final thoughts or recommendations you'd like to share?

Senior A: Continuous improvement is essential. We must remain vigilant, regularly reviewing and updating our plans to adapt to new challenges and opportunities.

Junior A: Engaging with external experts and participating in industry forums can provide fresh perspectives and best practices.

Senior B: Transparency and accountability should remain at the forefront of our efforts, maintaining stakeholder trust and confidence.

Junior B: Investing in our people is just as important as investing in technology. Skilled, motivated staff are the backbone of effective disaster recovery.

Senior C: Cybersecurity should be viewed as an integral part of disaster recovery planning, not an afterthought.

Junior C: Embracing a holistic approach that considers people, processes, and technology will yield the best results.

Essa: Thank you all for your valuable contributions throughout this discussion. Your insights have been incredibly informative and will greatly assist in enhancing our disaster recovery planning at Dubai Civil Defense. The collaborative spirit and expertise you've demonstrated are truly commendable. Together, we can strengthen our resilience and ensure the safety and well-being of our community.

Group Discussion Transcript (FGD-2)

Facilitator: Essa Almutawa

Participants:

Senior A (Operations Department)

Senior B (Finance Department)

Senior C (IT Department)

Senior D (Strategy Department)

Senior E (Human Resources Department)

Opening and Introductions

Essa: Welcome, everyone. Thank you for taking the time to join today's focus group discussion. We are here to explore perspectives on disaster recovery planning within Dubai Civil Defense. Your insights are invaluable, and I encourage open, candid conversations. Remember, there are no right or wrong answers—just honest reflections from your experience. Let's begin by introducing ourselves. Please state your name, role, and department.

Participant Introductions

Senior A (Operations Department): Thank you, Essa. I oversee daily emergency operations and response coordination. My focus is on ensuring operational readiness and that our teams can respond swiftly to disasters. Having clear and actionable recovery strategies in place can make the difference between a swift recovery and prolonged disruption.

Senior B (Finance Department): Good afternoon, everyone. I lead financial planning and resource allocation. My role is to ensure funds are efficiently managed and accessible during disaster situations. Financial planning for disaster recovery is more than just setting aside an emergency budget—it involves strategic investments, contingency planning, and compliance with regulatory requirements to ensure financial resilience in times of crisis.

Senior C (IT Department): Greetings. I manage IT infrastructure and cybersecurity. Disaster recovery for us means ensuring systems remain operational, data is secure, and communication networks are resilient during crises. Technology is both an enabler and a vulnerability in disaster recovery, which is why our focus is not only on securing infrastructure but also on adopting innovative technologies that can enhance recovery capabilities.

Senior D (Strategy Department): Thank you, Essa. My role focuses on long-term resilience and policy implementation. We ensure that recovery frameworks align with organizational goals and enhance preparedness. Strategic foresight is essential in disaster recovery, as it helps us anticipate potential disruptions and integrate proactive measures into our planning processes.

Senior E (Human Resources Department): Hello, I head the HR department, ensuring workforce preparedness, staff well-being, and training programs that equip personnel with the necessary skills for disaster response. A strong disaster recovery plan must consider not only operational continuity but also employee welfare, as a motivated and well-supported workforce is essential for effective disaster response and recovery.

Opening Question: What are your general views on disaster recovery?

Essa: Welcome, everyone. Thank you for taking the time to join today's focus group discussion. We are here to explore perspectives on disaster recovery planning within Dubai Civil Defense. Your insights are invaluable, and I encourage open, candid conversations. Remember, there are no right or wrong answers—just honest reflections from your experience. To begin, I'd like to hear your general thoughts on disaster recovery. How does each of your departments define disaster recovery, and why do you think it is essential?

Senior A (Operations Department): Thank you, Essa. Disaster recovery in the Operations Department is not just about responding to emergencies; it is about ensuring that we can restore full functionality to our critical services as quickly as possible. The faster we recover, the fewer long-term consequences we face. A well-structured disaster recovery plan means that even if we experience system failures, equipment loss, or structural damage, we already have pre-planned procedures in place that allow us to act immediately.

Our primary concern is ensuring that emergency response units remain operational, regardless of external conditions. If we cannot coordinate rescue operations or deploy personnel to affected areas efficiently, the entire recovery effort is compromised. To achieve this, we focus heavily on training and readiness. Our teams conduct regular drills that simulate worst-case scenarios, allowing personnel to develop quick decision-making skills under pressure. We also prioritize redundancy in our operations. Every piece of critical equipment, from communication devices to rescue vehicles, has a backup or alternative solution. The goal is to eliminate single points of failure that could delay recovery.

Collaboration with other departments is also crucial. Disaster recovery is not isolated to a single unit—it requires coordinated efforts across finance, IT, human resources, and strategic planning. Without financial support, we cannot procure emergency equipment; without IT resilience, we lose critical data and communication channels; without HR, we face manpower shortages due to stress or injuries. The complexity of modern disaster recovery means that we must think beyond immediate response and consider how we sustain operations in the long term.

Senior B (Finance Department): Disaster recovery, from a financial perspective, is about ensuring that resources are available when they are needed most. Many organizations underestimate the importance of financial preparedness during disasters. Without a solid financial recovery strategy, even the most well-coordinated emergency response efforts can be hampered by funding shortages, misallocation of resources, or bureaucratic delays in releasing necessary funds.

One of the key challenges we face is ensuring liquidity. It is not enough to have a budget allocated for disaster response; those funds need to be accessible in real time. That means having emergency financial mechanisms in place that allow for rapid approvals and transfers without compromising accountability. If financial bottlenecks delay the procurement of medical supplies, repair materials, or emergency contracts, the impact of the disaster worsens.

Fraud prevention is another crucial component of financial disaster recovery. Emergencies often create opportunities for mismanagement and financial abuse. During a crisis, financial oversight is sometimes relaxed in favor of speed, which can lead to inefficiencies or even corruption. Our role is to ensure that while we expedite financial processes, we do not compromise transparency. We use pre-approved vendor lists, digital tracking of expenditures, and real-time financial monitoring to make sure that every dollar spent directly contributes to recovery efforts.

A long-term view is also essential. While the immediate focus is often on restoring basic operations, financial disaster recovery must include strategies for economic stability in the aftermath. Some disasters have prolonged financial impacts, such as damage to infrastructure, loss of revenue-generating activities, and increased operational costs. Our responsibility is not just to release funds quickly but to plan for sustained financial resilience, ensuring that we can support recovery efforts for weeks, months, or even years if necessary.

Senior C (IT Department): Disaster recovery in IT is about ensuring that technological infrastructure remains functional, secure, and resilient. Modern disaster recovery efforts rely heavily on data, communication networks, and operational software. If these systems go down, it can cripple response efforts across all departments. That is why IT plays a central role in both the prevention and recovery phases of disaster management.

One of the biggest risks we face is cyber-related disasters. While natural disasters such as floods and fires can disrupt physical infrastructure, cyberattacks can be equally devastating. Ransomware, data breaches, and system hacks have the potential to disrupt emergency response capabilities. Our focus is not only on securing our networks but also on ensuring that we have multiple backup solutions in place.

Data redundancy is a key pillar of our disaster recovery plan. Every critical system must have a failover mechanism that ensures continuity even in the event of primary system failure. We employ cloud-based storage, off-site backup facilities, and automated recovery protocols to minimize downtime. If an earthquake or fire destroys a data center, we can quickly shift operations to an alternate site without losing essential records.

Communication continuity is another major concern. If our command centers cannot communicate with field teams due to a network outage, response times suffer, and the situation worsens. To mitigate this risk, we implement emergency communication channels, including satellite phones, alternative internet connections, and encrypted mobile messaging systems that function even in cases of severe network disruption.

Beyond technology, IT disaster recovery also requires regular testing. Many organizations have IT recovery plans but never put them through rigorous testing. We conduct regular stress tests on our systems, simulating real-world disaster scenarios to identify weaknesses and improve response times. Ensuring that these systems perform flawlessly under pressure is just as important as having them in place.

Senior D (Strategy Department): Disaster recovery from a strategic standpoint is not just about reacting to a crisis; it is about ensuring that we continuously improve our preparedness and resilience. Every disaster, whether small or large, provides valuable lessons that should inform future strategies. One of the biggest challenges we face is shifting from a reactive approach to a proactive mindset.

An effective disaster recovery strategy must be fully integrated into an organization's long-term planning. That means building resilience into everyday operations rather than treating disaster recovery as a separate function. If an organization only thinks about recovery when a disaster occurs, it is already too late. Our role is to ensure that risk assessments, recovery frameworks, and cross-departmental collaboration are embedded into standard operating procedures.

One of the critical areas we focus on is scenario planning. Many recovery plans fail because they do not account for evolving threats. The risks we face today are not the same as those we faced a decade ago. Climate change is increasing the frequency of extreme weather events, cyber threats are becoming more sophisticated, and global supply chain disruptions mean that recovery efforts may face unforeseen obstacles. We develop adaptive strategies that account for these changing conditions, ensuring that our recovery efforts remain relevant and effective. Collaboration between departments is also crucial. Disaster recovery is not just an operations issue, a finance issue, or an IT issue—it is an organization-wide priority. Strategy plays a key role in ensuring that different departments are not working in silos but are instead aligned towards a common recovery objective. If finance does not understand operational priorities, funding delays will occur. If IT is not coordinated with HR, employee communications will break down. A strong disaster recovery plan is one where every department knows its role and works in sync with others.

Senior E (Human Resources Department): Disaster recovery from an HR perspective is about ensuring that the workforce remains stable, safe, and capable of performing their duties under crisis conditions. While much of the focus in disaster recovery is placed on infrastructure and technology, the human element is just as important. Without trained and motivated personnel, recovery efforts will be ineffective.

One of the biggest challenges we face is workforce displacement. If an emergency forces employees to evacuate or makes office locations inaccessible, we need clear strategies in place to continue operations remotely. That means identifying which roles can transition to remote work and ensuring that employees have the tools and resources they need to do so effectively. Employee well-being is another major component of disaster recovery. Disasters are stressful and traumatic experiences, and prolonged exposure to high-pressure situations can lead to burnout. HR plays a crucial role in providing mental health support, crisis counseling, and flexible work arrangements that help employees cope with the psychological impact of a disaster.

Training is essential in preparing employees for disaster situations. Many staff members may not know what to do in a crisis, leading to confusion and inefficiency. Regular disaster response drills, leadership training, and cross-functional exercises ensure that personnel are prepared for different emergency scenarios.

Essa: Thank you for your insights. It is clear that disaster recovery is not just about restoring operations—it is about building a resilient, adaptable system that can withstand future crises. Now, let's move on to our next discussion.

Key Question 2: What are the key steps in creating a disaster recovery plan?

Essa: Now that we have discussed our general views on disaster recovery, I want to shift the discussion to the actual process of creating a disaster recovery plan. Every department plays a vital role in ensuring that when a disaster strikes, we have a structured, well-defined plan to restore operations as quickly as possible. From your perspective, what are the most critical steps involved in developing an effective disaster recovery plan?

Senior A (Operations Department): Creating a disaster recovery plan starts with a detailed risk assessment. If we do not fully understand the range of potential threats we may face, then any recovery plan we put together will be incomplete or ineffective. In Operations, we first analyze all possible disaster scenarios, from natural disasters such as floods and earthquakes to human-made crises like cyberattacks or equipment failures. Each type of disaster has its own

unique impact on operations, so we categorize them based on likelihood, severity, and response requirements.

Once the risks are identified, we develop response protocols tailored to each scenario. These protocols define who is responsible for what, how resources should be allocated, and what backup systems we need to have in place. The next critical step is testing these protocols through real-world simulations. Many organizations create recovery plans but never actually test them, which leads to failure when a real disaster occurs. We conduct frequent drills where our emergency teams respond to simulated crises, ensuring that everyone knows their role and can act without hesitation.

We also prioritize logistical resilience in our disaster recovery planning. We cannot assume that during a crisis, supply chains will function normally, or that emergency response teams will have full access to the necessary equipment. That is why we establish redundancy in critical resources, such as backup communication systems, reserve fuel supplies, and alternative transport routes. Without pre-planned alternatives, even a well-structured disaster recovery plan can fail due to unforeseen logistical bottlenecks.

Another essential component is interagency coordination. A disaster recovery plan is only effective if it is synchronized with external partners, including municipal services, law enforcement, emergency medical teams, and even private sector entities. If we do not establish these relationships in advance, then collaboration during an actual crisis becomes chaotic and inefficient. This is why we hold joint training sessions with other agencies, ensuring that all key players are aligned in their recovery strategies.

Senior B (Finance Department): From a financial perspective, the most critical step in creating a disaster recovery plan is ensuring that there is a clear and accessible funding structure in place before a disaster occurs. Many organizations fall into the trap of assuming that they will be able to allocate emergency funds on the spot, but in reality, financial processes are often bogged down by bureaucratic red tape. The key to financial disaster recovery is having pre-approved emergency spending protocols that allow for immediate fund allocation without excessive delays.

Once funding mechanisms are established, we conduct a Business Impact Analysis (BIA) to determine the financial implications of different types of disasters. Some disasters cause short-term disruptions, while others have long-term economic consequences. A cyberattack that takes IT systems offline for 24 hours has different financial implications than a major flood that destroys infrastructure and displaces employees for months. By quantifying potential losses,

we can prioritize financial reserves accordingly, ensuring that we allocate funds to the areas most in need during a crisis.

Another key step is vendor and supplier continuity planning. In the aftermath of a disaster, we often need to procure essential resources quickly. If we have to go through lengthy procurement procedures, we risk slowing down the recovery process. That is why we establish pre-negotiated contracts with critical suppliers, allowing us to fast-track purchases without unnecessary delays. This includes agreements with construction firms for infrastructure repair, IT service providers for system recovery, and medical suppliers for emergency response needs.

Fraud prevention is also a major concern. Disaster situations often create opportunities for financial mismanagement, especially when large sums of money need to be spent quickly. Our financial disaster recovery plan includes strict oversight mechanisms, ensuring that all transactions during an emergency are fully documented and auditable. We use real-time financial tracking systems to monitor expenditures and prevent any misuse of emergency funds.

Finally, we must ensure that insurance policies adequately cover all disaster scenarios. Some organizations assume that their insurance policies will automatically cover disaster-related losses, only to discover after the fact that their coverage is insufficient. We conduct annual insurance reviews to make sure that we are protected against a broad range of risks, from property damage to business continuity losses.

Senior C (IT Department): Disaster recovery in IT is built on system redundancy, cybersecurity preparedness, and data recovery mechanisms. The first step in any IT disaster recovery plan is mapping out all critical infrastructure. Many organizations assume that all systems are equally important, but in reality, some functions are mission-critical while others can tolerate downtime. We conduct an IT risk assessment to identify which systems must be restored first and create tiered recovery objectives.

Once we have identified critical systems, we implement automated backup solutions that ensure real-time data replication. In a disaster scenario, data loss is often one of the biggest threats to continuity. Without proper backups, even a small disruption can wipe out years of operational data. Our approach involves multiple layers of backups—on-site, off-site, and cloud-based storage—ensuring that even if one fails, we have an alternative available.

Another major step in IT disaster recovery is ensuring cybersecurity resilience. Disasters often create opportunities for cybercriminals to exploit vulnerabilities. If a natural disaster disrupts normal operations, hackers may attempt ransomware attacks, phishing scams, or system intrusions. To counteract this, we have disaster-specific cybersecurity protocols, including

intrusion detection systems, multi-factor authentication, and emergency lockdown measures that can be activated in the event of a crisis.

We also invest heavily in alternative communication networks. If our primary IT infrastructure fails, recovery efforts can be severely hampered if teams are unable to communicate. That is why we establish backup satellite communication systems, encrypted emergency messaging networks, and failover VPNs that allow employees to securely access critical systems even if local servers are down.

Lastly, regular disaster recovery testing is crucial. Many organizations have IT recovery plans, but they never test them under real conditions. We conduct quarterly disaster simulations where we deliberately take systems offline to assess how quickly they can be restored. These tests help us identify weaknesses and improve our response times, ensuring that when a real disaster occurs, we can recover without hesitation.

Senior D (Strategy Department): From a strategic planning perspective, the foundation of a strong disaster recovery plan is ensuring that resilience is embedded into every part of the organization's operations. A common mistake is treating disaster recovery as an isolated process, when in reality, it must be fully integrated into daily business continuity strategies.

Our first step in disaster recovery planning is conducting an organization-wide risk assessment. This means evaluating not just direct threats, but also cascading effects—how one disaster can lead to secondary crises. For example, a cyberattack on an IT system might seem like a purely technical issue, but it could also delay financial transactions, disrupt HR communication channels, and prevent operational units from coordinating responses. We ensure that our recovery plans address these interdependencies.

Another critical step is developing clear recovery timelines. A good disaster recovery plan does not just define the actions to take; it establishes specific timeframes for restoring key functions. We categorize recovery objectives into short-term (24 hours), medium-term (1–2 weeks), and long-term (months). This ensures that all departments are aligned in their recovery priorities.

Finally, we emphasize the importance of leadership in disaster recovery. Recovery plans are only as strong as the people executing them. We ensure that all senior leaders are trained in crisis decision-making, emergency communication, and resource prioritization, so that when disaster strikes, leadership can guide the organization through an efficient recovery process.

Essa: Thank you for your insights. It is clear that an effective disaster recovery plan requires meticulous planning, interdepartmental coordination, and continuous testing. Now, let's move on to our next discussion: What are the primary objectives of a disaster recovery plan?

Key Question 3: What are the primary objectives of a disaster recovery plan?

Essa: Now that we have discussed the steps involved in creating a disaster recovery plan, I want to focus on its core objectives. What should a well-structured disaster recovery plan aim to achieve? Each department plays a crucial role in ensuring a successful recovery, so I would like to hear from all of you about the key priorities and outcomes that a disaster recovery plan should focus on.

Senior A (Operations Department): The primary objective of any disaster recovery plan in operations is to restore essential services as quickly as possible while ensuring minimal disruption to emergency response activities. In an operational context, every minute counts, and a delayed recovery can mean the difference between life and death. Our focus is always on maintaining continuity of critical functions such as fire response, medical aid, and emergency evacuation procedures.

A well-structured disaster recovery plan should first and foremost aim to ensure operational readiness, regardless of the nature of the disaster. This means that even if key infrastructure is damaged, alternative systems must be in place to guarantee that first responders can still be deployed. The ability to quickly assess damage, reroute resources, and re-establish command structures is crucial.

Another major objective is mitigating secondary risks. Some disasters trigger cascading failures, where the initial event leads to additional problems, such as fires following an earthquake or power outages exacerbating an already critical situation. Our recovery plans include strategies for stabilizing the situation immediately to prevent further harm.

Coordination is another essential goal. A disaster recovery plan must ensure seamless collaboration between various response teams and external agencies. This involves a clear chain of command, predefined response roles, and established communication channels. If an emergency response team does not know who to coordinate with or how to access critical information, recovery efforts can become disorganized and ineffective.

Finally, the plan should aim to strengthen resilience for future incidents. Recovery is not just about returning to normal; it is about building back stronger so that when the next disaster

occurs, the response is even more effective. We take lessons learned from every incident and incorporate them into updated recovery protocols. If the same vulnerabilities keep leading to the same problems, then we have failed in our mission.

Senior B (Finance Department): The financial objective of a disaster recovery plan is to ensure immediate and sustained financial support for recovery efforts while maintaining economic stability. If financial processes break down during a disaster, the entire recovery operation can be severely compromised.

The first goal is to ensure rapid access to emergency funds. Delays in funding can slow down everything from equipment repairs to humanitarian aid distribution. We establish pre-approved financial mechanisms that allow for quick disbursement of funds without excessive bureaucratic procedures.

Another objective is cost management and accountability. Emergencies often require fast decision-making, but that does not mean financial controls should be ignored. Our recovery plan includes real-time financial tracking systems to ensure that funds are spent efficiently and transparently. We also work closely with procurement teams to prevent price gouging and fraudulent transactions that sometimes arise during crises.

Long-term sustainability is another major focus. A disaster recovery plan should not just aim to provide immediate relief—it must also ensure financial stability in the aftermath of a crisis. Some disasters lead to ongoing financial burdens, such as rebuilding costs, increased insurance premiums, or disruptions in revenue-generating activities. We incorporate economic impact assessments into our planning, ensuring that recovery funding covers not just immediate expenses but also long-term financial resilience.

One overlooked objective is insurance optimization. Many organizations assume that they have sufficient coverage, only to realize post-disaster that they are underinsured or that policy exclusions prevent them from receiving adequate compensation. Part of our disaster recovery strategy includes regular insurance policy reviews and adjustments to ensure that we are fully covered against a broad range of risks.

Senior C (IT Department): The main objective of a disaster recovery plan in IT is to ensure the continuity of digital infrastructure, protect critical data, and minimize downtime. If IT systems fail, almost every other department will face delays and inefficiencies. That is why cyber resilience and system redundancy are key pillars of our recovery planning.

One of our primary goals is to guarantee the availability of mission-critical systems. This means that backup servers, alternative data centers, and cloud-based solutions must be in place to ensure continued functionality, even if primary systems are compromised. We implement automated failover mechanisms that instantly switch operations to a backup system in case of failure.

Another crucial objective is data integrity and security. In disaster situations, data loss can be catastrophic. Whether it is medical records, financial transactions, or operational logistics, we cannot afford to lose vital information. Our recovery plan includes real-time data replication, ensuring that no matter what happens, the most recent version of our critical data is always accessible.

Cybersecurity during disasters is also a major priority. Many organizations focus on physical threats but underestimate the risk of cyberattacks during emergencies. Hackers and malicious actors often exploit moments of chaos to launch attacks, knowing that defenses may be weakened. Our recovery plan incorporates cyber threat monitoring, multi-factor authentication, and emergency security protocols to prevent unauthorized access.

Communication resilience is another important objective. If IT communication networks fail, coordination between departments will break down. We ensure that alternative communication channels, such as encrypted satellite messaging and secure VPN access, are available in case of a network outage.

The last major goal is minimizing downtime. Every minute that IT systems are offline results in lost productivity and delayed recovery efforts. Our disaster recovery plan prioritizes fast system restoration, with predefined recovery time objectives (RTOs) that set strict limits on how long systems can remain nonfunctional.

Senior D (Strategy Department): From a strategic perspective, the primary objective of a disaster recovery plan is to enhance long-term resilience while ensuring an efficient and coordinated response. Disaster recovery should never be seen as just a temporary fix—it must be a continuous improvement process that strengthens the organization over time.

One of our key goals is to integrate disaster recovery into overall organizational strategy. Too often, disaster recovery is treated as a separate function, disconnected from broader business continuity planning. Our approach ensures that recovery objectives are aligned with long-term organizational goals.

Another objective is to improve coordination between departments and external agencies. Recovery efforts are most effective when there is seamless collaboration between finance,

operations, IT, HR, and other relevant stakeholders. Our plan ensures that all key players understand their roles and responsibilities in a crisis.

We also prioritize realistic recovery timelines. Many organizations set recovery goals that are either too optimistic or too vague. Our strategy team works on defining specific milestones and performance indicators that measure the effectiveness of recovery efforts over different timeframes. This includes short-term stabilization, medium-term reconstruction, and long-term resilience-building initiatives.

Another major focus is community and stakeholder engagement. A disaster does not just impact an organization internally; it affects the people and communities that rely on our services. Our recovery plan includes clear strategies for public communication, media relations, and transparency to ensure that all stakeholders remain informed and involved throughout the process.

Senior E (Human Resources Department): The primary objective of a disaster recovery plan in HR is to ensure workforce stability, employee well-being, and leadership continuity. No recovery effort can be successful without a prepared, motivated, and capable workforce.

The first goal is to protect employee safety. This means having clear evacuation procedures, emergency contacts, and relocation plans to ensure that staff members are not put in harm's way.

Another major objective is mental health support. Disasters take a psychological toll on employees, leading to stress, burnout, and anxiety. Our recovery plan includes counseling services, flexible work arrangements, and peer support networks to help employees cope.

A well-structured plan must also address leadership continuity. If key decision-makers are unavailable during a disaster, operations can become chaotic. We implement succession planning and leadership training programs to ensure that there is always a capable team ready to take charge in an emergency.

Essa: Thank you all for your insights. It is clear that a disaster recovery plan is not just about short-term fixes—it must address long-term stability, financial integrity, IT security, operational resilience, and employee well-being. Now, let's move on to our next discussion: How does leadership get involved in disaster recovery planning?

Key Question 4: How does leadership get involved in disaster recovery planning?

Essa: We have now established the key objectives of a disaster recovery plan, but I want to explore an important aspect that often determines the success or failure of these plans: leadership involvement. A strong disaster recovery plan requires clear direction, decision-making, and accountability. Leadership plays a vital role in ensuring that recovery efforts are not just well-planned but also well-executed. I would like to hear from each of you—how does leadership in your respective departments shape disaster recovery efforts?

Senior A (Operations Department): Leadership in operations is about taking decisive action during a crisis. If leaders hesitate, the response effort loses valuable time, and in some cases, lives could be at risk. Disaster recovery planning starts with senior leadership defining response priorities. We need to be clear on what gets restored first, how teams are deployed, and what resources are made immediately available.

One of the biggest mistakes organizations make is failing to empower their frontline leaders. If every decision has to be approved by top executives, we introduce unnecessary delays. We ensure that incident commanders and regional response coordinators have the authority to make rapid decisions on the ground. Our leadership role in disaster recovery is about creating a structure of decentralized decision-making, where teams in the field can act without waiting for headquarters' approval for every move.

Senior B (Finance Department): I completely agree, and I would add that leadership in finance has to ensure that funding does not become a bottleneck during a disaster. Too often, emergency funds exist on paper but are not easily accessible when needed. Leadership in finance must establish pre-approved financial mechanisms that allow for quick fund disbursement. We also need to ensure that spending during a crisis is tracked and transparent, which requires leadership oversight to prevent financial mismanagement.

Another critical role leadership plays in disaster recovery planning is ensuring financial risk assessments are conducted before disasters strike. If leaders wait until a disaster happens to think about financial resilience, they are already too late. We work with risk analysts to create financial models that estimate potential losses and allow us to adjust our emergency reserves accordingly.

Senior C (IT Department): That makes perfect sense because the same principle applies to IT disaster recovery. Leadership in IT is not just about fixing broken systems—it is about ensuring that technology investments align with long-term resilience goals. One of the most important things IT leadership does is push for redundancy and cybersecurity preparedness.

I have seen cases where leadership does not take cybersecurity threats seriously until it is too late. If executives do not prioritize IT disaster recovery, they will cut corners on data backups,

system redundancies, and cyber threat mitigation strategies. Our role as IT leaders is to advocate for continuous investment in these areas, even when there is no active disaster.

We also have to be realistic about recovery timelines. Sometimes, leadership expects IT teams to restore systems instantly, without understanding the complexity of data recovery processes. It is our job to educate other leaders on what is technically feasible, so they do not set unrealistic recovery time expectations that put unnecessary pressure on the IT department.

Senior D (Strategy Department): That is an important point, and I think it speaks to why leadership across all departments needs to be aligned. A disaster recovery plan that only considers one department's needs is doomed to fail. Strategy leadership is responsible for ensuring that every department's recovery priorities complement each other rather than competing for resources.

One of the things we emphasize is scenario-based leadership training. Many senior leaders believe they know how to handle a crisis, but when put under real pressure, they struggle to make effective decisions. We conduct simulated disaster exercises, where leadership teams are placed in high-pressure scenarios and must make real-time decisions on resource allocation, media communications, and recovery coordination. These exercises expose weak points in leadership decision-making and allow us to refine disaster recovery protocols.

We also focus on external coordination. Leadership does not just mean managing internal teams; it means forming alliances with government agencies, private sector partners, and international relief organizations. No organization can recover from a major disaster on its own, and part of leadership's job is ensuring that we have pre-established relationships with external stakeholders before a disaster happens.

Senior E (Human Resources Department): I could not agree more. One of the biggest challenges we see in disaster recovery is that leadership focuses too much on logistics and not enough on people. HR leadership plays a crucial role in ensuring that employees are physically and mentally prepared to handle crisis situations. If our workforce is not in the right condition to operate effectively, all the planning in the world will not matter.

One of the biggest mistakes leadership can make is failing to communicate clearly during a disaster. Employees look to leadership for guidance, and if they feel like they are not being informed, confusion and fear take over. HR ensures that leadership training includes effective crisis communication strategies, so leaders know what to say, when to say it, and how to say it in a way that keeps employees calm and focused.

Another key leadership responsibility is ensuring that employees are not overworked during recovery efforts. In many cases, disaster recovery turns into a long and exhausting process, and

if leadership is not careful, they can burn out their teams. We establish workload distribution plans that ensure employees get necessary rest periods while still maintaining recovery momentum.

Senior A (Operations Department): That is a great point, and it actually reminds me of a past experience where we had a breakdown in leadership coordination. We had a scenario where an entire regional operations center was disabled due to a power failure, and the teams on the ground were not sure who had the final authority to make decisions. Leadership had not clearly defined roles ahead of time, so there was a lot of confusion about which backup plans to activate.

Since then, we have adopted pre-established leadership chains of command, where every team knows exactly who is in charge, who has decision-making authority, and what the escalation process is. This has made a massive difference in how smoothly our recovery efforts run.

Senior B (Finance Department): That is a really good example, and it highlights something we see in finance as well—leadership uncertainty can create delays in critical decision-making. If it is unclear who approves emergency purchases, essential resources can get stuck in the approval process at the worst possible time.

We make sure that leadership roles in financial decision-making are clearly defined in advance. This includes having pre-approved emergency expenditure lists, so leaders know exactly what can be fast-tracked without additional approvals.

Senior C (IT Department): That is a great approach because IT faces similar leadership challenges. I have seen situations where senior executives try to override IT recovery procedures because they do not fully understand the technical complexities involved.

This is why IT leadership must educate non-technical leaders on why IT disaster recovery requires a structured, methodical approach. Rushing system restorations without following proper protocols can lead to data corruption, security vulnerabilities, and extended downtime. Leadership must trust the expertise of their IT teams and not demand shortcuts that could cause long-term damage.

Senior D (Strategy Department): That is exactly why strategy leadership plays a crucial role in ensuring that leaders across all departments operate as a cohesive unit. If leadership is fragmented, recovery efforts will be inefficient, and different teams will pull in different directions.

We make sure that all leadership teams undergo joint training sessions, where operations, finance, IT, HR, and strategy leaders come together to work through mock disaster scenarios.

These exercises help break down silos and ensure that leadership teams are aligned in their recovery priorities before an actual disaster happens.

Essa: This has been a really insightful discussion. Leadership is clearly the backbone of an effective disaster recovery plan, and without strong, coordinated decision-making, even the best plans can fall apart. It is evident that leadership must focus on clear delegation, financial foresight, technical understanding, workforce well-being, and interdepartmental coordination to ensure an effective recovery.

Let's now move on to our final topic: What are the biggest challenges in disaster recovery, and how do we address them?

Key Question 5: What do you consider are CSFs (Critical Success Factors) in implementing a disaster recovery plan?

Essa: Now that we have explored the key challenges in disaster recovery, I want to focus on the critical success factors that determine whether a disaster recovery plan is effectively implemented. In your experience, what are the key elements that contribute to the success of a disaster recovery plan?

Senior A (Operations Department): The most critical success factor in operations is preparedness through continuous training and drills. A disaster recovery plan is only as good as the people executing it, and if response teams are not well-trained, even the best plan will fail. We prioritize scenario-based exercises that simulate real disaster conditions so that our teams can respond instinctively and efficiently when an actual crisis occurs.

Another key success factor is **redundancy in critical resources**. This includes backup power supplies, alternative communication channels, and pre-positioned emergency equipment. A recovery plan cannot rely on a single-point-of-failure system; everything must have a contingency option.

Senior B (Finance Department): From a financial perspective, the most critical success factor is **having pre-approved emergency funding mechanisms**. If financial approvals take too long during a disaster, the response effort will be delayed. We need to ensure that emergency spending protocols are in place, allowing for immediate access to funds without bureaucratic obstacles.

Another major factor is **transparent and accountable financial tracking**. Disasters can create opportunities for financial mismanagement or fraud. We implement strict auditing and monitoring tools to ensure that every expenditure directly supports recovery efforts and is properly accounted for.

Senior C (IT Department): In IT, **system redundancy and real-time data backup** are essential success factors. If a disaster takes down our primary systems, we must have failover solutions ready to ensure continuity. This includes cloud-based storage, alternative data centers, and automated recovery mechanisms that allow us to restore critical services as quickly as possible.

Another key factor is **cybersecurity resilience during disasters**. Cybercriminals often exploit times of crisis to launch attacks. We integrate **disaster-mode cybersecurity protocols** that include multi-factor authentication, intrusion detection systems, and emergency lockdowns to prevent data breaches during recovery operations.

Senior D (Strategy Department): The most important factor from a strategic standpoint is **cross-departmental coordination**. Disaster recovery cannot be executed in silos—every department must be aligned in their priorities and response efforts. We achieve this by establishing an **Interdepartmental Disaster Recovery Council** that ensures smooth coordination between operations, finance, IT, HR, and leadership teams.

Another critical success factor is **adaptive strategy development**. No disaster recovery plan can anticipate every possible scenario, so flexibility is key. We must continuously update recovery plans based on lessons learned from past incidents and evolving threats, whether they be natural disasters, cyberattacks, or infrastructure failures.

Senior E (Human Resources Department): In HR, the most critical success factor is **employee well-being and workforce sustainability**. Disaster recovery is not just about restoring operations—it is about ensuring that the workforce remains stable, motivated, and capable of executing the plan. We implement mental health support programs, stress management training, and crisis communication strategies to keep employees engaged during recovery efforts.

Another success factor is **leadership succession planning**. If key decision-makers are unavailable during a crisis, operations should not grind to a halt. We ensure that leadership backups are identified and trained to step in seamlessly if necessary.

Senior B (Finance Department): It is interesting that we have all these different indicators and success factors, but missing is the budgetary and funding measurements. This needs to be in all departments but may be tailored to the needs of the department, but a group of generic critical success factors or key performance indicators would be ideal

Senior E (Human Resources Department):

This activity is interesting as I never realised that the finance team were almost solely responsible for financial stability and budgetary allocation, and we definitely need this to be

devolved to all departments, and therefore we need to have some form of generic CSFs and KPIs.

Senior A (Operations Department): We need to ensure that all our critical success factors and key performance indicators are relevant, may be less than we currently have, and of course there is a need for fundamental indicators and measures in place, which must include departmental financial and budgetary responsibility

Senior D (Strategy Department): These are all excellent insights, and it is clear that a successful disaster recovery plan requires a combination of preparedness, redundancy, financial agility, cybersecurity resilience, strategic coordination, and workforce stability.

This list is comprehensive [laughter] but also how can senior leadership take a helicopter view of what is happening in terms of recovering the Dubai Civil Defence services? Having said this, we need to ensure that at an organisational level the plans are aligned to the department, and we are accurately assessing the progress, which are then linked to the strategic goals of the Dubai Civil Defence

By focusing on these critical success factors, we can ensure that our organization is not just able to recover from disasters but also emerge stronger and more resilient.

Key Question 6: What are the biggest challenges in disaster recovery, and how do we address them?

Essa: We've covered leadership involvement and how critical it is for disaster recovery planning, but even with strong leadership, challenges are inevitable. Recovery is rarely a smooth process. Unexpected obstacles, resource shortages, and even human factors can delay or complicate efforts. I want to hear from each of you about the biggest challenges you face in disaster recovery and how you work to overcome them.

Senior A (Operations Department): One of the biggest challenges we face is the unpredictability of disasters. No matter how much planning we do, there will always be elements we didn't account for. Natural disasters, for example, rarely unfold exactly as predicted. We may expect flooding in a certain area, but if the storm shifts, we may find ourselves dealing with a completely different crisis. This unpredictability makes it difficult to have a single recovery strategy that works for every situation.

Another major challenge is logistical failures. In disaster response, we often depend on infrastructure that may itself be compromised. If a key supply route is blocked, if transportation services are disrupted, or if communication networks are down, our ability to recover quickly is severely impacted. This is why we place such a heavy emphasis on redundancy and

adaptability. We don't just have one supply route; we have multiple. We don't rely on a single communications system; we have backups, including satellite phones and radio networks.

Senior B (Finance Department): That challenge is something we see in finance as well, especially when it comes to emergency resource allocation. Even if funds are available, getting them into the right hands at the right time is often difficult. Bureaucracy can be a major roadblock. If a department needs urgent funding for recovery efforts, but the request has to go through layers of approval, it can slow everything down.

We address this by establishing pre-approved financial pathways. Instead of waiting for a disaster to happen before deciding how to allocate emergency funds, we create pre-approved spending categories. This means that if a specific type of disaster occurs, the financial team already knows where money needs to go and can release funds without unnecessary delays.

Another financial challenge is fraud and financial mismanagement during crises. Disasters create opportunities for people to take advantage of chaotic situations. Whether it's inflated pricing from suppliers or misappropriation of funds, there's always a risk of financial abuse. We have strict audit controls and digital tracking in place to ensure that every expense is accounted for, and we conduct post-disaster financial reviews to identify any irregularities.

Senior C (IT Department): From an IT standpoint, one of our biggest challenges is cybersecurity threats during disasters. People assume that when a disaster happens, cybercriminals stop their attacks, but the opposite is true. Hackers specifically target organizations when they are vulnerable, knowing that their defenses may be down or that IT teams may be distracted by physical recovery efforts.

For example, during a large-scale disaster, phishing scams often increase. Employees who are already stressed and overwhelmed may be more likely to fall for fraudulent emails, exposing sensitive information or systems. We combat this by implementing disaster-mode cybersecurity protocols, where we heighten security during emergencies rather than lower it. Multi-factor authentication, emergency lockdown modes for critical systems, and cybersecurity monitoring teams that operate independently from the main IT response unit help us minimize risk.

Another major challenge is data loss and system restoration delays. If a data center is damaged or a server crashes, the recovery process can take time, even with backups in place. The problem is that many executives underestimate how long IT restoration actually takes. There's an expectation that systems should be back online instantly, but depending on the nature of the disaster, it could take hours or even days to fully restore certain services. We set realistic

recovery time objectives so that leadership understands what is possible and does not push for shortcuts that could result in permanent data loss.

Senior D (Strategy Department): That's a really important point, and it ties into another challenge we see in strategy—misaligned expectations between different teams. Some departments focus only on immediate recovery, while others are thinking about long-term resilience, and if those priorities don't align, it can create conflict. For example, operations may want to rebuild facilities as quickly as possible, while finance might be looking at cost-saving measures that delay reconstruction.

To address this, we focus heavily on coordination and shared recovery goals. Every department needs to understand the broader recovery strategy and see how their efforts fit into it. We hold interdepartmental disaster recovery planning sessions to ensure that all teams are on the same page before a disaster happens.

Another major challenge we face is public and media perception. During a disaster, people expect fast action. If recovery efforts appear slow, there is immediate criticism, whether it is from the public, government officials, or media organizations. This pressure can sometimes push decision-makers to prioritize speed over effectiveness, leading to rushed decisions that cause long-term problems.

We counteract this by establishing a clear public communication strategy. Instead of allowing misinformation or speculation to control the narrative, we ensure that official updates are provided at regular intervals. We train our leadership teams in crisis communication, so they know how to deliver information in a way that keeps the public informed without causing panic.

Senior E (Human Resources Department): One of the biggest challenges we face in HR is employee fatigue and burnout during disaster recovery. Recovery efforts don't last for just a few days—they can go on for weeks or even months. Employees, especially those on the front lines, may be working long hours under extreme stress, and that takes a toll on mental and physical health.

A disaster recovery plan must include workforce sustainability measures. This means rotating shifts, enforcing mandatory rest periods, and providing mental health support services. We've seen cases where employees push themselves to the breaking point, thinking they're helping the organization by working nonstop, but in reality, they end up making more mistakes and increasing the risk of long-term absenteeism due to stress-related illnesses.

Another challenge is workforce displacement. If a disaster damages an office building or prevents employees from coming to work, we have to ensure that operations can continue

remotely. This is easier said than done, especially if employees do not have access to the necessary tools or secure remote networks. We invest in remote work preparedness, ensuring that critical personnel can continue their duties from anywhere.

Senior A (Operations Department): That's a really good point, and it's something we've had to deal with in operations as well. After a major incident, morale can be very low, especially if team members have personally suffered losses. We've learned that leadership needs to take an active role in supporting employees emotionally during recovery. It's not enough to just focus on rebuilding infrastructure; we have to rebuild the workforce's confidence as well.

One way we do this is by recognizing the contributions of employees during disaster recovery. Simple things like publicly acknowledging team efforts, offering financial incentives, or providing extra days off once recovery efforts are completed can go a long way in maintaining morale.

Senior B (Finance Department): That ties into another financial challenge—unexpected long-term costs. Many organizations plan for the immediate costs of disaster recovery but fail to anticipate secondary financial impacts, such as higher insurance premiums, loss of productivity, or even lawsuits resulting from the disaster.

We conduct long-term financial forecasting for disaster recovery, which helps us see beyond the immediate costs and prepare for ongoing financial burdens. This ensures that recovery efforts don't stall due to funding shortages after the initial response phase.

Senior C (IT Department): That same concept applies to IT as well. Sometimes, disaster recovery plans focus on short-term system restoration but fail to consider long-term technology upgrades that might be necessary. A disaster is often an opportunity to modernize outdated systems, but if leadership doesn't plan for that in advance, they may end up rebuilding old systems instead of implementing new, more resilient technology.

Essa: This has been a fantastic discussion. It's clear that disaster recovery comes with complex challenges that go far beyond just fixing what's broken. Whether it's logistical failures, financial bottlenecks, cybersecurity risks, misaligned leadership expectations, or workforce fatigue, each of these obstacles can seriously hinder recovery efforts.

The key takeaway from this discussion is that challenges are inevitable, but they can be mitigated with proper planning, leadership alignment, and proactive strategies. Every department has a role to play in ensuring that when a disaster strikes, we don't just react—we recover smarter, stronger, and more prepared for the future.

This concludes our focus group discussion. Thank you all for your insights and for sharing your expertise.

Closing Reflections and Next Steps

Essa: This has been a deeply insightful discussion, and I want to take a moment to reflect on what we've covered today. We've explored disaster recovery from multiple angles—operations, finance, IT, strategy, and human resources—and it's clear that while each department has its own challenges, the key to effective recovery lies in coordination and forward-thinking planning.

Before we conclude, I want to give each of you an opportunity to share your final thoughts. Based on what we've discussed, what are the biggest lessons you believe we should take away from this session? And moving forward, what are the critical next steps we should focus on as an organization to enhance our disaster recovery capabilities?

Senior A (Operations Department): My biggest takeaway from this discussion is that disaster recovery is not just about restoring operations—it's about sustaining resilience in the long term. Too often, organizations focus only on the immediate aftermath of a disaster. They rebuild what was damaged, they replace what was lost, and they assume that recovery is complete. But the reality is, if we don't use disasters as an opportunity to improve, we leave ourselves vulnerable to repeating the same failures.

Moving forward, one of the most critical next steps for us in operations is to expand our disaster simulation training. We already conduct regular drills, but we need to introduce more cross-departmental training where finance, IT, HR, and strategy teams are actively involved. Recovery is not just an operational function—it requires every part of the organization working together.

Another key improvement area is establishing better real-time data collection mechanisms during disaster response. Often, decisions are made based on incomplete or outdated information. We need to invest in improved situational awareness tools—such as GIS mapping, drone surveillance for disaster zones, and AI-driven damage assessment systems—that provide leadership with accurate, real-time data to guide recovery efforts.

Senior B (Finance Department): From a financial perspective, the biggest lesson is that emergency funding needs to be more streamlined and proactive. We've discussed how financial bottlenecks can slow down recovery efforts, and one of the key solutions is creating a structured emergency funding protocol that removes bureaucratic delays.

One of our next steps should be to establish a disaster finance command center—a dedicated unit that operates separately from regular financial processes and is activated during emergencies. This unit would have pre-approved spending authority, direct access to

emergency reserves, and fast-track procurement capabilities to ensure that money gets where it's needed without unnecessary delays.

Another important financial priority is improving risk assessment for long-term economic impacts. Right now, most financial disaster planning focuses on immediate expenses—repairs, resource distribution, and recovery logistics. But what about the long-term financial health of the organization? We need to conduct financial resilience modeling to predict how disasters will affect our revenue streams, operational costs, and overall economic sustainability over months and years.

Senior C (IT Department): What stands out to me the most is that IT resilience is directly tied to the success of every other department's recovery efforts. If our systems fail, finance can't release funds, operations can't coordinate logistics, HR can't track personnel, and leadership can't make informed decisions. IT is not just a support function—it's the backbone of disaster recovery.

One of our key next steps should be to invest in automated disaster recovery solutions. Right now, our IT recovery process still requires a lot of manual intervention, which means recovery speed depends on available personnel. We should explore AI-driven self-healing systems, where critical infrastructure can automatically detect failures and initiate restoration processes without human input.

Another area for improvement is enhancing cybersecurity resilience during disaster response. We need to assume that cyberattacks will increase during a crisis and build disaster-mode security protocols that automatically tighten defenses the moment a disaster recovery plan is activated.

Senior D (Strategy Department): For me, the most important takeaway is that disaster recovery is not a separate function—it must be an integrated part of our overall strategy. Recovery is often treated as something that happens after a crisis, but in reality, it should be embedded into every decision we make as an organization.

One major step we need to take is to formalize a cross-departmental disaster recovery council. Right now, each department has its own recovery plans, but we need a centralized governance structure that ensures alignment. This council would meet regularly—not just after disasters—to continuously update recovery protocols, conduct joint training exercises, and oversee interdepartmental coordination.

We also need to improve our post-disaster analysis process. Every disaster presents an opportunity to learn, but if we don't systematically document failures, successes, and lessons learned, we risk making the same mistakes in the future. We should implement a standardized

disaster after-action reporting framework, where every department submits a structured post-recovery analysis, which is then used to refine future plans.

Senior E (Human Resources Department): From an HR standpoint, the most crucial lesson is that people are the most important resource in any disaster recovery effort. We've talked a lot about finances, operations, and technology, but at the end of the day, if our workforce isn't properly supported, everything else collapses.

A key next step for us should be building an employee resilience framework that includes mental health resources, stress management training, and emergency support programs. We also need to improve workforce adaptability, which means developing cross-training programs so that employees can step into different roles when needed.

Another priority is leadership succession planning for disasters. If key decision-makers are unavailable during a crisis, we need to ensure that trained backup leaders are ready to step in seamlessly. This requires ongoing leadership development, where middle managers are trained in disaster leadership, so they are prepared to take command if senior executives are not available.

Essa: These are excellent insights, and I think what's clear from all of your responses is that disaster recovery cannot be treated as a reactive process—it must be a proactive, continuously evolving strategy. Every part of the organization has a role to play, and if we don't coordinate effectively, even the best-laid plans will fail.

Based on our discussion, I propose the following three key action points moving forward:

Creation of a centralized Disaster Recovery Council – A standing interdepartmental team that ensures coordination across all areas, from operations and finance to IT and HR. This council will meet regularly and not just in response to crises.

Investment in automation and AI-driven recovery solutions – This applies across multiple departments, from IT self-healing systems to real-time damage assessment in operations and financial forecasting for long-term economic stability.

Comprehensive disaster workforce resilience planning – This includes mental health support, cross-training programs, and leadership succession planning to ensure that recovery efforts are sustainable in the long term.

If we can implement these action points, we will be taking a massive step toward not just surviving disasters but emerging from them stronger, more resilient, and better prepared for the future.

Before we officially wrap up, does anyone have any final thoughts?

Senior A (Operations Department): I think these action points capture everything we've discussed really well. My only addition would be that we also need better integration of disaster intelligence and predictive analytics. If we can anticipate risks earlier, our recovery plans can be more precise.

Senior B (Finance Department): That's a great point. I would also add that we need to review and update our disaster recovery plans more frequently. The world is changing rapidly, and risks that seemed unlikely a decade ago—such as large-scale cyberattacks—are now some of the biggest threats we face.

Senior C (IT Department): I completely agree. We should also conduct more joint disaster recovery drills, where multiple departments simulate a real recovery scenario together. Right now, many of our exercises are department-specific, but true recovery requires full organizational coordination.

Senior D (Strategy Department): I would also emphasize the importance of global partnerships. We are not alone in disaster recovery—there are international organizations, technology providers, and financial institutions that can provide support. We should explore collaborations that can strengthen our capabilities.

Senior E (Human Resources Department): I think we've covered everything well. The only thing I would add is that we should focus on improving internal disaster communication protocols. Employees need to feel informed, supported, and confident in leadership decisions during a crisis.

Essa: Excellent points from all of you. This has been an incredibly valuable discussion, and I truly appreciate the time and expertise each of you has shared today. Disaster recovery is not just a plan—it is a mindset, and with the right approach, we can ensure that we are always prepared to face any challenge that comes our way.

Thank you all for your time. This concludes our focus group discussion.

Group Discussion Transcript (FGD-3)

Facilitator: Essa Almutawa

Participants:

Junior A (Civil Protection Department)

Junior B (Strategy Department)

Junior C (Preventative Safety Department)

Junior D (Monitoring and Inspection Department)

Junior E (Dubai Civil Defense Academy)

Junior F (Station Affairs Department)

Opening and Introductions

Essa: Welcome, everyone, and thank you for taking the time to participate in today's focus group discussion. The purpose of this session is to explore your perspectives on disaster recovery planning within Dubai Civil Defense. Your insights are critical, and we want this to be an open, collaborative discussion. Please remember, there are no right or wrong answers—just honest thoughts and experiences.

Let's start with introductions. Please share your role and the department you represent.

Junior A (Civil Protection Department): I'm Junior Leader A from the Civil Protection Department. My role involves overseeing emergency responses, ensuring our teams are prepared to tackle disasters effectively, and maintaining public safety.

Junior B (Strategy Department): I'm Junior Leader B from the Strategy Department. My work focuses on developing long-term strategies and planning frameworks that guide the organization's resilience and preparedness initiatives.

Junior C (Preventative Safety Department): I'm Junior Leader C from the Preventative Safety Department. My responsibilities include identifying risks, enforcing safety regulations, and implementing measures to minimize hazards across the community.

Junior D (Monitoring and Inspection Department): I'm Junior Leader D from the Monitoring and Inspection Department. My role is centered around conducting inspections of critical infrastructure, ensuring compliance with safety standards, and supporting recovery efforts through detailed assessments.

Junior E (Dubai Civil Defense Academy): I'm Junior Leader E, representing the Dubai Civil Defense Academy. My focus is on training our personnel and educating the public to enhance preparedness and response capabilities for disasters.

Junior F (Station Affairs Department): I'm Junior Leader F from the Station Affairs Department. My work revolves around ensuring that our fire stations are operationally ready, well-equipped, and able to support response and recovery efforts efficiently.

Essa: Thank you all for your introductions. It's inspiring to see such a diverse group, each representing a crucial part of Dubai Civil Defense. This variety will undoubtedly enrich our discussion. Let's dive into our first question.

Opening Question: What are your general views on disaster recovery?

Essa: To start, I'd like to hear your general thoughts on disaster recovery. From your departmental perspectives, what does disaster recovery mean to you, and why is it important?

Junior A (Civil Protection Department): Disaster recovery, in my view, is the foundation of public safety. It ensures that when disaster strikes, we have a clear roadmap to restore normalcy as quickly and efficiently as possible. In the Civil Protection Department, this means being prepared to safeguard lives and property, coordinating rapid responses, and minimizing disruptions to the community. For instance, our role in managing large-scale evacuations and restoring order is critical to recovery efforts.

Junior B (Strategy Department): I completely agree with Junior Leader A. From a strategic perspective, disaster recovery is about ensuring resilience across all operations. It's not just about bouncing back after a disaster but also about learning from those experiences to strengthen future preparedness. For instance, our team develops frameworks that integrate recovery plans into every department's core functions, ensuring that each unit has the tools and guidance to recover effectively.

Junior C (Preventative Safety Department): For the Preventative Safety Department, disaster recovery is intrinsically linked to prevention. While our primary focus is on minimizing risks through stringent regulations and proactive measures, recovery helps us understand where gaps in prevention may have existed. It's about using the lessons from recovery to refine our safety standards and protect against future disasters.

Junior D (Monitoring and Inspection Department): Recovery, for us, starts with inspections. After a disaster, it's our job to assess damage, determine whether structures are safe, and prioritize which areas need immediate attention. Disaster recovery is important because it bridges the gap between response and rebuilding. Without accurate inspections and data, recovery efforts can stall or even fail.

Junior E (Dubai Civil Defense Academy): Disaster recovery is integral to what we do at the Academy. Recovery efforts provide critical insights into what works and what doesn't in the field, allowing us to adapt our training programs. For instance, if a recovery operation reveals gaps in hazardous material handling, we adjust our curriculum to address those gaps. It's about ensuring our personnel and community are better prepared for future challenges.

Junior F (Station Affairs Department): From the Station Affairs Department's perspective, recovery is about ensuring our operational capacity is maintained or restored quickly. Fire stations are the backbone of emergency response, and if they're not functional, recovery efforts

across the board are compromised. For example, during large-scale incidents, we must ensure that our equipment is operational, our vehicles are serviced, and our teams are ready to deploy at a moment's notice.

Essa: These perspectives underscore the multifaceted nature of disaster recovery. Each department contributes a unique element, from prevention to planning, inspections, and operations. Let's explore this further. How does your department integrate disaster recovery into its daily operations?

Junior A (Civil Protection Department): On a daily basis, disaster recovery planning is woven into our operational readiness drills. For example, we conduct regular multi-agency exercises that simulate disaster scenarios like industrial fires or chemical spills. These exercises test our ability to recover from disruptions while ensuring coordination with other departments. Additionally, our emergency response vehicles are equipped with backup communication systems, which are essential during recovery when infrastructure might be compromised.

Junior B (Strategy Department): In Strategy, our daily work involves analyzing data and trends to identify potential weaknesses in our recovery plans. For instance, we review the aftermath of previous incidents to refine recovery timelines and allocate resources more effectively. A key aspect is aligning department-specific recovery actions with the overall organizational vision to ensure consistency and efficiency.

Junior C (Preventative Safety Department): In our department, recovery starts with continuous risk assessment. By identifying high-risk areas or industries, we can tailor recovery plans to address their specific needs. For instance, after the warehouse fire last year, we re-evaluated safety compliance measures across similar facilities and included recovery protocols as part of their operational requirements.

Junior D (Monitoring and Inspection Department): Disaster recovery is central to our inspection protocols. We prioritize inspections based on potential recovery needs. For example, high-risk buildings are flagged for post-disaster evaluations to ensure their integrity. We also work closely with engineers and safety experts to develop rapid assessment methods that speed up recovery decisions.

Junior E (Dubai Civil Defense Academy): At the Academy, we integrate recovery-focused training into all our programs. This includes simulation-based learning, where trainees experience the realities of disaster recovery, such as managing logistics in disrupted

environments or coordinating with multiple agencies. These simulations are vital in preparing them for real-world challenges.

Junior F (Station Affairs Department): For us, operational readiness is synonymous with disaster recovery. Our teams conduct daily checks on vehicles, equipment, and communication systems to ensure everything is functional. Additionally, we maintain stockpiles of essential resources like firefighting foam and spare parts, which are critical during prolonged recovery efforts.

Essa: It's clear that disaster recovery is embedded deeply in your operations. Let's dive into the broader impact of these efforts. How does disaster recovery planning support Dubai Civil Defense's mission and values, particularly in areas like public safety, compliance, and community engagement?

Junior A (Civil Protection Department): Disaster recovery is a direct extension of our mission to protect lives and property. By ensuring that we can restore order quickly and effectively, we uphold the public's trust and demonstrate our commitment to safety. Recovery efforts also strengthen our compliance with national and international safety standards, which is critical for our credibility.

Junior B (Strategy Department): I would add that recovery planning reflects the organization's commitment to resilience and accountability. By having clear recovery frameworks, we show stakeholders that we are prepared not just to respond to disasters but also to learn and grow from them. This builds long-term confidence in our capabilities.

Junior C (Preventative Safety Department): For the Preventative Safety Department, recovery planning is a tool for community engagement. It allows us to involve local stakeholders in understanding the importance of safety compliance and the role they play in recovery. Public awareness campaigns, for example, are a direct outcome of lessons learned during recovery efforts.

Junior D (Monitoring and Inspection Department): Recovery planning highlights our dedication to thoroughness and transparency. When we conduct post-disaster inspections, our reports are not just for internal use—they're shared with stakeholders to ensure accountability and build trust in our processes.

Junior E (Dubai Civil Defense Academy): I see disaster recovery as an opportunity to reinforce public education. Community engagement during recovery, such as workshops on

rebuilding safely, helps citizens feel empowered and informed. This aligns with our mission to build a more resilient society.

Junior F (Station Affairs Department): Recovery efforts also demonstrate our operational reliability. When stations are able to recover quickly, it reassures both our teams and the public that we are always ready to serve. This reliability is a cornerstone of our mission.

Essa: These connections between recovery planning and the organization's mission are invaluable. Before we conclude this question, let's discuss challenges. What are the biggest obstacles you face in disaster recovery, and how do you address them?

Junior A (Civil Protection Department): One of the biggest challenges we face is resource allocation during simultaneous incidents. For example, if there's a large industrial fire and a separate residential flooding event happening at the same time, our teams and equipment are stretched thin. To address this, we've implemented a prioritization framework. Critical life-saving operations take precedence, and we leverage mutual aid agreements with neighboring jurisdictions to bring in additional resources when needed.

Junior B (Strategy Department): From a strategic standpoint, a key challenge is balancing short-term recovery needs with long-term resilience goals. For instance, there might be pressure to rebuild quickly after a disaster, but rushing can sometimes compromise the quality of recovery and future safety. To address this, we've started integrating decision-making tools that weigh immediate needs against strategic objectives. This ensures that recovery aligns with broader organizational goals.

Junior C (Preventative Safety Department): I'd say compliance is a recurring obstacle, particularly during recovery. Stakeholders, including business owners and developers, often prioritize speed over adherence to safety regulations. This can lead to further risks down the line. To mitigate this, we've strengthened our communication strategies. For instance, after the fire at a manufacturing plant last year, we conducted awareness sessions with local businesses to emphasize the importance of compliance in preventing secondary incidents during recovery.

Junior D (Monitoring and Inspection Department): Limited access to disaster sites is another significant challenge. After a disaster, some areas may be too dangerous to inspect immediately. This delays our ability to provide accurate assessments for recovery planning. To overcome this, we've started using drones and other remote inspection technologies. These tools allow us to evaluate structural damages from a safe distance, enabling faster decision-making.

Junior E (Dubai Civil Defense Academy): For us, the challenge lies in adapting training programs quickly based on recovery insights. For example, if a disaster highlights deficiencies in a specific skill set—like handling hazardous materials—it can take time to develop and roll out updated training modules. To address this, we've started using modular training systems. This allows us to introduce targeted updates to specific areas of training without overhauling the entire program.

Junior F (Station Affairs Department): Logistics bottlenecks can severely impact recovery efforts. During widespread disasters, supply chains may be disrupted, delaying the resupply of essential equipment and materials. For instance, during last year's sandstorm, many stations ran low on fuel and spare parts. We've addressed this by creating pre-positioned stockpiles at strategic locations and maintaining strong relationships with multiple suppliers to ensure redundancy in our supply chain.

Essa: Those are insightful points, and it's clear that each department has developed strategies to navigate these obstacles. Let's expand on one of these challenges: compliance during recovery. How do you ensure safety standards and accountability are maintained when there is pressure to expedite the process?

Junior C (Preventative Safety Department): That's a key concern for us. We address this by maintaining a clear communication framework with all stakeholders. For example, after the flooding in a residential area last year, there was significant pressure to reopen buildings quickly. Our team worked closely with contractors to ensure safety inspections were conducted before reoccupation. Additionally, we've developed a checklist of minimum safety standards that must be met before any recovery activity is considered complete.

Junior D (Monitoring and Inspection Department): I'd like to add to that. During recovery, we make use of detailed reporting systems that document every inspection and its findings. These reports are shared with local authorities and relevant stakeholders to ensure transparency and accountability. This not only upholds safety standards but also builds trust in our recovery efforts.

Junior B (Strategy Department): From a strategic perspective, we've included compliance metrics in our recovery KPIs. For example, the number of safety violations resolved during recovery is tracked and analyzed. By embedding compliance into our performance indicators, we ensure that safety is always a priority, even under time constraints.

Essa: It's clear that maintaining compliance is a shared priority. Now, let's discuss how recovery efforts can improve community engagement and trust. What role does public education play in disaster recovery?

Junior E (Dubai Civil Defense Academy): Public education is a cornerstone of effective recovery. When communities understand their role in recovery—such as following evacuation protocols or reporting hazards—they become active participants rather than passive beneficiaries. After the chemical spill incident earlier this year, we organized community workshops to educate residents about environmental safety and proper reporting channels. This not only improved safety but also fostered trust between the community and our teams.

Junior A (Civil Protection Department): Public education also helps manage expectations during recovery. For example, during large-scale evacuations, there can be frustration if residents don't understand the recovery timeline or the reasons for certain restrictions. By providing clear and consistent updates through community briefings and social media, we've been able to keep the public informed and engaged.

Junior F (Station Affairs Department): I'd add that community engagement during recovery helps us identify specific needs more effectively. For instance, after a fire in a residential complex, residents highlighted a need for temporary storage solutions for salvaged belongings. This feedback allowed us to coordinate with local partners to provide storage facilities, demonstrating our commitment to their well-being.

Essa: These examples highlight the importance of public education in recovery. Finally, let's conclude this question with your thoughts on improvements. What would you recommend to strengthen disaster recovery planning in your departments?

Junior A (Civil Protection Department): I'd recommend increasing collaboration with external agencies, such as private companies and non-profits. These partnerships can bring in additional resources and expertise, particularly during large-scale recoveries.

Junior B (Strategy Department): From a strategic perspective, I'd suggest integrating predictive analytics into our recovery planning. This would allow us to anticipate recovery challenges and allocate resources more efficiently.

Junior C (Preventative Safety Department): I believe closer coordination with community leaders would be beneficial. By involving them in recovery planning, we can ensure that our efforts align with the unique needs of each community.

Junior D (Monitoring and Inspection Department): Investing in advanced inspection technologies, like AI-powered assessment tools, would significantly improve our ability to conduct rapid and accurate evaluations.

Junior E (Dubai Civil Defense Academy): Expanding our training programs to include more community-focused recovery scenarios could strengthen public participation in recovery efforts.

Junior F (Station Affairs Department): I'd recommend creating a centralized logistics coordination system to track and manage resources across all departments during recovery. This would reduce delays and improve efficiency.

Essa: Thank you all for your thoughtful insights and suggestions. This discussion has provided a comprehensive overview of disaster recovery's importance and the ways it is implemented and improved within Dubai Civil Defense. Let's take a short break before moving on to the next question.

Key Question 2: What are your views on the steps to be taken in creating a disaster recovery plan process?

Essa: Welcome back, everyone. Now that we've discussed the general importance of disaster recovery, let's focus on the actual steps involved in creating a disaster recovery plan. From your departmental perspectives, what do you see as the critical components and actions required to develop an effective plan?

Junior A (Civil Protection Department): The most fundamental step in creating a disaster recovery plan is conducting a detailed risk assessment. This involves identifying potential hazards, whether they are natural disasters like floods or heatwaves, industrial incidents like chemical spills, or technological disruptions like cyber-attacks. In the Civil Protection Department, we prioritize these risks based on both likelihood and potential impact. For instance, while sandstorms are relatively frequent and less devastating, an industrial fire in a densely populated area poses a much higher risk to public safety. Our recovery plans must reflect these priorities by focusing resources and strategies on high-impact scenarios.

Junior B (Strategy Department): Building on what Junior A said, I believe risk assessment should flow seamlessly into a comprehensive Business Impact Analysis, or BIA. While risk assessment identifies the threats, the BIA evaluates the consequences of those threats on our operations and services. For example, we analyze how disasters might affect key services like communication networks, emergency response, or public utilities. A BIA also helps prioritize which functions need immediate recovery and which can tolerate longer downtimes. In the Strategy Department, we've used this approach to ensure that critical infrastructure, like our emergency dispatch systems, is always prioritized in recovery plans.

Junior C (Preventative Safety Department): After conducting the risk assessment and BIA, the next crucial step is setting recovery objectives. These objectives serve as benchmarks for what the recovery plan aims to achieve. In the Preventative Safety Department, recovery objectives often include timelines for restoring compliance with safety standards. For example, after a fire in a manufacturing zone, we had an objective to complete safety inspections for all surrounding facilities within 72 hours to prevent secondary incidents. Without clear objectives, recovery efforts risk becoming unfocused and inefficient.

Essa: That's a strong point, Junior C. But let me ask—how do you ensure these objectives are realistic and achievable, especially in high-pressure situations?

Junior C (Preventative Safety Department): That's where interdepartmental collaboration comes in. We coordinate with other departments, like Civil Protection and Strategy, to align our recovery goals with operational realities. For example, if our timeline for inspections is too aggressive given the number of personnel available, we adjust it to ensure both quality and feasibility. It's better to take slightly longer than to rush and compromise safety.

Junior D (Monitoring and Inspection Department): I agree. In our department, data plays a critical role in setting realistic objectives. During and immediately after a disaster, we collect detailed information about the extent of the damage, available resources, and the needs of affected areas. This data helps us prioritize tasks and allocate resources effectively. For instance, during the recent floods, we used drone technology to assess damage in remote areas, which allowed us to quickly identify the most urgent recovery needs.

Junior E (Dubai Civil Defense Academy): I'd like to add that training also influences the achievability of recovery objectives. Personnel need to be thoroughly trained in their roles and responsibilities during recovery efforts. At the Academy, we simulate various disaster scenarios, allowing teams to practice implementing recovery plans under realistic conditions.

For example, we recently conducted a drill where participants had to manage recovery efforts following a simulated chemical spill. This not only tested the plan but also highlighted areas where additional training was needed.

Junior F (Station Affairs Department): Redundancy planning is another factor that ensures recovery objectives are realistic. By having backup systems, resources, and procedures in place, we reduce the pressure on personnel during disasters. For example, during a city-wide power outage last year, our stations relied on backup generators to maintain operations. This redundancy allowed us to focus on recovery efforts without worrying about losing functionality.

Essa: Those are excellent foundational steps. Let's now delve into coordination. How do you ensure that recovery planning is integrated across all departments and with external stakeholders?

Junior A (Civil Protection Department): Coordination begins with establishing a unified command structure. The Incident Command System, or ICS, is a great example of this. It provides a standardized framework that ensures all departments and stakeholders are working together under a single plan. For instance, during a recent large-scale evacuation, the ICS allowed us to seamlessly coordinate with the Station Affairs Department to ensure that evacuation routes were staffed with operational fire stations.

Junior B (Strategy Department): I completely agree with Junior A. In the Strategy Department, we also emphasize collaboration with external stakeholders, such as municipal authorities, private businesses, and even international agencies. These partnerships expand our resources and expertise, which is especially critical during large-scale recovery efforts. For example, after a sandstorm disrupted transportation networks, we worked with logistics companies to prioritize the restoration of critical supply chains. This collaboration ensured that recovery efforts were efficient and inclusive.

Junior C (Preventative Safety Department): Stakeholder involvement is equally important from a preventative standpoint. Engaging industries and high-risk facilities in the planning process ensures that their internal protocols align with our recovery plans. For instance, we recently revised recovery protocols for chemical plants and held workshops with facility managers to ensure they understood their roles in recovery efforts. This proactive approach minimizes miscommunication and delays when a disaster occurs.

Junior D (Monitoring and Inspection Department): I think our disaster recovery plans which are in place are effective, but there needs to be some form of mechanism that consolidates these plans together.

Essa: That's an interesting example, Junior C. How do you measure the effectiveness of this stakeholder engagement?

Junior C (Preventative Safety Department): We measure effectiveness by conducting post-incident reviews with all stakeholders. After the chemical plant workshops, for example, we received feedback on how well their internal plans aligned with ours during a simulated emergency. This iterative process helps us continuously improve both our plans and our engagement strategies.

Junior D (Monitoring and Inspection Department): I'd like to highlight the importance of interdepartmental data sharing in coordination. After we conduct post-disaster inspections, our findings are shared with Strategy and Civil Protection to inform resource allocation and operational priorities. For example, during the floods, our data on road conditions helped Civil Protection reroute emergency vehicles, while Strategy used the information to plan longer-term infrastructure repairs.

Junior E (Dubai Civil Defense Academy): Training also plays a role in fostering coordination. By involving representatives from multiple departments in our simulation exercises, we ensure that everyone understands their roles and how they intersect with others during recovery. During a recent flood recovery drill, participants from six different departments worked together to address challenges, which improved communication and highlighted areas for improvement.

Junior F (Station Affairs Department): Collaboration at the ground level is equally important. Our stations often serve as staging areas for recovery operations, so we work closely with Civil Protection and Monitoring to ensure that resources are deployed effectively. For instance, during last year's city-wide drill, our teams coordinated with other departments to test how quickly we could deploy equipment to multiple sites. These drills not only improve our operational readiness but also strengthen our relationships with other departments.

Essa: Let's talk about implementation now. Once the plan is finalized, what steps do you take to ensure it is effectively implemented during a disaster?

Junior A (Civil Protection Department): Effective communication is the cornerstone of implementation. Recovery directives must be disseminated quickly and clearly to all field teams. In our department, we use multiple communication channels, including radios, mobile apps, and satellite systems, to ensure redundancy. This approach proved invaluable during a recent industrial fire when traditional communication lines were temporarily down.

Junior B (Strategy Department): In Strategy, implementation is all about flexibility. We monitor recovery efforts in real-time using dashboards that track progress against key objectives. This allows us to identify bottlenecks and adjust plans as needed. For example, during the floods, we noticed that recovery efforts in certain areas were falling behind schedule due to resource shortages. By reallocating resources in real-time, we were able to get those efforts back on track.

Junior C (Preventative Safety Department): Implementation in our department involves rigorous compliance checks. Recovery activities must adhere to safety standards to prevent secondary disasters. For instance, after a warehouse fire, we inspected recovery efforts to ensure that workers were following safety protocols when handling hazardous materials.

Junior D (Monitoring and Inspection Department): Prioritization is a key aspect of implementation. After a disaster, we categorize affected sites based on the severity of damage and the urgency of recovery. This ensures that critical areas, like hospitals or schools, are inspected first.

Junior E (Dubai Civil Defense Academy): Training plays a direct role in implementation. Personnel who have undergone scenario-based training are better prepared to execute recovery plans effectively. Additionally, we deploy trainers to assist field teams during large-scale recoveries, providing real-time guidance and support.

Junior F (Station Affairs Department): Logistical readiness is another critical aspect. By pre-deploying resources to high-risk areas before a disaster, we ensure that recovery efforts can begin immediately. For instance, during last year's storm, we positioned additional vehicles and equipment in vulnerable areas, which significantly reduced response times.

Essa: Those are excellent insights. Finally, let's discuss improvements. Based on your experiences, what enhancements would you recommend to strengthen the disaster recovery planning process?

Junior A (Civil Protection Department): I'd recommend integrating AI and predictive analytics into our recovery planning. These tools could help us anticipate challenges more accurately and allocate resources more effectively.

Junior B (Strategy Department): From a strategic perspective, we should focus on building stronger public-private partnerships. Engaging private companies in recovery planning could provide additional expertise and resources, particularly in areas like logistics and infrastructure repair.

Junior C (Preventative Safety Department): Enhancing community involvement is crucial. Educating residents about their role in recovery efforts—such as adhering to safety guidelines or reporting hazards—can significantly improve overall effectiveness.

Junior D (Monitoring and Inspection Department): Investing in advanced inspection technologies, such as AI-powered assessment tools, would improve the speed and accuracy of our evaluations.

Junior E (Dubai Civil Defense Academy): Expanding our training programs to include more scenario-based drills that mimic complex, multi-agency recoveries could better prepare our personnel for real-world challenges.

Junior F (Station Affairs Department): I'd suggest developing a centralized resource management system that allows all departments to track and share recovery resources in real-time. This would reduce redundancies and improve efficiency.

Essa: Thank you all for your thoughtful contributions. This discussion has provided a comprehensive view of the critical steps in disaster recovery planning and actionable recommendations for improvement. Let's take a short break before moving on to the next question.

Key Question 3: What according to you are the objectives of a disaster recovery plan?

Essa: Let's continue by discussing the objectives of a disaster recovery plan. From your perspectives, what should be the primary objectives of such a plan?

Junior A (Civil Protection Department): The first and foremost objective of any disaster recovery plan is to protect human lives. This must always be our top priority. In the Civil Protection Department, our plans are designed with the understanding that the quicker we can

act to safeguard people during and after a disaster, the better. For example, during the recent warehouse fire incident, our recovery plan included immediate post-incident safety checks and community notifications to ensure that residents were safe from lingering smoke hazards.

Junior B (Strategy Department): I completely agree with Junior A that protecting human lives is paramount. However, I'd also add that maintaining continuity of essential services is a key objective. A disaster recovery plan must ensure that critical infrastructure—like electricity, water, and communication systems—is restored as quickly as possible. For instance, during a heatwave earlier this year, the Strategy Department prioritized restoring power to affected areas to ensure that cooling systems could function, especially in hospitals and emergency shelters.

Junior C (Preventative Safety Department): Another crucial objective is minimizing the economic and environmental impact of disasters. In the Preventative Safety Department, we've worked on recovery plans that focus on mitigating damage to industrial zones to prevent chemical spills or other environmental hazards. For example, after a recent fire in a factory, our team collaborated with environmental agencies to clean up hazardous materials and prevent long-term contamination of nearby water sources.

Junior D (Monitoring and Inspection Department): From my perspective, ensuring rapid recovery and restoration is another fundamental objective. The sooner we can rehabilitate affected areas and restore a sense of normalcy, the quicker communities can recover emotionally and economically. During last year's floods, our inspections prioritized structural assessments of residential buildings to expedite the process of getting families back into their homes.

Junior E (Dubai Civil Defense Academy): I believe another key objective is training personnel to handle recovery operations effectively. At the Academy, we've incorporated disaster recovery training into all our programs to ensure that staff are well-prepared for their roles during recovery efforts. For example, we've designed courses on managing logistical challenges and coordinating multi-agency operations, which are critical for smooth recovery processes.

Junior F (Station Affairs Department): Lastly, I'd say that fostering community resilience is an important objective. A disaster recovery plan should include measures to support affected communities emotionally and socially. For example, after the recent sandstorm, our department organized community outreach programs to distribute relief supplies and provide psychological support, helping residents feel supported during the recovery phase.

Essa: Those are excellent points. Let's go deeper into this. Do you think these objectives are being fully addressed in our current plans? If not, where are the gaps?

Junior A (Civil Protection Department): I think we've made significant progress in addressing these objectives, but there's always room for improvement. For instance, while our plans prioritize human safety, we've faced challenges in evacuating vulnerable populations during large-scale disasters. In the warehouse fire incident, evacuating elderly residents took longer than expected due to limited resources and communication issues.

Junior B (Strategy Department): I agree with Junior A. One gap I've noticed is in maintaining service continuity during prolonged disasters. Our recovery plans often focus on immediate restoration, but we need more robust strategies for sustaining operations over extended periods. For example, during the power outage caused by the heatwave, some backup generators failed, highlighting the need for better resource management.

Junior C (Preventative Safety Department): I'd add that we need to strengthen our focus on environmental recovery. While we've done well in addressing immediate hazards, long-term environmental impacts often take a backseat. For example, after the factory fire, while we managed the immediate cleanup, there wasn't enough follow-up to monitor soil and water quality over time.

Junior D (Monitoring and Inspection Department): Another area where we can improve is in speeding up recovery efforts. Delays in structural assessments and resource allocation have sometimes prolonged the recovery phase. For instance, during the floods, it took several days to assess the safety of bridges, which delayed reopening critical transportation routes.

Junior E (Dubai Civil Defense Academy): From a training perspective, I think we need to invest more in advanced recovery simulations. While our current training programs are effective, they often focus on response rather than the transition to recovery. Including more recovery-specific scenarios would better prepare personnel for the challenges they'll face.

Junior F (Station Affairs Department): I believe we can also do more to engage communities in recovery planning. While we've made efforts to involve residents in preparedness programs, there's less emphasis on their role in recovery. For example, after the sandstorm, many residents were unclear about how they could assist in cleanup efforts or access resources, which slowed down the overall recovery process.

Essa: Those are valuable insights. What steps can we take to address these gaps and ensure that the objectives of our disaster recovery plans are fully realized?

Junior A (Civil Protection Department): One step is to enhance coordination with external agencies, such as NGOs and healthcare providers, to improve evacuation and medical support for vulnerable populations. For example, establishing partnerships with ambulance services and nursing homes could help expedite evacuations during future incidents.

Junior B (Strategy Department): I'd recommend investing in more resilient infrastructure, such as high-capacity backup generators and durable communication networks. These resources are critical for maintaining service continuity during extended recovery periods.

Junior C (Preventative Safety Department): To address environmental gaps, I think we should establish a dedicated task force for environmental recovery. This team could monitor long-term impacts and ensure that post-disaster cleanups meet both immediate and future needs.

Junior D (Monitoring and Inspection Department): Improving the speed of recovery efforts requires better resource management systems. For instance, a centralized platform for tracking and allocating resources could significantly reduce delays in recovery operations.

Junior E (Dubai Civil Defense Academy): From a training perspective, we should develop more advanced simulation tools that mimic real-world recovery challenges. These tools could include virtual reality scenarios that allow personnel to practice coordinating multi-agency recovery efforts.

Junior F (Station Affairs Department): To engage communities more effectively, I'd suggest creating recovery task forces at the neighborhood level. These groups could receive basic training in recovery procedures and act as liaisons between residents and civil defense teams, ensuring that the community plays an active role in the recovery process.

Essa: Thank you all for your thoughtful responses. This discussion has highlighted some key objectives of disaster recovery plans and identified practical steps we can take to achieve them. Let's take a short break before moving on to the next question.

Key Question 4: How does leadership as a role get involved in preparing an operational disaster recovery plan?

Essa: Let's shift focus to a topic central to disaster recovery: leadership. From your perspective, how does leadership get involved in preparing an operational disaster recovery plan?

Junior A (Civil Protection Department): Leadership plays a foundational role in disaster recovery planning. In the Civil Protection Department, leaders set the tone and direction for how we approach recovery efforts. For instance, during the preparation phase for a recent city-wide disaster drill, our department head was directly involved in defining the objectives and ensuring that every team member understood their role. By being actively engaged, they inspired confidence and clarity, which translated into better execution during the drill.

Junior B (Strategy Department): I agree, Junior A. From a strategic standpoint, leadership is essential for establishing clear goals and aligning departmental efforts. At the Strategy Department, our leaders emphasize the importance of integrating recovery planning into our long-term objectives. They ensure that our plans are not just reactive but proactive, accounting for potential future challenges. For instance, during a planning session, our director facilitated discussions across departments to identify gaps in resource allocation, ensuring everyone was aligned on priorities.

Junior C (Preventative Safety Department): Adding to that, leaders are also crucial in fostering collaboration. In the Preventative Safety Department, our leadership prioritizes coordination with other departments and external stakeholders. For example, after a recent factory fire, our director brought together representatives from the Environmental Agency, Civil Protection, and local businesses to create a comprehensive recovery plan that addressed safety and environmental concerns. Their ability to bring people together was key to the plan's success.

Junior D (Monitoring and Inspection Department): From my perspective, leadership ensures that recovery plans are grounded in data and reality. In the Monitoring and Inspection Department, our leaders focus on leveraging technology to assess vulnerabilities and guide decision-making. For instance, they spearheaded the adoption of drones to inspect flood-prone areas, providing accurate data that informed our recovery strategies.

Junior E (Dubai Civil Defense Academy): I'd add that leaders in the Academy focus on capacity building. They understand that recovery planning requires well-trained personnel, so they invest heavily in education and training programs. For example, our leadership recently introduced a course on advanced recovery strategies, emphasizing leadership roles during crises. This not only prepared our trainees but also demonstrated how leaders should guide their teams in high-pressure situations.

Junior F (Station Affairs Department): Leadership in the Station Affairs Department ensures operational readiness by emphasizing resource management and team morale. During a recent sandstorm recovery effort, our station manager prioritized regular briefings to keep everyone informed and motivated. Their hands-on approach ensured that resources were distributed efficiently and that teams felt supported throughout the operation.

Essa: These are excellent examples of leadership in action. Let's explore specific leadership roles further. What leadership qualities or actions do you think are most critical during disaster recovery planning?

Junior A (Civil Protection Department): One of the most critical qualities is decisiveness. During recovery planning, leaders must make swift, informed decisions that can significantly impact the outcome. For example, our department head recently made a quick decision to relocate recovery resources to a high-priority area during a drill, which demonstrated the importance of adaptability and clear thinking under pressure.

Junior B (Strategy Department): Building on that, I'd say vision is equally important. Leaders need to see the bigger picture and guide their teams toward long-term recovery goals. In the Strategy Department, our director emphasizes resilience-building as a core objective, ensuring that our recovery plans don't just address immediate needs but also strengthen our capacity to handle future disasters.

Junior C (Preventative Safety Department): I think communication is key. Effective leaders ensure that their teams and stakeholders are always informed and aligned. For instance, during the factory fire recovery planning, our director maintained open lines of communication with all involved parties, ensuring transparency and trust throughout the process.

Junior D (Monitoring and Inspection Department): I'd highlight the importance of technical knowledge. Leaders who understand the tools and technologies involved in recovery planning can make more informed decisions. For example, our department head's expertise in GIS mapping allowed us to identify high-risk areas more effectively during recovery planning.

Junior E (Dubai Civil Defense Academy): Leaders must also be educators. They should mentor their teams and pass on knowledge and skills. In the Academy, our leadership actively participates in training sessions, sharing their experiences and insights to inspire and prepare trainees for real-world recovery scenarios.

Junior F (Station Affairs Department): Lastly, I think empathy is critical. Recovery planning involves dealing with affected communities and stressed teams. Leaders who show

understanding and compassion can build morale and foster a supportive environment, which is essential for effective recovery efforts.

Essa: Let's delve into how leaders can inspire and engage their teams during recovery planning. What strategies have you observed or experienced?

Junior A (Civil Protection Department): One effective strategy is leading by example. When leaders are actively involved in drills or recovery planning meetings, it motivates the team to give their best. During a recent exercise, our department head personally participated in field assessments, which boosted team morale and demonstrated their commitment to the mission.

Junior B (Strategy Department): I've noticed that recognition and appreciation are powerful motivators. In the Strategy Department, our leadership regularly acknowledges team efforts, whether it's through public commendations or small gestures like personalized notes. This kind of recognition fosters a sense of pride and ownership in the recovery planning process.

Junior C (Preventative Safety Department): Effective leaders also empower their teams by delegating responsibilities and trusting them to deliver. During the factory fire recovery planning, our director delegated specific tasks to team leads, giving them the autonomy to make decisions within their areas of expertise. This not only improved efficiency but also built confidence within the team.

Junior D (Monitoring and Inspection Department): I'd add that fostering a culture of innovation is another way to engage teams. Our leaders encourage us to propose new ideas and solutions during recovery planning sessions. For instance, one of my colleagues suggested using AI to predict infrastructure vulnerabilities, and our department head fully supported the idea, which has since become a key part of our planning process.

Junior E (Dubai Civil Defense Academy): At the Academy, leaders engage trainees by incorporating interactive learning methods, such as simulations and role-playing exercises. These hands-on approaches not only make training more engaging but also instill a sense of preparedness and confidence in trainees.

Junior F (Station Affairs Department): Open communication is another effective strategy. Leaders who listen to their teams and address their concerns build trust and loyalty. During the sandstorm recovery effort, our station manager held daily debriefings where team members could share their feedback and suggestions, which greatly improved coordination and morale.

Essa: Leadership also involves addressing challenges. What obstacles do leaders face in disaster recovery planning, and how can they overcome them?

Junior A (Civil Protection Department): One major obstacle is balancing competing priorities. Leaders often have to decide between focusing on immediate recovery needs and long-term planning. To overcome this, our department head uses a priority matrix to evaluate the urgency and impact of different tasks, ensuring that resources are allocated effectively.

Junior B (Strategy Department): I'd add that resistance to change can be a challenge. Some team members may be hesitant to adopt new strategies or technologies. Our director addresses this by involving teams in the decision-making process, which helps build buy-in and reduces resistance.

Junior C (Preventative Safety Department): Another challenge is maintaining coordination among diverse stakeholders. Leaders in our department overcome this by establishing clear roles and communication channels during the planning phase, ensuring that everyone knows their responsibilities and how to collaborate effectively.

Junior D (Monitoring and Inspection Department): Access to accurate and timely information can also be a challenge. To address this, our leaders have invested in data management tools that streamline information sharing and analysis, enabling better decision-making during recovery planning.

Junior E (Dubai Civil Defense Academy): In training environments, keeping programs relevant and up-to-date is a constant challenge. Our leadership tackles this by continuously reviewing and updating our curriculum based on emerging trends and lessons learned from past disasters.

Junior F (Station Affairs Department): Lastly, maintaining team morale during prolonged recovery efforts can be difficult. Leaders in our department address this by celebrating small wins and providing regular updates on progress, which keeps teams motivated and focused.

Essa: Let's conclude with recommendations. What can we do to further enhance the role of leadership in disaster recovery planning?

Junior A (Civil Protection Department): I'd recommend providing leadership training specifically focused on disaster recovery. This could include courses on decision-making under pressure, effective communication, and interagency coordination.

Junior B (Strategy Department): From a strategic perspective, I think we should establish mentorship programs where experienced leaders can guide and develop the next generation of disaster recovery planners.

Junior C (Preventative Safety Department): I believe formalizing leadership roles in recovery plans can also help. By clearly defining responsibilities and expectations, we can ensure that leaders are fully prepared and accountable.

Junior D (Monitoring and Inspection Department): Investing in leadership development programs that focus on technology and data-driven decision-making would be beneficial. This would enable leaders to leverage advanced tools effectively during recovery planning.

Junior E (Dubai Civil Defense Academy): From a training perspective, incorporating leadership simulations into our programs can help future leaders practice their skills in realistic scenarios.

Junior F (Station Affairs Department): Lastly, fostering a culture of continuous learning and improvement is essential. Leaders should be encouraged to reflect on their experiences, share lessons learned, and apply those insights to future recovery efforts.

Essa: Thank you all for your thoughtful contributions. This discussion has provided valuable insights into the critical role of leadership in disaster recovery planning. Let's take a short break before moving on to the next question.

Key Question 5: What do you consider are CSFs (critical success factors) in implementing a disaster recovery plan?

Essa: Welcome back, everyone. We've discussed disaster recovery planning objectives and leadership roles. Let's now focus on implementation. What do you consider are the critical success factors—or CSFs—in implementing a disaster recovery plan? From your departmental perspectives, what factors ensure that a disaster recovery plan is both effective and efficient?

Junior A (Civil Protection Department): From the Civil Protection standpoint, one of the most critical success factors is having a clear and comprehensive recovery plan. This includes scenario-based planning that addresses a wide range of potential disasters, from fires to floods. For example, during last year's warehouse fire, our recovery plan's specificity—covering

everything from evacuation procedures to resource allocation—was instrumental in minimizing disruptions and ensuring swift action.

Junior B (Strategy Department): I completely agree, Junior A. From the Strategy Department's perspective, another key CSF is robust leadership and governance. A centralized command structure ensures that recovery efforts are coordinated across all departments. For instance, during a heatwave-induced power outage, our department facilitated interagency collaboration, ensuring that priorities were aligned and resources were deployed effectively.

Junior C (Preventative Safety Department): I'd like to add that effective communication strategies are equally critical. Clear communication channels help disseminate accurate information to all stakeholders, including the public. During a factory fire recovery, our department used a centralized communication platform to coordinate with other departments and the media, ensuring that updates were timely and accurate.

Junior D (Monitoring and Inspection Department): From my perspective, resource management is another essential factor. Having sufficient and pre-allocated resources, including personnel, equipment, and funding, ensures that recovery operations can proceed without delays. During last year's floods, our department relied on pre-positioned resources to expedite inspections and assessments, significantly reducing downtime.

Junior E (Dubai Civil Defense Academy): Training and skill development are foundational CSFs for us at the Academy. Regular drills, simulations, and specialized training programs prepare personnel to execute recovery plans effectively. For example, our recent multi-agency disaster recovery simulation highlighted the importance of interdepartmental coordination, which was later applied successfully during a real-life incident.

Junior F (Station Affairs Department): Lastly, fostering community engagement is a key success factor. Involving the community in recovery planning and operations builds trust and ensures that their needs are met. During a sandstorm recovery effort, our department collaborated with local leaders to identify priority areas for cleanup, which accelerated the process and improved community morale.

Essa: These are excellent points. Let's explore each of these factors in more depth. How do you ensure that these critical success factors are consistently applied in your departments?

Junior A (Civil Protection Department): For clear and comprehensive planning, we conduct annual reviews of our recovery plans to ensure they remain relevant and account for emerging

risks. We also involve all stakeholders in these reviews, from frontline responders to community representatives, to ensure the plans are realistic and inclusive.

Junior B (Strategy Department): To maintain robust leadership and governance, we've established a disaster recovery committee that includes representatives from all key departments. This committee meets regularly to evaluate recovery strategies and address any gaps. During incidents, the committee transitions into an operational command center, ensuring seamless decision-making.

Junior C (Preventative Safety Department): For communication, we've adopted a multi-channel approach that includes digital platforms, public announcements, and face-to-face briefings. This ensures that information reaches all stakeholders quickly and accurately. During the factory fire, this approach was critical in coordinating efforts and managing public expectations.

Junior D (Monitoring and Inspection Department): To ensure efficient resource management, we've developed a centralized inventory system that tracks available resources across all departments. This system allows us to allocate resources dynamically based on real-time needs, as we did during the floods when demand for inspection teams was highest in certain areas.

Junior E (Dubai Civil Defense Academy): For training, we emphasize continuous education through modular programs that can be easily updated as recovery strategies evolve. Our recent addition of a course on digital tools for recovery planning is an example of how we adapt our training to meet current needs.

Junior F (Station Affairs Department): Engaging the community involves regular outreach programs and collaborative workshops. By involving residents in mock drills and recovery planning sessions, we ensure they are prepared to play an active role in recovery efforts.

Essa: Let's shift to challenges. What obstacles do you encounter in implementing these critical success factors, and how do you address them?

Junior A (Civil Protection Department): One major challenge is the unpredictability of disasters, which can render even the most comprehensive plans inadequate. To address this, we've incorporated flexibility into our plans, allowing for adjustments based on real-time conditions. For instance, during a recent wildfire, we adapted our recovery plan to account for unexpected changes in wind direction.

Junior B (Strategy Department): Resistance to change is another challenge, especially when introducing new governance structures or technologies. To overcome this, we prioritize stakeholder engagement and demonstrate the value of these changes through pilot projects and case studies.

Junior C (Preventative Safety Department): Ensuring consistent communication can be difficult, especially in high-pressure situations where misinformation can spread quickly. To address this, we've trained our teams in crisis communication and established protocols for verifying information before dissemination.

Junior D (Monitoring and Inspection Department): Resource shortages are a common obstacle, particularly during large-scale disasters. We've mitigated this by establishing resource-sharing agreements with neighboring jurisdictions and private sector partners, ensuring that we can access additional resources when needed.

Junior E (Dubai Civil Defense Academy): For training, one challenge is keeping programs up to date with the latest practices and technologies. To address this, we maintain partnerships with international organizations and academic institutions, which provide us with access to the latest research and innovations.

Junior F (Station Affairs Department): Community engagement can be challenging when residents are reluctant to participate due to a lack of trust or awareness. To build trust, we've focused on transparency and demonstrated the tangible benefits of their involvement, such as faster recovery times and improved safety.

Essa: Before we wrap up, let's discuss long-term strategies. What systemic changes would you recommend to enhance these critical success factors?

Junior A (Civil Protection Department): I'd recommend investing in advanced technologies, such as AI-driven risk assessment tools, to improve the accuracy and flexibility of recovery plans.

Junior B (Strategy Department): From a governance perspective, we need to institutionalize cross-departmental collaboration through formal agreements and joint operational protocols.

Junior C (Preventative Safety Department): Enhancing public-private partnerships could provide additional resources and expertise, particularly in areas like environmental recovery and infrastructure restoration.

Junior D (Monitoring and Inspection Department): Expanding the use of digital platforms for resource management and communication would streamline operations and improve efficiency.

Junior E (Dubai Civil Defense Academy): Establishing a dedicated training institute for disaster recovery professionals could ensure that personnel across all departments receive specialized and consistent education.

Junior F (Station Affairs Department): We need to have like our plans, critical success factors and indicators of our performance to be reflective of our needs and not simply one set fits all approach. But as we are looking through these different indicators and success factors, it is confusing as to their relevance and how they are used. I really do not understand. …May be a solution, would be to have core critical success factors and key performance indicators, but then I would like to see elements like the financial measurements being adopted and used the same way throughout the Dubai Civil Defence

Essa: Thank you all for your thoughtful contributions. This discussion has provided valuable insights into the critical success factors for implementing disaster recovery plans. Let's take a short break before moving on to the next question.

Key Question 6: What do you consider are KPIs (Key Performance Indicators) in assessing a disaster recovery plan?

Essa: Welcome back, everyone. Our discussions so far have shed light on disaster recovery planning and its critical components. Now, let's focus on how we measure the effectiveness of these plans. From your perspectives, what Key Performance Indicators—or KPIs—do you consider essential for evaluating and assessing a disaster recovery plan? Let's also explore how these KPIs apply within your departments and guide us toward continuous improvement.

A valuable framework for integrating these KPIs into a broader strategic and operational perspective is the **Balanced Scorecard**. This approach provides a structured way to assess disaster recovery by incorporating four key dimensions: **financial, customer, internal processes, and learning & growth**. By aligning disaster recovery KPIs with the Balanced Scorecard, organizations can ensure a holistic evaluation—measuring not just financial

implications, but also the efficiency of internal processes, stakeholder engagement, and long-term learning opportunities.

Moreover, the Balanced Scorecard allows for better **stakeholder measurement**, enabling leadership to track performance at both the **operational and strategic levels**. It also encourages a culture of continuous improvement by highlighting **critical success factors (CSFs)** and linking them to measurable outcomes. As we explore disaster recovery effectiveness, let's consider how the Balanced Scorecard can enhance our ability to monitor and refine our response strategies across departments.

What are your thoughts on using this framework to strengthen our disaster recovery evaluation process? Can it provide meaningful insights for your teams?

Junior A (Civil Protection Department): One of the primary KPIs for us in Civil Protection is Response Time. It's critical to measure how quickly our teams can respond once a disaster is identified. During the warehouse fire last year, we monitored how long it took for teams to mobilize and arrive at the site. Any delays could have serious consequences for public safety and the effectiveness of the recovery phase.

Junior B (Strategy Department): I completely agree, Junior A. From a strategic perspective, another important KPI is Recovery Time Objective (RTO). This measures how quickly we can restore critical functions and operations after a disaster. For example, during a recent flooding incident, our goal was to restore water supply to affected areas within 48 hours. Tracking our performance against this target allowed us to identify bottlenecks and refine our processes.

Junior C (Preventative Safety Department): Adding to that, I'd say Resource Utilization is a crucial KPI. This involves assessing whether we're using our resources—such as personnel, equipment, and funding—effectively and efficiently. During a factory fire recovery, we noticed that some teams were overburdened while others were underutilized, which highlighted the need for better resource allocation strategies.

Junior D (Monitoring and Inspection Department): For us, Inspection Completion Rate is a key metric. It tracks the percentage of buildings, bridges, and other infrastructure that have been inspected and cleared within a set timeframe. After the recent sandstorm, we aimed to complete 80% of inspections within 72 hours. Monitoring this KPI helped us stay on track and ensure timely recovery efforts.

Junior F: This Balanced Scorecard does seem to provide a framework of sorts to consolidate all the Dubai Civil Defence disaster recovery plans. It is interesting that this framework does seem to link operational and strategic activities and does cover most of the DCD DR activities

Junior E (Dubai Civil Defense Academy): … as model, yes, I think the Balanced Scorecard does provide an overarching framework. I can see how we here at DCD can use the four dimensions, as you call them, but some might be more relevant than others. I do like the financial aspect and can see the connection to the CSFs and KPIs being used to each if not all those four squares.

Junior C: There are two parts, I really liked, the internal processes and stakeholders or shareholders. The internal processes have a direct close connection to us, as we are focused on the internal processes in our recovery plan. As to shareholders, Dubai is ultimately our shareholder, so again I can see the connection.

Junior F (Station Affairs Department): I believe Community Satisfaction is another critical KPI. This measures how well the recovery efforts meet the needs and expectations of affected communities. During a sandstorm recovery operation, we conducted surveys to gather feedback from residents, which provided valuable insights into areas where we could improve.

Junior A: The financial aspect of the model makes sure that all departments and plans have considered the financial and budgetary implications of their various disaster recovery strategies. Then if we provide more generic financial critical success factors and key performance indicators, this will ensure that we are providing value for money for Dubai.

Junior D: The fact that the Balanced Scorecard has the mission of the entire organization as the main focus, as often we plan based on our departmental needs and may neglect the overall mission or purpose of disaster recovery for Dubai

Essa: These are excellent suggestions. Let's discuss how you ensure these KPIs are tracked and used effectively in your departments.

Junior A (Civil Protection Department): In our department, we use a centralized dashboard to monitor KPIs like Response Time. This dashboard provides real-time updates, allowing us to address delays immediately. For instance, during the warehouse fire, we noticed that one team took longer than expected to mobilize due to equipment issues. By identifying the problem early, we were able to rectify it and improve our response.

Junior B (Strategy Department): For RTO, we conduct regular reviews to compare our actual recovery times against our targets. This involves detailed debriefings after each incident to identify what worked and what didn't. For example, after the flooding incident, we found that delays in resource deployment were due to communication gaps, which we've since addressed by implementing a more robust communication plan.

Junior C (Preventative Safety Department): Resource Utilization is tracked through detailed logs that record how resources are allocated and used during recovery efforts. After the factory fire, we reviewed these logs to identify inefficiencies, such as underutilized equipment, and adjusted our resource planning accordingly.

Junior D (Monitoring and Inspection Department): For Inspection Completion Rate, we use GIS mapping to track progress. This allows us to see which areas have been inspected and which are still pending. During the sandstorm recovery, this tool helped us prioritize high-risk areas, ensuring that we met our inspection targets.

Junior E (Dubai Civil Defense Academy): To measure Training Effectiveness, we use pre- and post-training evaluations, as well as real-world performance assessments. For example, we recently conducted a drill on chemical spill recovery and compared participant performance during the drill to their actual response during a similar incident.

Junior F (Station Affairs Department): Community Satisfaction is gauged through surveys and community meetings. We also track the number of complaints received and resolved during recovery efforts. After the sandstorm, we noticed a significant drop in complaints compared to previous incidents, which indicated improved community engagement.

Essa: These tracking methods are insightful. What challenges do you face in monitoring these KPIs, and how do you address them?

Junior A (Civil Protection Department): One challenge is the lack of standardized tools for tracking KPIs. Different teams often use different methods, which can lead to inconsistencies. To address this, we're working on adopting a unified system that all teams can use.

Junior B (Strategy Department): Another challenge is resistance to change. Some team members are hesitant to adopt new KPI tracking tools or processes. To overcome this, we've focused on training and demonstrating the benefits of these tools, such as better decision-making and more efficient recovery efforts.

Junior C (Preventative Safety Department): Data accuracy can also be an issue, especially when information is collected manually during high-pressure situations. We've started using digital tools to automate data collection, which has significantly improved the accuracy and reliability of our KPI tracking.

Junior D (Monitoring and Inspection Department): For us, the challenge is ensuring timely data collection, especially in remote or inaccessible areas. To address this, we've deployed

drones and mobile teams equipped with data-gathering tools, which have helped us maintain our inspection timelines.

Junior E (Dubai Civil Defense Academy): Measuring Training Effectiveness can be subjective, especially when it comes to behavioral changes. To address this, we've incorporated objective metrics, such as response times and error rates, into our evaluations.

Junior F (Station Affairs Department): Engaging the community to provide feedback can be challenging, as some residents are reluctant to participate. We've addressed this by simplifying our surveys and working with community leaders to encourage participation.

Essa: Let's conclude with recommendations. What systemic changes would you suggest to enhance KPI tracking and ensure they contribute to the continuous improvement of our disaster recovery plans?

Junior A (Civil Protection Department): I'd recommend investing in advanced analytics tools that can provide real-time insights and predictive analysis for KPIs like Response Time.

Junior B (Strategy Department): From a strategic perspective, integrating KPI tracking into our broader performance management systems would ensure that these metrics are consistently monitored and acted upon.

Junior C (Preventative Safety Department): Establishing a centralized KPI tracking system that all departments can access would improve consistency and collaboration.

Junior D (Monitoring and Inspection Department): We are back to the discussion about key performance indicators and success factors, and the debate about greater organizational involvement. There are clear benefits, but we also need to ensure that we ultimately provide a robust disaster recovery solution for Dubai and not a departmental operational remedy which excludes the strategic aspect, or only having a strategic focus and making the plan not operationally viable.

Junior F: We definitely need to move away from solo DR planning process and only for the plans to be developed and instigated by the leadership team. However, I would like to add that involving the entire organization may not be totally feasible as we have over 15,000 employees, but I understand the reason and motivation

Junior E (Dubai Civil Defense Academy): Standardizing training evaluation methods across all departments would ensure that Training Effectiveness is measured consistently.

Junior F (Station Affairs Department): Incorporating community feedback into our KPI tracking process would provide a more holistic view of our recovery efforts and identify areas for improvement.

Essa: Thank you all for your thoughtful contributions. This discussion has provided valuable insights into the KPIs that drive effective disaster recovery planning. Let's take a short break before moving on to the concluding question.

Concluding Question: What improvements can be made to disaster recovery planning?

Essa: As we approach the conclusion of our discussion, let's focus on improvement opportunities. Based on our earlier conversations and your experiences, what specific improvements or initiatives would you recommend to strengthen disaster recovery planning at Dubai Civil Defense?

Junior A (Civil Protection Department): One key improvement I'd suggest is enhancing risk assessment methodologies. Currently, our assessments are comprehensive, but there's room to integrate more advanced tools like predictive analytics. These tools could help us anticipate low-probability, high-impact events. For example, during the recent floods, having a more dynamic risk model might have allowed us to identify vulnerable areas earlier.

Junior B (Strategy Department): I agree with Junior A. Another area for improvement is streamlining the resource allocation process. We've faced situations where resources were either delayed or insufficiently distributed, creating bottlenecks during recovery. Establishing a centralized resource management platform could help ensure that resources are allocated efficiently and transparently.

Junior C (Preventative Safety Department): From a safety perspective, I believe we need to expedite the implementation of mitigation measures. After a risk is identified, the time it takes to address it can be lengthy. For example, following a fire inspection, delayed action on structural reinforcements can increase vulnerabilities during disasters.

Junior D (Monitoring and Inspection Department): Communication is another area that needs improvement. While internal communication is robust, external communication with stakeholders and community members can sometimes lead to misunderstandings. Creating

standardized multilingual communication templates could help bridge this gap, especially during emergencies.

Junior E (Dubai Civil Defense Academy): I think we also need to focus on the continuity and evaluation of training programs. While our drills and simulations are effective, there's a lack of follow-up to ensure that training outcomes are being applied in real scenarios. Regular evaluations could help us measure the effectiveness of these programs and make necessary adjustments.

Junior F (Station Affairs Department): From an operational standpoint, improving coordination between departments is crucial. While our teams work well together during planned drills, real-life scenarios sometimes expose gaps in collaboration. Introducing more frequent interdepartmental exercises could help us identify and address these gaps proactively.

Essa: Excellent points. Let's delve deeper into community engagement. How can we enhance the role of the community in disaster recovery planning?

Junior A (Civil Protection Department): Community engagement is critical, but it needs to be more consistent. Regular town hall meetings and workshops can ensure that residents are better informed and involved in the recovery process. These events could also serve as platforms for gathering feedback and building trust.

Junior B (Strategy Department): Adding to that, I think we need to leverage technology for community outreach. Mobile apps and social media platforms can provide real-time updates, resources, and instructions during disasters. For instance, a dedicated app could guide residents on safe evacuation routes and available shelters.

Junior C (Preventative Safety Department): Community education is another area for improvement. Offering workshops on disaster preparedness and recovery techniques, such as basic first aid or home safety inspections, could empower residents to contribute more actively during recovery efforts.

Junior D (Monitoring and Inspection Department): We should also involve community leaders in our planning process. They often have a deeper understanding of local needs and concerns, which can help us develop more targeted and effective recovery strategies.

Junior E (Dubai Civil Defense Academy): Incorporating community feedback into training programs is essential. For example, inviting residents to participate in drills could provide valuable insights into how they perceive recovery operations and highlight areas for improvement.

Junior F (Station Affairs Department): I'd also recommend creating a community liaison role within each department. This person could act as a bridge between the civil defense and the community, ensuring that communication and coordination are seamless.

Essa: Let's shift focus to innovation. What role do you think emerging technologies could play in improving disaster recovery planning?

Junior A (Civil Protection Department): Emerging technologies like AI and machine learning could revolutionize risk assessment and resource allocation. For example, AI could analyze real-time data during a disaster to predict resource needs and optimize deployment.

Junior B (Strategy Department): I'd also suggest exploring blockchain technology for financial transparency and efficiency. During disasters, blockchain could help track resource distribution and ensure accountability.

Junior C (Preventative Safety Department): Drones and IoT devices can significantly enhance our monitoring capabilities. For instance, drones can provide real-time imagery of affected areas, while IoT sensors can track environmental conditions and infrastructure stability.

Junior D (Monitoring and Inspection Department): Virtual reality (VR) and augmented reality (AR) could improve our training programs. These tools can simulate realistic disaster scenarios, providing a more immersive and effective learning experience for personnel.

Junior E (Dubai Civil Defense Academy): Cloud-based platforms are another area to explore. They can enhance data sharing and collaboration across departments, especially during large-scale recovery operations.

Junior F (Station Affairs Department): Finally, integrating mobile technologies into our operations can improve communication and coordination. Mobile apps for internal use could allow teams to report progress, request resources, and share updates in real-time.

Essa: As a final question, how can we ensure continuous improvement in disaster recovery planning?

Junior A (Civil Protection Department): Continuous improvement starts with regular reviews of our recovery plans. After each disaster or drill, conducting detailed after-action reviews can help us identify what worked and what didn't, ensuring that lessons learned are applied to future plans.

Junior B (Strategy Department): I'd recommend establishing a dedicated team for monitoring and evaluation. This team could oversee KPI tracking, conduct audits, and ensure that our plans evolve in line with emerging trends and challenges.

Junior C (Preventative Safety Department): Collaboration with international organizations and experts can also drive improvement. Learning from best practices and incorporating global standards can strengthen our recovery efforts.

Junior D (Monitoring and Inspection Department): Investing in training and professional development is key. Ensuring that personnel are equipped with the latest skills and knowledge will enhance our overall resilience.

Junior E (Dubai Civil Defense Academy): Creating a culture of innovation and adaptability within the organization is essential. Encouraging teams to propose new ideas and experiment with different approaches can lead to significant advancements.

Junior F (Station Affairs Department): Finally, fostering strong relationships with external partners and stakeholders can provide additional resources and support, making our recovery efforts more robust and effective.

Essa: Thank you all for your thoughtful contributions. This discussion has provided invaluable insights into how we can strengthen our disaster recovery planning. Your expertise and dedication are truly commendable. Together, we can build a more resilient and prepared organization.