Risk Management Strategies for dealing with Unpredictable Risk in Saudi Arabian Organisations

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To my family

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ABSTRACT

From time to time, large numbers of organisations of all types and sizes throughout the world suffer from large destruction, either as a direct or an indirect consequence of events triggered by Unpredictable Risk (UR); hence, potentially impacting upon the existence of the organisations affected. UR is a risk that occurs at a considerably low-frequency, is sudden, and carries high-impact, due to its low frequency is often considered as the "unknown unknowns". The aim of this study is to develop a set of guidelines to enable Saudi Arabian Organisations to improve upon their robustness and resilience in the event of URs. To achieve this aim, this study reviewed and examined relevant literature on UR, its philosophies and practice in order to determine the level of understanding of concepts and characteristics of UR. Another objective integral to achieving the research aim is the critical examination of significance and effectiveness of risk management strategies in enhancing robustness and resilience of organisations in managing UR in Saudi Arabia.

Impacts of UR identified in existing literature and engagement with experts in Saudi revealed that UR can be severe, extreme and of low frequency, and negatively impact organisations and the society where they occur. Secondary data collected through existing literature on UR, crisis and risk management, indicated that capacity to deal with URs require a combined strategy. The primary data sources which included semi-structured interview with thirteen experts and directors in Saudi Arabia and two focus group sessions with middle level, experienced practitioners in public and private sectors in Saudi, confirmed that there is low knowledge level on the significance and effectiveness of resilience, robustness and risk management strategies in mitigating the impacts of URs in organisations in Saudi Arabia.

The research findings led to the development of set of guidelines that can inform practice and management of URs in Saudi Arabian organisations. The result also informed recommendations for future research in this subject area; thereby encouraging further investigation into main findings of this research. Thus, this research contributes to both academic and practice field of UR, crisis and risk management, especially by emphasising the need to improve organisational capacity, resilience and robustness for dealing with future UR events.

CHAPTER 1: RESEARCH INTRODUCTION

1.1 INTRODUCTION

This chapter aims to introduce the research area. It provides the background to the study, examines the research problem, and justifies the rationale for examining the effects of 'Unpredictable Risk' (UR) in Saudi Arabia. Subsequent sections further outline the aim and objectives, scope of the study, research contribution, methodology as well as the thesis structure. Thus, this chapter highlights the fundamental factors relevant to the study, and provides context for the entire research.

1.2 BACKGROUND TO THE RESEARCH

Events and economic activities across the world may be unpredictable, often resulting in element of surprises that hamper missions of organisations (Gershenson, 2007). While the occurrence of events may not be predictable, organisations and management often strive to mitigate the risks and impacts of events that may cause major interruptions to operations (Renn, 2009). From time to time, the impacts, either as a direct or an indirect consequence of events triggered by Unpredictable Risk (UR), cause more disruption than organisations plan for since UR occur in different scales (Castellano, 2010). UR as mentioned here refers to a risk that occurs at a considerably low-frequency, is sudden, and carries high-impact, which often results in organisational failure due to its "unknown" characteristics (Taleb, 2007). A combination of these characteristics position URs as risks which are, "unknown unknowns" as further explained in this research. Effects and concept of UR is not recent, according to authors like Taleb (2007) and Paté- Cornell and Cox (2014), the increase of the occurrence and effects of UR has been accelerating since the times of the industrial revolution, as the world has transitioned and grown into a complicated and interconnected environment.

Although this awareness exists, one of the main problems in managing URs is that it is hard to achieve efficiency (Taleb, 2007; Gershenson, 2007; Zurich, 2008; Green, 2011; Gandz & Seijts, 2013; Drennan, et al., 2014). The world, as Gershenson (2007) expressed, changes and becomes increasingly more challenging, and tightly interrelated year by year. In the meantime, most organisations are operating and interchanging both within and with their environment. Hence,

organisations around the world often face URs and uncertainties on a continuous basis as if a UR happened in one part of the world, it is likely to have a further effect in another part of the world, a phenomenon often referred to as the 'butterfly effect'. To put this in a metaphorical sense, the world could be described as a system, which gets broken down into smaller accordingly, varied ecosystems, of which, each carries their own risks and threats that present a vulnerability to URs in organisations.

As a result of this background, this thesis focuses on examining suitable risk management strategies for managing UR in organisations based in Saudi Arabia. This examination is necessary because despite the number of URs that have occurred in the last 30 years and the wide publicity they have received, organisations are still vulnerable to the occurrence of URs and somewhat appears incapable of dealing with this type of risk (Green, 2011). In general, organisations are confronting more obstacles in order to cope with URs, despite persistent requests from specialists to implement precautionary measures against URs (Ivantsov, 2014). The organisations in Saudi Arabia are not excluded from most global organisations that have been ill-prepared to deal with UR. Based on the experience of the author working in Saudi Arabia for over 23 years in a number of organisations that deal with risk and protection management services, only a limited number of organisations currently integrate risk management that incorporates the dynamics of URs into their systems. The majority of organisations have continued to adopt conventional and insufficient risk management models, and remain ill-prepared for imminent UR (Al-Garni, 2010). Therefore, it can be deduced that URs can occur to organisations through multiple factors and failures, which this research has identified and aims to examine in relation to potential risk management strategies that can be adopted to mitigate its impact.

1.3 RESEARCH PROBLEM

High-frequency risks are 'known' risks to most organisations, in that due to the common occurrence of them, their timing and context can often be foreseen. On the other hand, low-frequency risks are 'known unknowns', in that although the occurrence of an event may be predictable, the timing cannot be predicted (Carver, 2015). However, URs are 'unknown unknowns', in that they are considerably low-probability, difficult to predict, and carry a high-impact (Taleb, 2007). URs are often hard to identify because they involve many forces

interacting in unknown or unpredictable ways (Lamm et al., 2010). According to Taleb (2007) and Green (2011), 'unknown unknowns' or URs are a perilous category of risk, because they are both unthinkable and unpredictable, and when they do occur, the time for action is very short.

The so-called UR carries an enormous devastation, which interrupts the ability of organisations to absorb, and predominantly manage the presented risk. Bouvard and Lee (2015) state that the public and academic discourse on risk management deficiencies has focused on two problems: the "risk shifting" problem that leverage, (implicit) bailout guarantees, or other channels of externalizing losses induce excessive risk taking, and the "black swan" problem that firms make a mistake in putting too much trust in risk measures that do not adequately account for tail risks or in being insufficiently buffered against them. According to Taleb (2011), the term 'Black Swan' indicates, the impossibility of calculating the risks of consequential rare events and predicting their occurrence. This infers that UR can be detected and its impact mitigated.

Despite the previous assertions, organisations are interacting with the typical stereotype of risk, in which risks are taken as 'known' to the organisation, whilst excluding 'unknown unknowns' in their plans and concerns. Furthermore, experts in risk management often exclude the possibility of exceptional and UR events from their measurements (Taleb, 2007), and in the meantime, they deal with such risks in a considerably optimistic situation (Taleb, 2001). Therefore, Lauder (2011) explores whether individuals perceive issues of jeopardy differently from the way benefits are perceived. Consequently, UR events of recent years have exposed areas of weakness in risk management performance in organisations across the globe (Zurich, 2008).

URs are thus considered to be the most complex category of risk, challenging the practice of risk management with finding a suitable solution or contingency plan for dealing with risks of this kind. This notion is further emphasised by Nell and Richter (2005), who stated that dramatic events in the recent past have drawn attention to catastrophe risk management problems. Most organisations have faced prolonged periods of suffering as a result of either direct or indirect risks, such as the unprecedented attacks in the United States on September 11th, 2001, and the global credit crisis of 2008. The prolonged periods of suffering can be attributed to the inability of a lot of organisations to predict these types of risks and its impacts. In addition, organisations

often lack a standard risk management framework across their systems that are able to cope with UR (Hopkin, 2010).

According to Sia (2015), extreme events have caused large, unexpected losses in organisations in recent years. Hence, establishing robust risk mitigation techniques to manage losses during extreme events has become increasingly critical to organisations (Sia, 2015). However, risk management predominantly does not have the capacity to identify elements of UR on a regular basis, and the response process makes these events worse because the transition from routine operations to crisis response can be challenging. It should be noted that risk management often deals with risks by the silo mentality (Drennan et al., 2014). Guelke (2005) explained the silo mentality as a metaphor for organisational parochialism, which is the antonym for the system approach, which sees circumstances or conditions in their entirety rather than from a narrow-minded perspective (Chisita and Abdullahi, 2012). Edward and Bowen (2005), states that a systematic approach to risk management develops the ability of organisations to manage risk at all stages. he emergence of three constraining themes

In general, there is a claim that risk management in the last decades caused and increased the exposure of organisations to URs (Hopkin, 2010; Nota, 2010; Paté-Cornell and Cox, 2014), and made the organisations increasingly fragile (Bernstein, 1996; Taleb, 2012). This claim depends mostly on the latest crises that revealed a number of weaknesses in risk management practices (Zurich, 2008). Gandz and Seijts, (2013) similarly asserted that most organisations seemed to be ill-equipped in coping with the onset process of the risk. Zurich (2008) states that an example of this can be seen in the global credit crisis of 2008, in which the 'seeds' were spread and nurtured gradually during the sustained low real interest rate environment in the US, following the end of the dotcom boom in October 2002.

Hence, risk management should meet vital needs and build strong strategies in order to protect organisations from UR events, or at least minimize their impacts. As aforementioned, risk management strategies seem to be losing their credibility, reliability, and integrity worldwide. As a result, risk management practices in organisations are undoubtedly faced with a plethora of challenges concerned with efficiently dealing with URs and their consequences. This can be attributed to the fact that the majority of organisations are primarily focused on their core services, in order to achieve their objectives effectively (Stevenson, 2013). In the meantime,

much of the issues that arises surrounding risks and crisis management can be squeezed off organisational agendas (Drennan et al., 2014).

Therefore, organizations often neglect or underestimate the warnings of risk and crisis managers. Furthermore, according to Kaplan and Mikes (2012) risk management is too often treated as a compliance matter that can be resolved by setting legislation and enforcing people to follow it. However, the said legislation will not abolish the likelihood or the effect of URs, such as the Deepwater Horizon oil spill in the Gulf of Mexico, because URs are unavoidable (Treasury, 2004; Taleb, 2007). Based upon the highlighted research so far, it can be deduced that organisations should improve their risk management models and strategies in order to be precautionary, robust, and resilient in bearing extreme stress within the system in organisation, consequently avoiding failure.

According to Drennan et al. (2014) crises in current dispensation have been noticed to develop in unseen ways, escalating rapidly and transforming through the interdependencies of modern society. Of more significance to this research context is the fact that crises tend to be growing in frequency, however, risk management is yet to be robust and effective enough to universally prevent their occurrence or sufficiently mitigate their impacts (Drennan et al. 2014). According to Frigo and Anderson (2011), risk management must be robustly firm within an organisation in order to function competently. Burnard and Bhamra (2011), state that risk management is an integral component of a successful organisations strategy and operation. The task of absorbing the shock of unpredictable risks in an appropriate timeframe is particularly difficult, and places a strain upon the capacity of a system. When a system is shocked by an UR, the system attempts to absorb the shock via the robustness of systems and move towards order, otherwise the system will slip into chaos (Comfort, 1999).

Furthermore, once the UR pushes through the robustness stage and passes a certain point, it creates a state of chaos. Therefore, Hüser (2006) states that despite the robustness of some organisational systems, they become fragile when UR events occur. Similarly, Taleb (2007) believes that URs threaten the equilibrium of systems or organisations, because these events do not form part of the regular distribution. Nevertheless, organisations need to build and implement a strong robust system in order to absorb and contain the impacts of an UR event in the case of risk assessment failure; for example, nobody predicted the surprise attacks on the World Trade

Centre and the Pentagon in the United States on September 11, 2001 (FID, 2005). Furthermore, according to Zurich (2008) many of the organisations affected by the financial crisis of 2008 utilised risk models that provided the contentment prior to the onset of the crisis that it is not possible for such a crisis to occur. Therefore, it should be emphasized that URs can destroy an organisation's survival if they are not considered or if they are disregarded (Merle, 2011).

In light of this information, it should be noted that when things do go wrong, resilience is the last layer of defence. The 'chaos theory' depicts a systems ability to transform itself, thereafter adopting a self-organising dynamic to reorder its structure so as to better handle the changes it goes through (Bechtold, 1997). However, organisations continue to ignore the changing nature of risks and the inadequacy of existing responses (Ivantsov, 2014). Moreover, attaining the right balance and integrative process between organisational robustness and resilience, in order to improve risk management strategies to be able to deal with UR events, is a complicated procedure.

Saudi Arabia as a country part of the world is yet to establish a solid and efficient risk management strategy. Therefore, this research attempts to identify essential component of effective risk management strategies in organisations across the world and to evaluate its application and success in coping with UR and mitigating its impact in organisations in Saudi Arabia. Hence, this research has adopted and provided a synthesis of the risk management strategies based on the robustness and resilience of a system, and their relationship to organisational systems based on capacity to minimise the impacts of URs, in order to proffer layers of defence for strengthening organisations. These layers of risk management strategies, robustness and resilience, should be compact and prevent errors throughout the management of URs. In other words, risk management attempts to better prepare systems for the occurrence of URs. Subsequently the outcome of this research identifies the gaps and eliminates them, as well as contributes to the existing body of knowledge.

1.4 RATIONALE FOR THE RESEARCH

The contemporary world is becoming more worrying, troubling, and disturbing than ever before. For over 50 years, the theory of Hermann (1963), that the number of possible catastrophic and URs in the years ahead will be virtually infinite, has proven to be true. Nathan (2004) added that world catastrophes are omnipresent and proliferating. In 2011, Lerbinger stated in his book 'The

Crisis Manager: Facing Disasters, Conflicts, and Failures' that "as [sic] the second decade of the 21st century', crises have become more numerous and more widespread and hazardous. Furthermore, Drennan et al. (2014) indicate that risks are ever changing and ever growing.

1.4.1 Need for Organisational Resilience

Since organisations are increasingly linked and interconnected as a result of the commonplace globalisation of the 21st century, they become more exposed to changes and threats, meaning a simple crisis can easily turn into a major event (Davies and Walters, 1998). In the connected world, risk in one place can affect others, and if a harmed unit in the system is not properly managed, then the risk could easily spread from the harmed unit to the entire organisation (Laloux, 2014). The assumption can therefore be made that managing the risks of complex systems is a hard and complicated task (Gershenson, 2007). This is further exuberated by the fact that even if an organisation possesses strong layers of defence, chaotic changes and challenges can occur anytime and anywhere in the system, with no prior indication (Farazmand, 2004). Furthermore, minor exogenous disturbances in chaotic systems can generate unexpectedly large changes (Hüser, 2006). According to Nota (2010), many challenges exist in the risk management field especially in relation to complexity and change. This problem emphasises the importance of this research and the need for organisational resilience in developing the capacity to cope with URs.

As Nota (2010) further explains, things change all the time and risk management requires new concepts and ideas in the scenario of complex systems. It can therefore be deduced that, there is no established or conclusive way to prevent all URs from happening (Treasury, 2004; Taleb, 2007). However, according to Berman (2015), the ability to prepare for, respond to and mitigate the impact of negative and unforeseen events as well as UR has become a necessity for businesses and organisations across the world. Taleb (2007) linked the causes of the said risks to the changeable and unpredictable environment of the present day. This notion is similar to the earlier assertions of Farazmand (2004) who conveyed that as the organisational environment becomes more complex, more pressuring, and more dynamic, the probability of changes and unexpected failure increases with a high intensity, which in the end increases the ambiguity around the stability of organisations. Accordingly, risks of this type are likely to continue to

confound organisations that face the difficulty of implementing an effective risk mitigation strategy (Zurich, 2008; Green, 2011) hence the need for organisational resilience.

1.4.2 Need for more effective and formidable Risk Management Strategies

URs are complex and very challenging for organisations (Tarrant, 2010), and are considered as the toughest type of risk to manage or cope with (Taleb, 2007; Ivantsov, 2014). Enormous failures occur, even in organisations with a highly reliable reputation, undoubtedly demonstrates that contemporary risk management has failed to deliver sufficient responses to the impacts of URs (Ivantsov, 2014). Häggberg (2015) stated that risk management focuses on finding the small 'incidents' and errors before they evolve and become a greater threat. In turn the opposite pole of this scale is what is classified as 'disasters' and is in general given much less attention. This signifies that a lot of organisations are still focusing on smaller events, or events that have already occurred, without thinking about the opposite pole of the scale, and hence, totally ignoring the UR event or the possibility of such. However, Ivantsov (2014) stated that recent events that came as a result of the 2008 financial crisis, such as the organisational collapse the Lehman Brothers, as well as events that came as a result of organisational scandals, such as the Bankruptcy of the Enron Corporation in 2001, presented lessons for organisations and highlighted the need of developing solutions to address URs. Organisations should also attempt to identify the URs in advance, in order to mitigate the effects generated as a result of such risks occurring (Zurich, 2008). Furthermore, risk management needs an indispensable rethinking of URs, for the rebuilding of the protection requirements of an organisation, thus justifying the need for this research.

1.4.3 Lack of awareness and risk management culture in Saudi Arabia

In general, organisations and institutions of Saudi Arabia possess complex systems, which are considered to be weak in their composition (Levins, 2013). As UR events easily destroy the weakest systems in organisations and institutions, it can be deduced that the relative stability in Saudi Arabia is grounded in its capacity to withstand shocks (Bremmer, 2005). In the present day, it can be observed that there are certain areas of the world, considerably developing countries, where organisations are often dominated by the extreme, the unknown, and ultimately unknown risk. This emphasises the importance of question raised by Hutter and Power (2005);

"what should we do about this?" In answer to such a question, it can perhaps be suggested that the awareness and culture of risk management needs to rise dramatically. The importance of a risk management culture within the organisation, sector or country has grown in importance in the risk management literature. Expressed simply, a risk management culture is "*the system of values, beliefs, knowledge, attitudes and understanding about risk shared by a group of people who have a common purpose*" (Institute of Risk Management, 2012). This definition has been further developed by Cooper et al. (2011) who see risk culture, as having centralised and integrated approach to risk assessment, but assessment that enables organisations to identify and monitor inherent and residual risks in terms of both imparts and likelihood in the way that is consistent across their enterprise. While a risk management framework was recommended in their paper, they encouraged a decision-making process that is based on a 360-degree view of risk at all levels, and risks that may have occurred in the past, that is occurring present and may occur in the future.

According to Franken et al. (2014), organisations around the world realize that not each risk can be predicted and mitigated and Saudi Arabian organisations are not exceptional. So, the current challenges of complexity in organisations and institutes in Saudi Arabia, seem to have increased the demand for organisational resilience and robustness (Oluwasoye and Ugonna, 2015). Saudi Arabian organisations work to be prime candidates for adopting strategies of risk management concerned with robustness and resilience, because they are often presented with complex and diverse risks. Boin et al. (2010) indicated that there is a need for robust and resilient strategies to deal with uncertain and unforeseen crises, in order to balance the shortcomings of existing policies with the reality of an increasing exposure to URs.

Additionally, it should also be considered that Saudi Arabia is situated in a volatile area of the world (Al-Mulhim, 2012), and is a pressure-prone country. At present, the country is facing a critical historical moment and becoming seemingly more fragile, as the nation is currently presented with a number of considerable challenges and security threats (Al-Rasheed, 2013). These challenges not only threaten the stability of Saudi Arabia, but also the prosperity interests. Therefore, it is a worrying fact for the nation that tangible risks will be 'real' in the near future (Alshehri et al., 2014). Hence, it is predicted by Murphy (2012), that a risk-induced shock is coming to the country, but the crucible of that transformation remains largely unpredictable. For

that reason, greater efficiency and increased risk management resolutions within Saudi Arabian organisations is needed, in order to compel a re-examination of the problems associated with UR.

The reality is that Saudi Arabia and its organisations are on the frontline when it comes to URs, as such organisational failures to address URs can have a ripple effect on other stakeholders. Therefore, sensitizing organisations in Saudi Arabia to the increased frequency of so-called URs is a vital phase. In addition, encouraging decision-makers to think strategically about these events is a necessity in order to build a strong protection against them. To continue, organisations further need to be robust in facing UR events. Hence, for absorbing the UR events, organisations should also ensure that robust risk management structures are in place (Zurich, 2008). The growth of various URs from events around the world should promote organisations across the globe to develop solid risk management processes (Fadun, 2013). Accordingly, organisations should be prepared for systemic shocks and catastrophic events (Zurich, 2008). Such a notion can be linked to the teachings of Drucker (1980), who stated that managing effectively is the only reason for the existence of managers and management. However, Taleb (2007) stated that when it comes to URs, being robust is undoubtedly not good enough, since Light (2005) argued that organisations are far from the perfect state of operations needed to achieve robustness.

It can be stated that Saudi Arabia is a globally important country; it is the birthplace of Islam (CIA, 2010), and the pilgrimages to the holy sites of Mecca and Medina in Saudi Arabia attract millions of Muslim pilgrims every year, with visitors from every country in the world (De Bel-Air, 2014). It can therefore be deduced that Saudi Arabia has an ideological and political influence over 1.6 billion Muslims, which is 23% of the world's population (CIA, 2010). It can therefore be suggested that such a status is likely to exaggerate the knock-on effects felt by the occurrence of an UR related event in the country, considering the influence that the country exerts on a large sector of the human population. It is also notable that Saudi Arabia is the largest oil producer in the world, and boasts the world's second largest proven oil reserves, as well as being the biggest economy in the Arab world (De Bel-Air, 2014). Moreover, Saudi Arabia is the twentieth biggest economy by GDP in the world, and ranked seventeenth in the World Economic Forum (WEF) Global Competitiveness Index (AESS, 2011).

Despite this, Saudi Arabia is almost wholly dependent on oil exports, and it can be suggested that diversification is needed in order to secure the economic future of the country. This is can be partially attributed to the risk of the 'peak oil' theory occurring, in that a point of time will be reached where the extraction of oil will peak at maximum rate, before subsequently entering into a terminal decline (Newman, Beatley & Boyer, 2009). Although such a risk cannot be classed as an UR, it is a relevant and ever present 'known unknown' risk, which necessitates large-scale efforts of mitigation to avoid the detrimental effects that such an event would have on the world economy, and which itself may trigger URs (Söderbergh, Robelius & Aleklett, 2007).

According to Rogmans (2013), Saudi Arabia is the largest market for many investors, and it is also a major hub for population movements (De Bel-Air, 2014). As a result, Saudi Arabia is among the top five migrant destination countries worldwide, and a prime destination and source of remittances from workers for many countries in the world (De Bel-Air, 2014). In 2013 the World Bank ranked Saudi Arabia as the second top remittance-sending country. The number of non-Saudis living in Saudi Arabia in mid-2013 was recorded at 9,723,214 persons, which is 32.4% of the total Saudi Arabian resident population of 29,994,272 (De Bel-Air, 2014).

The failure of the crucial payment systems enforced to send remittance payments, for example, the unprecedented outage of crucial payment systems at the Bank of England in 2014, can have a negative 'cascading' effect, delaying payments planned for a later date (Treanor, Osborne & Wearden, 2014). Given the large amount of remittance-sending in Saudi Arabia, it can be assumed that were such an event to occur there, the impacts would be great, and could potentially lead to civil unrest grown from frustration with the delay of bank transfers, or a 'run' on the banks due to uneasiness with the unobtainability of transactions (Chakravarty, Fonseca & Kaplan, 2012).

1.4.4 Prevention of economic crisis in Saudi Arabia

As a globally important economy, any disruption to Saudi Arabia's oil production, or system failure as a result of an UR event may result in massive global economic and strategic crisis (Cohen et al., 2012). Moreover, instability in Saudi Arabia can quickly produce shocks all over the world, as Bremmer (2005) indicated that the world is currently more interconnected than ever before. According to Naseba (2013), the rapid growth in Saudi Arabia results in challenges for

the public and private sectors since they face increasing demand for greater efficiencies and the need for sustained and improved productivity. Nevertheless, Magrabi (2011) stated that the phenomenon of disaster risk management in Saudi Arabia is a new subject, with very few in-situ studies, and the situation requires a detailed framework for disaster management in order to manage disaster-related risks in an efficient manner.

The research findings by Magrabi showed the priority issues which need attention in Saudi Arabia, where the most important related to participation and coordination amongst the relevant stakeholders; coordination/cooperation, education, professionalism, prevention, permanent reconstruction, the systemisation of information, and social vulnerability studies (ibid). Although the costs of disasters are huge in terms of the loss of materials, and often lives, it can be considered that the costs associated with prevention and protection are far less (Comfort, 1999; USAID, 2005; Pasteur, 2011). The United Nations Office for Disaster Risk Reduction (2015) indicate that reducing disaster risk is a cost-effective investment in preventing future losses. Similarly, but by a different expression, Comfort (1999) stated that the cost of the response after a disaster has occurred is often many times higher than the cost of taking mitigation action prior to the event. Thus, UR is a huge problem and needs enormous attention, mitigation and consideration.

According to Treasury (2004) since the publication of the 2001 (The Orange Book), many, if not all government organisations now have basic risk management processes in place. However, UR presents a serious problem that has not yet been addressed systematically in both a worldwide, and more specifically a Saudi Arabian perspective. Moreover, despite the advantages of risk management, most organisations in Saudi Arabia do not implement it. Based on the author's experience, which exceeds 23 years working in the mid- and top-management level, it is evident that in the organisations of Saudi Arabia there is a distinct lack of attention towards the implementation of or reliance on risk management, in both public and private organisations alike. This status further deteriorates given the fact that the response to URs needs fast decision making; according to Haase (2013) in Saudi Arabia decisions are made slowly, since most decisions require several layers of approval because Saudis are tough negotiators. They believe that everything is negotiable. Business is hierarchical; therefore the highest-ranking employee

makes decisions. Furthermore, there is a lack of study on risk management in organisations in Saudi Arabia (Hasse, 2013).

The available studies on risk management in Saudi Arabia focus mainly on the financial sector, such as the Saudi Arabian Monetary Agency and Capital Markets Authority, due to the Basel 11 and Basel 111 regulations (Alsahlawi, 2014; Mensi et al., 2015). Thus, there is limited literature on risk management and organisational failure in Saudi Arabia. However, there are some unique organisations in Saudi Arabia that solely deal with the regular risks, and their management for a catastrophic event is focused on reaction and not pro-action. Thorne (2010) stated that; if preventative, corrective actions are taken, a fully-fledged crisis may be averted.

The importance of this study can be aptly demonstrated in light of the aforementioned challenges, and the effective risk management strategies of URs have become an increasingly important part of organisational efficiency. Additionally, the expanded spectrum of new dramatic changes in Saudi Arabia has created an increasing need to implement a strong risk management framework across organisations, in order to cope with UR events, and help to forestall future organisational failures. Furthermore, when by definition an UR event is difficult to anticipate, is increasing in frequency, and gives a limited response time to the high stakes, it can be suggested that the best response of organisations is to be mitigated, prepared and ready to cope with nasty surprises.

According to Axinte and Ivanus (2014) no organisation can have complete control over its business environment. In addition, Oluwasoye and Ugonna (2015) state that the combination of the two concepts of resilience and robustness help organisations to manage UR. This could be attributed to the fact that risk management is a proactive measure that is concerned with making preparations today, in order to avoid problems tomorrow (Häggberg, 2015). On the other hand, disaster and crisis management are mainly focused on taking action once the event is a fact, in order to solve it (Hamilton, 1996). Clearly a combination of risk and crisis management, in order to make a more rounded and complete framework for dealing with threats and contingencies, is needed. Thus, organisations need change to improve their robustness and resilience, and meet the aforementioned demands. While this change can be met by using the following strategies; enterprise risk management, business continuity management, and crisis management as

examined in the literature review, there is need for more robust and integrated strategies rather than strategies applied in silos.

1.5 RESEARCH AIM, OBJECTIVES AND QUESTIONS

1.5.1 Aim

The aim of this research is to critically evaluate risk management strategies effective enough for mitigating the impacts of Unpredictable Risks (URs) in order to develop a set of guidelines that enables Saudi Organisations to improve their robustness and resilience in coping with URs.

1.5.2 Objectives

In order to achieve the aim of this research, number specific research objectives have been formulated. The following formulated objectives were used to ensure that the focus of the research remained clear towards the achievement of the aim of this research:

1. To review and examine relevant literature on unpredictable risks; its philosophies, theories and practices
2. To assess the negative impact of unpredictable risks on organisation and current mitigation strategies used in reducing the negative impacts of UR on Saudi Arabian Organisations;
3. To examine the significance and effectiveness of risk management strategies in enhancing robustness and resilience of organisations in managing unpredictable risks in Saudi Arabian Organisations
4. To develop set of guidelines that may be adopted for use in Saudi Arabian organisations, and to critically assess the capacity of guidelines in improving robustness and resilience of organisations in view of potential unpredictable risks

1.5.3 Research Questions

Based on the objectives, the following research questions have been formulated to ensure that the above research objectives are achieved.

1. How would you explain unpredictable risks in relation to Saudi Arabian Organisations?
2. How does Saudi Arabian organizations manage URs?
3. Are strategies used for dealing UR effective and sufficient for reducing its impacts?

1.6 RESEARCH SCOPE

This research focuses on developing guidelines that can be adopted for preventing (where possible) and mitigating the impacts of URs in Saudi Arabia. This focus necessitates that organisations within Saudi Arabia are used as case studies to examine their robustness and resilience to URs, and risk management strategies for dealing with URs when they occur. The rationale for this scope is to ensure that a rigorous and in-depth evaluation is conducted of organisations and that the nature of URs experienced, their impacts and strategies for management are identified and critically examined. The URs examined are restricted to organisational context and forms of risks that may constitute crisis in an organisation. Therefore, natural and any form of environmental risks are excluded from this research scope, but attention is given to risks scope that may impact organisations globally, but with a focus application to Saudi Arabia context.

Organisational risks take pre-eminence in this research because of the experience of the researcher working in organisations in Saudi and the potential impacts of organisational crisis on the economy and wider community in Saudi Arabia, the Middle East and the world. Thus, the focus of this research is not only beneficial to Saudi Arabia, but with potential for influencing URs management in any organisation with similar structure and mission as ones operational in Saudi Arabia. Hence, the research scope is limited to keywords such as UR, resilience; especially organisational resilience, robustness, and risk management. While the word 'black swarm' feature frequently in this research, it is used to refer to URs and its unpredictable nature. Emphasis is placed on UR and 'black swarm' in order to ensure that critical evaluation is conducted with the view of identifying essential risk management strategies that can be viable, effective and suitable enough for dealing with URs in Saudi Arabian organisations.

To achieve this, the scope requires that interviews and focus group session is used to gather data that can be analysed to arrive at an objective conclusion regarding the set-out goal of this research. As such, content analysis is used to identify and classify qualitative data that indicate the most suitable and effective strategies for dealing with URs in Saudi organisations. The guidelines developed are adapted from critical evaluation of risk management strategies as well as essential aspects of theoretical context of URs examined in the literature review. This research

process and scope both reflect the findings, the theoretical concepts and the risk management strategies considered suitable enough for application in Saudi Arabia.

1.7 RESEARCH METHODOLOGY AND LIMITATIONS

In order to address the research questions and achieve the objectives established for this research, a suitable research methodology is needed to determine an all-round research strategy. In this work, the qualitative approach was justified as most appropriate for conducting this research. Through this approach, the use of expert groups and case-study analysis as components of a constructivist/interpretivist research philosophy was also used to ensure that both quality, objective and valid data were collected, interpreted and analysed. This research sought to capture a range of data on risk management issues and considerations associated with Saudi Arabian organisations.

The literature review described in this thesis concentrates on a critical evaluation of the current problems associated with URs, verifying the importance of risk management frameworks, processes and strategies in order to cope with the UR events in Saudi Arabia. A systematic review of the literature was undertaken to ensure that only the most relevant and reliable evidence was drawn from books, journals, articles, and other existing sources of data. Primary research methods were also used in this study to generate more Saudi aligned conclusions. The main methods by which the data was collected and analysed for the purpose of this research were interviews and focus groups. Chapter 4 discusses these methods in detail, and provides a full justification for their use.

The research scope focuses on risk management strategies applicable or suitable for organisations in Saudi Arabia. While this scope makes the research area manageable and feasible, it can also be seen as a limiting factor. This limitation is influenced by limited timeframe, and the need to manage the extended data in the area of risk management and organisational crisis. However, it is important to note that what works in one country may not work in another, but a wider scope of study area may have yielded results that could be applicable across countries. The incentive behind this was not only because this research was fully financed by the Government of Saudi Arabia, but also because Saudi Arabia is a country located in a volatile region, prone to crisis with a lot of challenges and security threats (Al-Mulhim, 2012).

Furthermore, this research pays attention to the risks that will have an impact on organisational objectives only, and not on other types of risk. In order to manage the URs in this study, the goal was to protect the objectives by minimizing the potential adverse effects of URs on organisations. Nevertheless, according to Axinte and Ivanus (2014) no one method is perfect for a research inquiry process, and as such may be interrupted by factors that the researcher is unable to control. However, despite this assertion, adopting the broad methodology within the risk management strategies developed in this research is envisaged to assist organisation in Saudi Arabia to be better prepared for UR and its impacts.

1.8 CONTRIBUTION TO KNOWLEDGE

This research aims to increase understanding of URs among crisis and risk managers in organisations. The guidelines provide insights into strategies and approaches that may be adopted by organisations especially the ones in Saudi Arabia for dealing with URs and its potential impacts. As such this research improves awareness of the type of risk examined in this academic work, while encouraging an organisational culture that prioritises risks management as well as resilience especially in view of dealing more effectively with URs.

Furthermore, this research makes an imperative contribution to the current body of knowledge on how organisations can strive to minimize the effect of UR events by implementing risk management strategies. This is especially so for a country such as Saudi Arabia, where there remains a distinct dearth of such related studies. Hence, this study fills that gap, and contributes to knowledge by broadening the scope of literature on risk management in Saudi Arabia. Consequently, in order to increase the knowledge of risk management and the need for coping with UR events in organisations in Saudi Arabia, this study is imperative. Additionally, the set of guidelines for UR to be implemented will be of a particular interest to the entire Saudi Arabian organisation and policy makers.

The guidelines will highlight the key fundamental requirement for managing UR in order to improve capacity of Saudi Arabian organisation in responding to UR. Therefore, the research contributions and impacts span to practitioners, academics and managers of the organisations of Saudi Arabia and provide the opportunity to understand how a risk management framework can influence attempts to build organisational robustness and resilience. Therefore, this study

proposes a framework for reducing the risk of UR events and in mitigating its impacts, where at the end of the thesis, recommendations for future practice and research were also made.

1.9 STRUCTURE OF THE THESIS

This thesis is structured to carefully examine and achieve the purpose of this research. Each chapter is dedicated to specific aspect of this study area while ensuring that the overall research aim is achieved. There are seven chapters in this thesis and the interactions and main focus of each chapter is illustrated in Figure 1.1

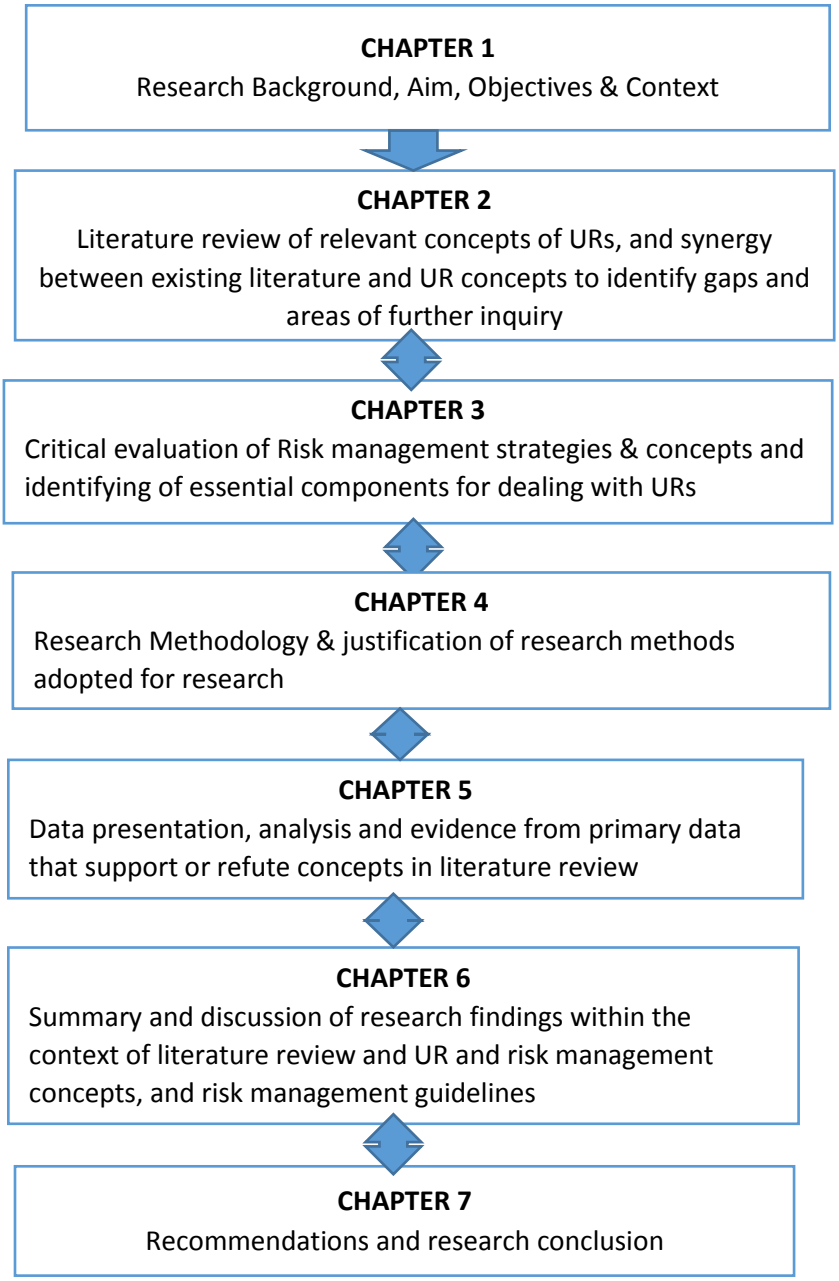


Figure 1-1: Research Conceptual Framework

The diagram indicates that while chapter informs and provides background to the other chapters, chapter two, three, four, five, six and seven all interlink by drawing information from contents of each chapter as well as referring to content examined in each chapter. The content of each chapter is briefly discussed as follows:

Chapter 1 – Introduction

This chapter provides a brief outline of the structure of the thesis in the following order. First, it introduces the background to the research followed by research problem and rationale for the research. Second, it outlines the scope of this research, followed by the research aim and objectives, research questions, scope, overview of methodology and then the structure of the thesis.

Chapter 2 and 3 – Literature review

This chapter entails critical review of existing and relevant literature in this subject area. Detailed literature review on UR was explored within organisational context and the implication for Saudi Arabian organisations. Concepts such as resilience, robustness and risk management strategies that relate to mitigating the impacts of URs on organisations were also critically evaluated in order to identify more effective concepts that can inform guidelines for dealing with URs. Gaps in literature that informed the research questions and data collection process were also identified in these two chapters.

Chapter 4 – Research methodology

This chapter defines the methodology adopted specifically to achieve the aim of this research, the objectives and questions. Appropriate research philosophies, research approaches, research strategies, research choices and research techniques adopted for conducting this research are all discussed and justified in this chapter. The relationship and relevance of these methodology components to validity and reliability as well as triangulation process are all discussed in this chapter.

Chapter 5 – Qualitative data presentation and analysis

Chapter five focused on the analysis of findings from semi-structured interviews conducted. It presents the findings from and data collected through semi-structured interview with senior managers. This chapter also interpreted the data and analyses the relevance of the findings to concepts examined in the literature review chapters.

Chapter 6 – discussion and guidelines development

This chapter summarises the findings from the primary data and discusses it within the context of the literature review and concepts identified as essential for more effective management of URs. The discussion in this chapter confirmed key requirements for UR guidelines when implemented and discusses its implementation in relation to how improvement may be possible in Saudi Arabian organisations in dealing with URs. In order to achieve the aim of this research, the guidelines are discussed and justified by drawing from epistemology in the field of crisis and risk management.

Chapter 7 – conclusions and recommendations

This chapter concludes the research and presents it major contributions to the body of knowledge. It summarises the results, research limitations and areas that may inform further research and investigation into the field of UR management.

1.10 CHAPTER SUMMARY

Overall, it can be seen that this study contributes significantly to the field of risk management in general and specifically in improving organisational resilience in Saudi Arabia to coping with and dealing with URs. This chapter has provided an insight into a rarely studied phenomenon in the country, but more importantly provided context for the study area. As a relevant topic in the uncertain times of today, the danger of unpredictable risk can be signified in its name and this chapter has offered background into the subject area and justification for conducting this research. The importance of this research is observable in sections on research problem, aim and objectives, research justification, and scope of the study. Subsequently, the research methodology and limitations has helped to further define the boundaries and context in which the research is conducted. Following on from this, the next chapter is a critical review of existing and relevant literature on the key words and focus of this research.

CHAPTER 2: NATURE AND CONCEPTS OF UNPREDICTABLE RISKS

2.1 INTRODUCTION

This chapter reviews existing literature on Unpredictable Risks (URs), its related concepts, philosophies, theories and practices. It also assesses the negative and other possible impacts of URs on organisations, and potential mitigation strategies that may be adopted for preventing (where possible) and mitigating the negative impacts of URs. By addressing these components of URs, this chapter would have set the research inquiry process on the path of establishing the context for achieving the first and second research objectives. Thus, this chapter strategically focuses on explanations of concepts that relate to or may be confused with URs, philosophies, theories and practices of URs, as well as impacts of URs in general and on organisations. The last section provides a summary of the chapter and main outcomes of this first literature review chapter.

2.2 EXPLANATIONS OF TERMS

The rise in numbers and continued events that result in devastation seems to have motivated more scholars and scientists to examine concepts and issues in this field across the world. This section examines work that present a useful information that relates to understanding of devastating events, and ones that focuses on prevention as well as minimising the impacts of events. Lagadec (1993) considered that that efforts and interests in the field of crisis and unfavourable events were the first database toward a diagnosis and one that leads to identifying potential solutions. However, nothing is really changed in recent decades, as the world continue to witness the increase and impacts of unfavourable events and the world is still living in a volatile era of its impacts. The 9/11 attacks in the United States of America (USA), the Asian Tsunami in 2004, the Japan earthquake, Tsunami and nuclear emission in 2011 are all some of the examples that caused widespread devastations to countries and people. Furthermore, the global economic crisis 2008 and the Icelandic volcano Eyjafjallajökull erupted in 2010, which lead to the closure of airspace over most of Europe, all indicate the unpredictable impacts of malicious events.

As such it seems recent decades have continuously unleased unfavourable, malicious, devastating and unpredictable events that are causing widespread impacts on countries, people

and organisations. Based on this, it can be inferred that the modern world is changing, interrelating, and interacting with each other which makes things a lot more complicated and unpredictable. While several reasons such impacts of climate change have been identified to be responsible for these events, there is a lot of worry concerning the increase and proliferation of serious risks in the near future (Taleb, 2007; Zurich, 2008; Green, 2011; Woo, 2011; Lauder, 2011; and Styczynski, et. al., 2014).

Boudreau (2012) stated that: "a VUCA (volatile, unpredictable, complex, and ambiguous) environment will be the norm for the foreseeable future". Similarly, Taleb (2007) indicated that the future will be progressively unpredictable and unpredictable often link to the unknown. The unknown or unpredictable events create situations of uncertainty (Wisner, et. al., 2004), but their impacts are certain and tangible. Such impacts, occurrence and scale have been described by scholars and researchers using the following words or concepts:

- Crisis
- Chaos
- Disaster
- Black Swan
- Catastrophe

The general definition regarding crisis, disaster, and catastrophe have common elements in all the definitions that are of high-magnitude and low-frequency. However, Black Swan have these common concepts similar to others, but with more extreme high-magnitude and very much low-frequency. This statement is derived from the explanation by Taleb (2007) which emphasises that "Black Swans" can be described as unpredictable, rare, and extreme events. The shared commonalities with concepts and terms such as crisis, disaster, catastrophe, chaos, and Black Swan may be said to all relate to the concept of UR. This is because the outcomes of UR may produce one of these concepts (crisis, disaster, catastrophe, chaos, and Black Swan). When the UR occurs, its consequences often depend on two things: 1) the degree of the event, and 2) the robustness and resilience of the organisation. Therefore, these concepts and the terms that are related to the degree of tragic risks are important to ensure a full understanding of how they relate to UR. Further explain that these characteristics belong to UR.

2.2.1 Crisis

In the literal sense, the Oxford English Dictionary (2014) defined crisis as the:

"vitally important or decisive stage in the progress of anything; a turning-point; also, a state of affairs in which a decisive change for better or worse is imminent; now applied esp. to times of difficulty, insecurity, and suspense in politics or commerce."

This definition views crisis as a 'stage' and 'state', suggesting there is a pre-and post-status in crisis. Thus, a crisis may be defined as ''a situation that, left unaddressed, will jeopardize the organization's ability to do business'' (Hearle, 1993). It may also mean "an event that can destroy an entire organisation" (Mitroff et al. 1996), but Pearson and Clair (1998) argued that it is:

"a low-probability, high-impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly."

The definition by Pearson and Clair (1998) focuses on the action that is required in order to manage crisis, however, other scholars in this era emphasised and described crisis in terms of its occurrence, threats and potential impacts in preventing survival of people. One of such explanations that emphasised this position defined a crisis as; an immediately unexpected event or action that threatens the lives of stakeholders and the ability of the organization to survive (Caywood and Stocker, 1993). This definition indicates that the unpredictable nature of crisis does not only threaten lives, but survival. Thus, drawing focus on the need to have a comprehensive approach to dealing with both its characteristics and impacts.

According to ICM (2013), nobody can predict when a crisis will strike, but LaPierre (1938) considered that what is unusual is a crisis. Further, he defined unpredictable events as crises. Whereas, Hermann, (1963) explained that the definition of a crisis will be formulated along three dimensions: that it threatens high-priority values of the organisation; presents a restricted amount of time for responding; and is unanticipated. Accordingly, numerous studies have argued that a crisis applies to all situations that are unexpected, unprecedented, annoying, and nearly unmanageable, causing widespread hardship and uncertainty (LaPierre, 1938; Hermann, 1963;

Rosenthal, et. al., 2001; Stern and Sundelius, 2002; Taleb, et al., 2009; Merle, 2011; Hollis, 2013).

The characteristics of crisis inspired more investigations into the concept of crisis management which Kreps (1986) explained as the use of public relations to minimise harm to organisations in emergency situations that could cause the organisation irreparable damage. His explanation however was limited in that it restricts the solution and management strategies to external measures like public relations. However, the definition and explanations by Fearn-Banks (1996) tend to be more comprehensive, arguing that crisis management is a process of strategic planning for a crisis or negative turning point in an organisation. While this definition focuses on strategic planning which may be both internal and external, it is rather vague in its aim to address the uncertainty nature of crisis. Taking clue from this, explanations in the millennium viewed crisis and its management as a process that removes some of the risk and uncertainty from the negative occurrence and thereby allows the organization to be in greater control of its own destiny (Ziaukas, 2001). Regardless of the limitations of some of these definitions and explanations, crisis management tend to have some basic principles that can be identified based on how its understanding has evolved over the years. These principles can be summed up and illustrated as shown in Figure 2.1.

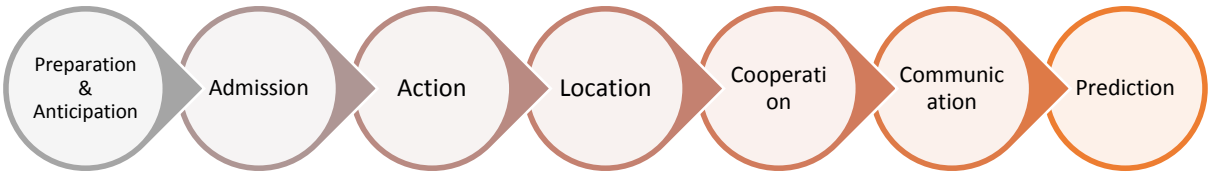


Figure 2- 1: Principles of Crisis Management

(Adapted from Seitel, 1998; Yagoda, 1990; Mitroff et al. 1996; Ziaukas, 2001)

Figure 2.1 shows that the principles overlap, although it is imperative that each principle is well understood in order to make more accurate predictions regarding crisis. Hence each principle is explained.

- *Preparation and Anticipation*. It is essential to plan for crises before they happen. Practitioners should require a written crisis plan (frequently updated) that identifies the crisis management team. In all cases, an official spokesperson should be designated, from whom all official internal and external information should come. In addition, it is essential to anticipate the needs of important constituents. Ultimately, the crisis team must develop a plan that will enable it to act ethically while adapting to evolving situations involving many unknowns.
- *Admission*. As Seitel (1998) declares, ‘‘Tell it all and tell it fast’’—perhaps the number-one rule in crisis communications. Accepting responsibility in public at the earliest possible time is essential for maintaining or restoring credibility. Never shift the blame or engage in scapegoating. While legal consequence must be considered, fear of litigation is not an ethically valid excuse for avoiding responsibility and blame.
- *Action*. A window of opportunity exists in the very early stages of the crisis ‘‘during which response by the company is absolutely crucial to the way crisis is perceived’’ (Yagoda 1990). Further, as Mitroff et al. states that, the key to whether an organization will be perceived as a hero, victim or villain is in its ability to respond quickly with genuine care and concern (1996).
- *Location*. Particularly at the time of crisis, the president (or CEO) embodies the corporation. The president generally should be on site to see, to feel, and to report to significant publics, especially the media (Yagoda, 1990).
- *Cooperation*. ‘‘Stonewalling,’’ a generally naive form of information control, is characterized by a lack of cooperation. The implied hope of stonewalling seems to be that by ignoring the problem, the crisis will disappear. Seitel confirms (1998) that as a general rule, when information gets out quickly, rumours are stopped and nerves are calmed.
- *Communication*. It is essential to communicate often and regularly with significant publics, especially the often-forgotten internal public.
- *Prediction*. At least some members of the communications team should be thinking about and working on what is to happen when the crisis is over (Ziaukas, 2001).

These basic principles as noticed are not independent, but overlap mostly in actions required before, during and after a crisis. As such, it can be inferred from the definitions, and principles of crisis and crisis management that crisis is a subjective concept. One party considers this event a

crisis while for another party may not consider it as a crisis. Crisis is an event and/or a situation which endangers the established system, including organisation, social community, government, and so on (Kim and Lee, 2001). Thus, in this sense, system does differ from organisation to organisation, thereby making the context of crisis subjective. Regardless of this vagueness, Merle (2011) and Light (2008) emphasised that, there is a consensus among many authors that the negative impact of a crisis threatens the survival of an organisation or/and its goal for fulfilment and success. Nevertheless, the primary goal of crisis management is to prevent the occurrence of unfavourable and destructive events (Kim and Lee, 2001).

2.2.2 Chaos

Farazmand (2004) considered the notion of chaos as a crisis. According to Sakamoto (2001), chaos is a state of emergency as a result of a large-scale disaster. However, chaos theory does suggest that it is a complicated approach that needs a thorough understanding of a network of relationships between segments and system, either in parts or as a whole, pertaining to relationship between constant and change especially one that oppose systems and stability that often result in a new form or order and stability (Farazmand, 2004). Levy, moreover reiterates the fact that chaos theory is the study of complex, nonlinear, dynamic systems (Levy, 1994). But the definition of chaos itself is according to Stacey (1993) a form of or state of instability where the specific long-term future of an organisation is unknown.

Chaos may also be explained as is a state of non-equilibrium, instability, or rapid changes that hamper plans, cause unpredictability that result in consequences of anxiety, as well as fear of unknown which triggers effects of destruction and system breakdown (Faraxmand, 2004). According to Otulana (2011), the distinguishing features between chaos and crisis are important, which is because the organisational crisis is a low-probability, high-impact event that threatens the survival of organisation. It is noticed that it is characterised by being ambiguous with relation to cause, effect and means of resolution, and therefore, it is believed that decisions must be made swiftly (Pearson and Clair 1998). Whereas, chaos in an organisation means a complete state of randomness, and unpredictability of existing systems' relationships and its associated linkages in observed complex, adaptive organisational systems (Wilding 1998). Therefore, chaos is deterministic while crisis is not. This means that chaos is generated by specified rules that in themselves involve no element of chance (ibid).

Furthermore, the change from order and predictability into unpredictability or chaos for dynamic systems are governed by "route" that is between the two conditions (Koehler et al. 2014). According to Pietgen et al. (1992), route implies that there a sudden qualitative change which marks the transition from order into chaos like a schedule. Therefore, according to Koehler et al. (2014), preparing a response for a chaotic event is a difficult task. In the same context, chaos is a type of nonlinear behaviour emerging at a certain point along the route "the edge of chaos" which makes organization becomes extremely sensitive to initial conditions (Koehler et al. 2014). This understanding and distinction is relevant to this research and the concept of URs since crisis and chaos are often used interchangeably in the field of risk management.

2.2.3 Disaster

Coppola (2006) explained that the term disaster is derived from the Latin roots (dis- and astro), meaning "away from the stars" or, in other words, an event to be blamed on an unfortunate astrological configuration." Disasters are not only natural events that cause them, but may also be the product of social, political and economic environments (Wisner et al., 2004). Moreover, they are a complex mix of natural hazards and human action (ibid). Disasters illustrate the complications of being prepared for every potential event and the complexity that influences organisations (Davies and Walters, 1998). Moreover, the International Strategy for Disaster Reduction (ISDR, 2002) explain that a "disaster is a function of the risk process", but Coppola (2006) examined the concept of disasters more from action and response perspective by emphasising that a disaster occurs when a realized hazard overwhelms the response capability of a community.

Furthermore, Lewis (2006) indicates that the difference between a "disaster and a catastrophe is that one can remove oneself from the disaster, but cannot do so from the catastrophe." Therefore, disasters are not unpredictable and unavoidable events but unsolved problems of development (The World Bank, 2008). Nevertheless, Quarantelli (1998) states that disaster does not have a universally agreed definition. However, the concept of disaster may be explained in the following ways:

1. Anything that befalls of ruinous or distressing nature; a sudden or great misfortune, mishap, or misadventure; a calamity (The Oxford English Dictionary, 2014)

2. A unique consequence(s), where no single formula can be used to characterise how the problems can be precisely solved and/or managed (Coppola, 2006)
3. 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 (Pasteur, 2011)

These definitions indicate that the term disaster is a twist between "*predictable and Unpredictable Disruptions.* Even so, the expectation exists that a system designed for resilience will avoid, survive and recover from unpredicted disruptions also (Pasteur, 2011). Fortunately, many disturbances are predictable, at least on a probabilistic basis (Coppola, 2006). For example, hurricanes on the Gulf Coast, earthquakes in California, and tornadoes in Kansas are disaster events that their frequency of occurrence and magnitude are well known and can be monitored. Unpredictable disturbances can occur, either because a phenomenon was unknown to modern science, or because it was unanticipated/unknown to the systems designers.

Despite extensive training, humans can still act in completely unpredictable fashion. Invariably, these acts are not a result of lack of competence or mal-intent. Rather, they tend to be completely innocent mistakes. While it is impossible to anticipate everything in the world (Kim and Lee, 2001), dealing with the unexpected is fundamental to survival in modern day world where there are high stakes situations which can lead to disasters (Christiansen, 2015).

2.2.4 Black Swan

Rare events, beyond the realm of normal expectations, which resulted in a major impact on the financial markets and investor wealth have become known as "Black Swans", "Fat-tailed events" or "unknown unknowns" (Tastsidis Olsson & Löfberg, 2014). The "Unknown Unknowns" is a risk category because they are unthinkable and unpredictable, besides, when they occur, the time for action is very short (Green, 2011). These rare events were later named "Black Swans" (BS) by Taleb (2007) and the concept has extended far beyond finance. Despite this, Ivantsov (2014) still considered BS as the most complex and difficult threat to deal with. By definition, BS events lack the historical perspective needed to perform *ex-ante* mathematical risk analysis (Adams and Thornton, 2013).

Taleb (2007) argued that unknown risk which is also known as UR is the most dangerous of all risk concepts because it is a combination of extremely low predictability and tremendously large impact. As such, most risk management system often fall short on managing emerging risks as well as black swan events that occur without warning, but possess severe impacts (PWC, 2012). Thus, the BS concept or term suggest that there is a limit to knowledge that can never be reached, no matter how sophisticated statistical and risk management science ever gets (Taleb, 2007). However, by definitions and based on the principles of crisis management, if certain risks are BS, it follows that organisations may need to focus their risk management efforts on enhancing their resilience to deal with them (PWC, 2012). Explanations and solutions such as this emphasises the importance of this research scope and the notion that BS or URs are manageable through more effective and appropriate strategies.

2.2.5 Catastrophes

Dramatic events in the recent past have drawn attention to catastrophe risk management problems (Nell and Richter, 2005). According to the Oxford English Dictionary (2014), catastrophes are "a sudden disaster, wide-spread, very fatal". In addition, Woo (2011) explains that catastrophe is a Greek word that signifies a down-turning in a theatrical tragedy. He also explains that chaos is twinned with catastrophe. Woo refers to crisis as a word of Greek origin linked with catastrophe which originally means a decision or judgment (ibid). Furthermore, some people equate the term BS with crisis (Green, 2011). However, the occurrence of events that had been considered a one in 100-year event are deemed more than a crisis and are a Black Swan (Zurich, 2008; Green, 2011). These suggest that catastrophes are drastic and extremely devastating in comparison to crisis, chaos and BS. But unlike crisis and BS, catastrophes are not unknowns, rather an existing tragedy that has gone wrong.

The importance of clarifying these terms that may be confused or be used in synonym with UR is to ensure that only terms and concepts that have common and a combination of characteristics such as unpredictability, unknown, low probability and severe impacts are examined, used and accepted as relevant to this study. While references may be made to terms like disasters, chaos and catastrophes, the emphasis in this research are on crisis and BS which are terms that have synonymous characteristics and relationship with UR. Thus, the next section critically examines the concepts of UR especially elements that influences and contributes to its characteristics and

those that make it challenging to manage. Therefore, the words UR and BS will be used interchangeably and characteristics and past crisis events will be used to elaborate on arguments and criticisms made in subsequent chapters. The scope of terminologies used are also limited to crisis, BS, UR and unknown risks as this research progresses.

2.3 CONCEPTS OF UNPREDICTABLE RISKS: Theory and Philosophy

UR, undoubtedly, is more disturbing than predictable risk (Bach et al. 2015). According to Keyes (n.d.) UR is impossible to anticipate, which is a fundamental characteristic that have been established in previous sections. According to The Oxford English Dictionary (2014), unpredictable means "not able to be predicted". However, Witwicki et al. (2013) presented more clarification for unpredictable events as events which are uncontrollable and those with occurrence whose probability may not be accurately estimated. Whereas, the known unknowns present risks that could happen, but no one that can be predicted with accuracy, but nonetheless possess ability to cause major or severe impacts. Thus, suggesting that UR events require levels of response procedures that sufficiently deals with unpredictability and major impacts (Green, 2011).

While it may be more rationale to put measures in place at all times for dealing with all manner or types of risks, Green (2011) argued that knowing that unknown risks may occur warrants that different set of strategies are put in place such as extra modelling tools to predict the stages and patterns of UR or unknown risks in order to determine the most suitable and effective interventions to improve outcomes. While BS, UR or unknown risks have low probabilities, and may have occurred in one way or another in the past, Taleb (2007) affirm that nothing from the past can accurately help predict their emergence or impacts. Nonetheless, UR still needs to be effectively managed to prevent their devastating impacts on organisations and economy of a country as a whole, hence the rationale and importance of this research.

The term uncertainty and risk have been long connected (Vaughan and Vaughan, 2008). The distinction between risk and uncertainty was first outlined in the work of Frank H. Knight in *Risk, Uncertainty, and Profit* (1921). As Knight specified, risk is a measurable quantity due to the probabilities and distributions being known, whereas, uncertainty is immeasurable. However, Taleb (2009) has a strong statement about uncertainty because he considered it equal to the rare

event. Risk is therefore related and used in connotations with uncertainty, probability and severity. For instance, Rosa (1998) and (2003) and Aven and Renn (2009a) defined risk as an event or situation where something of significance or worth is at stake and its outcome is uncertain. In an organizational context, risk is anything can influence and has the potential to impact the fulfilment of objectives and mission (Hopkin, 2010). It is clear that these definitions and explanations that risk as an event or a consequence of an event, but one with potential to cause harm if not managed.

Although the concepts of risk and uncertainty are generally acceptable to decision theorists, statisticians, economists, risk managers, a common definition is yet to be accepted by all due to differences in each field (Vaughan and Vaughan, 2008). For example, each field relate and define risks in relation to the most significant area that can be affected. This is so because risk is considered as the likelihood of exploitation of vulnerability or that a threat may become harmful (National Research Council, 2002). Moreover, risk is always calculated according to two factors: likelihood and consequence (Haddow et al. 2011). This notion is also explained by Aven (2007) that risk is equal to the two-dimensional combination of consequences of events and associated uncertainties. Thus, the concept of risks with UR raises the question about the extent to which risk may be objective and independent of the assessor. But not all share this view as Kirchsteiger (2002) linked risk with the likelihood of a particular impact coming from known risk which is occurring within a specified circumstances or period.

However, events in recent years in the world have subjected the argument by Kirchsteger (2002) scrutiny in this research. Although there are known and unknown risks, the likelihood and consequences of both are subjective (Renn, 2009a). This argument and criticism emphasises the need to examine types of risk, which may constitute to UR. According to Hopkin (2010) risks may be or considered as the opportunity or a loss or the presence of uncertainty for an organization. Therefore, risks have their own characteristics that require specific treatment. In this sense, Hopkin (2010) divided risks into three categories:

- Hazard (or pure) risks
- Control (or uncertainty) risks
- Opportunity (or speculative) risks

As explained by Hopkin (2010) hazard risks are associated with a source of potential harm or a situation with the potential to undermine objectives in a negative way. Hazard risks are the most common risks associated with organizational risk management, including occupational health and safety programmes. Control risks are associated with unknown and unexpected events. They are sometimes referred to as uncertainty risks and they can be extremely difficult to quantify. Control risks are often associated with project management. In these circumstances, it is known that the events will occur, but the precise consequences of those events are difficult to predict and control. Therefore, the approach is based on minimizing the potential consequences of these events. There are two main aspects associated with opportunity risks.

There are dangers associated with taking an opportunity, but there are also risks associated with not taking the opportunity. Opportunity risks may not be visible or physically apparent, and they are often financial in nature. Although opportunity risks are taken with the intention of having a positive outcome, this is not guaranteed. Opportunity risks for small businesses include moving a business to a new location, acquiring new property, expanding a business and diversifying into new products (Hopkin, 2010). There are certain risk events that can only result in negative outcomes. These risks are hazard risks or pure risks, and these may be thought of as operational or insurable risks. In general, organizations will have a tolerance of hazard risks and these need to be managed within the levels of tolerance of the organization (Hopkin, 2010).

These categories indicate that risks have no subdivision of ‘right or wrong’, but should be considered in all seriousness of their impacts. However, within the scope of this research, the control and opportunity risks tend to fit more into the characteristics of UR which is being examined in this research. Although theoretical discussions may vary in focus, it is worth noting that organisations adopt risk classification that is most suitable to their circumstances, but the uncertainty and/or speculative types of risks tend to be severe. As explained by Aven et al. (2011) uncertainty indicates or suggest ignorance around whether the event will occur or not, when, and what the consequences if it does occur. Thus, uncertainty especially as it relates to risks is viewed as a lack of knowledge about the future which refers to a state of mind characterised by doubt (Aven et al. 2011).

However, Verspargen (2005) declared that uncertainty has two kinds; weak and strong uncertainties. Weak uncertainty is a point toward the statistical analysis which gives a probability

distribution around predictable outcomes (Verspargen, 2005). In contrast, strong uncertainties mean that there are numerous types of uncertainty and can cumulate to the extent that they make the possible outcomes unpredictable (Vaughan and Vaughan, 2008). While peril and hazards differ from the notion of UR as examined in this research, hazard does carry associated risk that may lead to disaster or an emergency (Haddow et al. 2011; National Governors Association, 1982). There are certain risks that give rise to uncertainty about the outcome of a situation, though manageable, in general, organizations may have an aversion to control risks with the appropriate risk management strategies in place.

Uncertainties can be associated with the benefits that a project produces in an organisation, since organisations often deliberately take risks especially in the marketplace and for economic purposes in order to achieve a positive return. While these may be considered as opportunity or speculative risks, they may also have some elements of UR in it that may cause severe impacts. However, these types of risks are considered as deliberate and may be predicted, and as such do not fall within the combined characteristics of URs which are low probability, unpredictable, unknown and with severe/high impacts which are illustrated in Figure 2.2

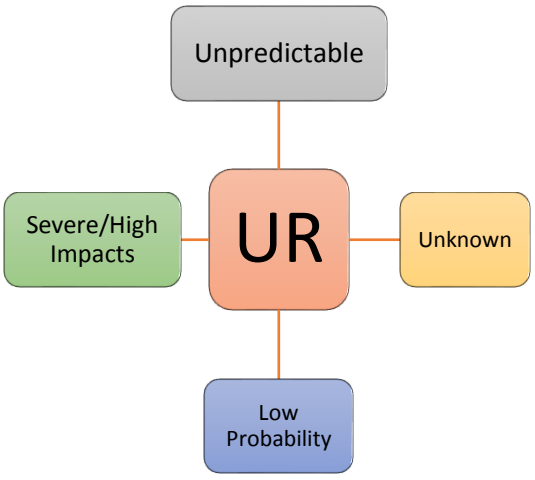


Figure 2.2: UR and its associated characteristics

As seen in Figure 2.2, UR's have specific characteristics which makes it difficult and challenging to manage. These characteristics inform the definition of UR adopted in this research, which means that UR in this research is defined as risk which is unpredictable, unknown (unknown unknowns), low probability, with high or severe impacts. URs may also be described or used in this research by emphasising one or more of these characteristics. Therefore, understanding the

relationship between the characteristics of UR is key to avoiding confusion and maintaining arguments within the research scope and objectives. Furthermore, while the mission and aim of organisations that will be examined in this research may differ, the characteristics of UR will be used to evaluate impacts of URs in order to determine appropriate strategies for dealing with UR. However, it is important to examine the concepts of URs.

2.3.1 Concepts of URs

As observed in previous sections, risk is a fundamental concept of UR and will be examined in this section to understand its features, origin and scholar or theoretical perceptions and overview. Risk is widespread in all forms of human existence. Knight (1921) stated that the term "risk" is loosely used in everyday speech and discussion. According to Borghes and Gaudenzi (2013), since the eighteenth century, the concept of risk is largely connected to the concept of unfavourable event. In that period, authors dealt with it for the first time as an independent topic of study (ibid). Due to the nature of risks that is constantly changing, Knight (1921) explained that we live in a world of change and Drennan, et al. (2014) emphasised that the potential threats of risk are endless, thus, a wide range of academic literatures considered that risk has a multi-faceted and complex topic (Lauder, 2011). However, the twentieth century saw many authors such as; Willet (1901), Leitner (1915), Knight (1921), Stadler (1932), and Sassi (1940) address risk as a measurable uncertainty while the concept of non-measurable uncertainty was left unarticulated. Although Knight (1921) stated that the world is uncertain, the gaps left unexamined on uncertainty and unpredictable risk were to later have significant impacts on society and organisations in particular in subsequent years.

The term risk and its origins is also controversial in views and explanations. For instance, Bernstein (1998) considers that risk word comes from the early Italian language. However, Mythen (2004) believes that risk word originated from the Arabic word, while Damodaran (2008) argued that risk emerged from the Chinese language. Regardless of its diverse origins, social sciences have some prevailing risk perspectives through consideration that risk exists as objective state, but for other, the status of risk remain subjected to investigation and debate (Aven et al. 2011). For example, Hopkin, (2010) and Lauder, (2011) explained that the term risk may be defined in very different ways based on the various disciplines.

Crouhy, et. al., (2001) further explained the emphasis of this statement by clarifying that risk has many meanings and connotations in different disciplines. According to them, risk can be business risk, market risk, financial risk, liquidity risk, systematic risk, credit risk, operations risk, country risk, portfolio risk, systemic risk, legal risk, reputational risk, and more. Many authors such as Milburn and Billings (1976), Adams (1995), Lupton (1999), Gigerenzer (2003), Ward and Chapman (2003), Ramgopal (2003), Renn (2008) and Lauder (2011) support that the use of the term risk is vague. This vague often causes confusion and complication for risk managers especially when risk need to be identified, determined, communicated and its threat mitigated.

In developed countries, the argument about the ambiguity around risk meaning remains on-going despite the awareness and culture towards risks. It follows that the status is worse in developing countries where perception and culture towards risk is still passive. On the other hand, some authors like Renn (1998), and Huber and Lewis (2010) disagree that a considerable part of risk is a mental construct. Talking about risks encompasses often from different perspectives (Renn, 1992). According to Fischhoff et al. (1984), there is a difference between subjective and objective risk. So, there is an argument that risk is a tangible things and others believe that it is intangible as a mental concept (Lauder, 2011). However, Aven (2012) concludes that over the last 15–20 years, has been perceived that the ways of thinking toward risk became based on consequences and uncertainties instead of probabilities.

Also, he added that some narrow perspectives like expected values and probability-based perspectives are still intensely impacting the risk field. However, Kaplan and Garrick (1981) defined risk as relating to both uncertainty and some kind of loss or damage. Therefore, the risk as an intuitive notion implies a lack of knowledge about the future and the possibility of some adverse consequence. Moreover, the future holds uncertainty and uncertainty is a fundamental attribute of risk (Alberts and Dorofee, 2010). This fundamental attribute emphasised by Alberts and Dorofee (2010) also aligns with the argument proposed in this research as well as characteristics of URs which need to be adequately managed in the modern-day world.

In addition, although there is a general lack of agreement concerning the definition of risk, there are common elements in all the definitions that are indeterminacy and loss. There is no risk if there is a certainty that a loss will occur or that outcomes are desirable (Vaughan and Vaughan,

2008). According to Aven and Renn (2009a), clarifying the ontological status of common risk as well as characteristics the present is important for risk assessment, risk management and risk communication. While authors like Campbell (2005) considers risk as the probability of an unwanted event, Verma and Verter (2007), and Willis (2007) emphasised the linked between what constitute to risk and the expected loss that may occur. Moreover, the Institute of Risk Management (IRM) explained risk as the mixture between the probability of an event and its consequence. Similar definition from Lauder (2011) which defined risk as:

Risk = Probability x Impact

This formula or representation further supports that risk in its nature is unpredictable and highly depended on probability of its occurrence. Understanding this means that any risk management strategy must strive to understand and possess capability to identify probability and deal with impacts simultaneously. This assumption is made based on positions and arguments of several authors such as Lowrance (1976), Treasury (2004), Hopkin (2010) and Lu et. al. (2012) who also considered risk as a combination of the probability and severity of reverse consequence. Similarly, Ale (2002) also defined risk as a combination of the probability with extent of consequences. In addition to this, governmental document, governing councils and policy document such as Cabinet Office (2002), Treasury (2004), the International Risk Governance Council (2005) all explained and defined risk as situations that have uncertainty of consequence of actions and events.

2.3.2 Uncertainty and Unpredictability of UR

Uncertainties are unavoidable in a real control system, because there is a massive uncertainty for events that are unable to be predicted. Uncertainty has two types; known uncertainties, and unknown ones (Makridakis et al. 2009). Known uncertainty is the type of risk addressed by most current risk management functions. However, the second one has had little effort in attempting to manage this type of risk because the magnitude of the risk and its likelihood are considered hard or impossible to measure, or even to conceive (Petty, 2011). According to Taleb (2007), the unknown uncertainty is the strategic or catastrophic risk known as the UR. As such, risks and uncertainties are integral part of all organisations (Laloux, 2014). The uncertainty factor of risk can be classified into two categories: disturbance signals and dynamic perturbations. The former

includes input and output disturbance (such as a gust on an aircraft), sensor noise and actuator noise, to mention a few. The latter represents the discrepancy between the mathematical model and the actual dynamics of the system in operation.

A mathematical model of any real system is always just an approximation of the true, physical reality of the system dynamics. Typical sources of the discrepancy include un-modelled (usually high-frequency) dynamics, neglected nonlinearities in the modelling, effects of deliberate reduced-order models, and system-parameter variations due to environmental changes and torn-and-worn factors. These modelling errors may adversely affect the stability and performance of a control system (Gu, et al. 2005). Gu et al. (2005) further suggests that most dynamic perturbations that may occur in different parts of a system can, however, be lumped into one single perturbation block. For instance, some un-modelled, high frequency dynamics, the uncertainty representation is referred to as "unstructured" uncertainty. In the case of linear, time-invariant systems, the block may be represented by an unknown transfer function matrix (Gu et al., 2005).

While the model explained by Gu et al. (2005) is not widely used in organisations to prevent, mitigate and manage the impacts of UR or risks in general, the application of risk management tools and techniques for dealing with risks remains the longest-established strategies in organisations and societies across the world, hence the focus on risk management strategies in this research. The justification for this focus is that risk management strategies possess a hierarchy of controls that apply to risks and this will be discussed in the next chapter.

Of significance to URs is also the factor of unpredictability. Taleb (2001) stated that events may be inherently unpredictable. In the same context, Witwicki et al. (2013) defined an unpredictable event as events whose occurrence probability cannot be accurately estimated. Therefore, unpredicted events are a significant challenge for both risk analysis and risk management (Zimmerman and Bier, 2002). This could be because the underlying causes of the events are prohibitively complex to model or resolve or may be because circumstances surrounding the event reside in a portion of the environment that cannot be sensed. Yet another reason to label an event as unpredictable could be that it is so rare as to preclude an accurate estimate of transition probabilities neither through collected data nor through expert knowledge (Witwicki et al., 2013). For instance, it is often difficult to predict high-magnitude, low frequency events or the

possible impact of such events (FID, 2005; Talab, 2007; Zurich, 2008; Taleb, et. al., 2009; Green, 2011; Nolte and Boenigl, 2013; ICM, 2013).

Taleb (2007) emphasized that despite that BS or UR events are more and more dominating in the environment; the discussion and thought about them do not include URs. The worry is focused on the wrong improbable events. Further, organisations focus their attention on the risks that are known and frequently encountered (Taleb, 2007). Sparrow (2008) and Merle (2011) reiterated the same idea by saying that more and more organisations are learning to act this way as a result of that. According to Nocera (2009) and Green (2011), nobody envisioned URs, their size, and the scope of them. Hence, predictors are more successful in predicting the ordinary, not the UR. An example is pertaining to the predictions related to the World Trade Centre and the Pentagon in the United States on September 11, 2001. Such predictions were totally missing and the attacks took people by surprise (FID, 2005). According to Evans (2012) in this world, nothing is certain or impossible, there are only degrees of likelihood.

Risks management strategies are associated with a source of potential harm or a situation with the potential to undermine objectives in a negative way. This feature may be likened to ability to identify source of unpredictable characteristics of UR, hence the likelihood that URs can be better managed in organisations using more effective risk management strategies. However, to determine appropriate strategies, it is important to assess and evaluate capability of organisations to cope with risks especially URs. However, two professors in Harvard Business School Professors Robert Kaplan and Annette Mikes distinguish three types of risks:

1) *Preventable Risks*, such as breakdowns in processes and human error
2) *Strategic Risks*, which are undertaken voluntarily after weighing them against the potential rewards
3) *External Risks*, which are beyond capacity of individuals to influence or control (Zurich, 2008)

Preventable risks as implied relates to breakdown in processes and human error and can be managed by ensuring that breakdowns and human error do not occur or are immediately dealt with. As such this type of risk do not fall within URs and unknown risks being examined in this research. Strategic risks on the other hand is similar in nature to opportunity risk which is since it

is deliberately taken on by organisations in view of achieving a target or specific outcomes. Thus, both preventable risk and strategic risk appear manageable and can be avoided.

In organisations and in the business sense, Kaplan and Mikes suggest that the first two types can be approached through traditional risk management methods, focusing mostly on organizational culture and strict compliance with regulatory, industry or institutional directives (Zurich, 2008). Given the exogenous nature of external risks, cultivating resilience is the preferred approach for this last type of risk (Zurich, 2008), however, this is subjected to ability to predict the likelihood and characteristics of the potential URs. Although Zurich (2008) maintains that resilience of organisations is key in handling and coping with risks, in the view of worldwide manifold performances, risks must be considered as a phenomenon which needs significant attention and management (Laloux, 2014). This is because organizations increasingly find themselves in uncertain times as a result of the impact of complexity and globalization (Oracle, 2009; FMA, 2004) and the frequency of UR (Merle, 2011).

Several studies have revealed that the negative impact of a UR threatens the survival of an organization if and when not sufficiently controlled (Nathan, 2004; Taleb, 2007; Light, 2008; Sparrow, 2008; Merle, 2011). Therefore, to address and manage risks most organizations have a need for a risk management function (Petty, 2011), which need to capable of identifying risks which are internal and external in nature. According to Kennon et al. (2015), UR events could be internal or external in nature. While these feature of UR is known, it worth emphasising that UR events may be uncontrollable risk with probability of its occurrence difficult to precisely estimate (Witwicki et al. 2013). For example, during the last financial crisis, risk models in organisations indicate the limitations of organisations in coping with URs.

Organisations such as British Airways, American Airlines, Lufthansa to mention a few suffered a business disruption due to the Icelandic volcano Eyjafjallajokull eruption in spring 2010, which released a cloud of ash into the atmosphere for about two weeks (Christensen, et al., 2013). During the Icelandic volcano crisis, 108,000 flights were cancelled and approximately 10.5 million passenger journeys unable to board there flight and cost the airline industry in excess of $1.7 billion in lost revenue (Budd et al., 2011). While these UR is external, its impact was also significant internally and where not part of the foreseen or part of the regular disruptions that organisations experience. Nevertheless, organizations continue to ignore the changing nature of

those types of risks and the inadequacy of existing responses strategies and procedures in dealing with them (Ivantsov, 2014).

2.3.3 Philosophies of URs

It has been established that Black Swan (BS) are unknown events and unpredictable drawing from the metaphor described by Taleb (2007). According to Taleb (2007), very low-probability, extremely high-impact events that are almost impossible to forecast are called BS events. Similarly, Ivantsov, (2014) stated that extreme risk events are BS. To further appreciate the BS concept and the related terms several definitions are explored to obtain a broad perspective of the theoretical views. For instance, some of the definitions of BS are as follow:

a) Something extremely rare (or non-existent); a rarity (Oxford English Dictionary, 2014)
b) A real black swan event cannot be anticipated and is unprecedented, surprising, and catastrophic (Hollis, 2013)

However, Taleb (2007) has written the most complete synthesis to date of the metaphor of a BS event as:

"An event with the following three attributes. First, it is an outlier, as it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility. Second, it carries an extreme impact. Third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable"

In summary, BS can be defined as a new theory which presents unpredictable, rare, and extreme events, and the extensive pressure that accompanies them. Having said that, because there is nothing from the past can accurately predict how and when the BSs will emerge (Green, 2011). In addition, it is unlikely to be able to anticipate such extreme events precisely (Zurich, 2008; Werndl, 2009). In this sense, BS can also be referred to as UR and as one of the most dangerous risks because of the low probability and severe impacts, although debate persist on the extent to which unknowns can be known. For instance, Green (2011) presented speedometer graphic which elucidate the discussion by Taleb (2007) about the 'known unknowns', and 'unknown unknowns' which are called BS. The speedometer graphic in Figure 2.3 shows the difference between the various concepts of the risks.

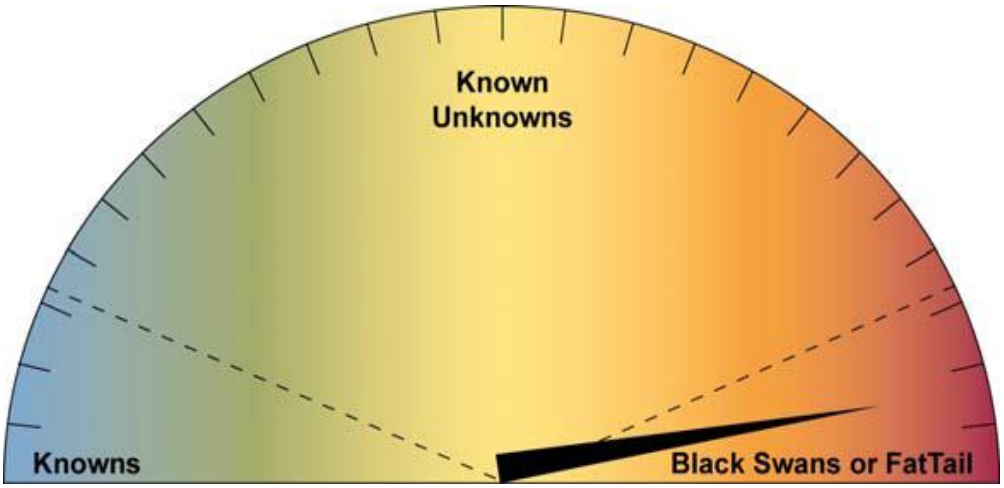


Figure 2. 3: Concepts relating to BS (Adapted from Green, 2011)

As seen in the Figure 2.3, BS's unlike other concepts does not take a long time to know what is happening, while other forms or types of risks and unfavourable events may take a while to determine what is happening (Taleb, 2007). On the other hand Taleb (2007) stated that extremist events that have huge influences do not always imply BS because some events can be rare and consequential, but somewhat predictable. Taleb in his "Black Swan" book (2007) named them "Grey Swans" because they are near to BS but in the reality, are not because they are somewhat knowing and expected.

Black Swan and UR

Black Swan (BS) event is dynamic (Taleb, 2007). However, Taleb (2007) stated that the technical name for the BS is the induction. Nevertheless, the BS is a result of many problems including induction. The BS was first introduced by Taleb. Nassim Nicholas Taleb (2007) in his best-selling book "*The Black Swan: The Impact of the Highly Improbable*" used the metaphor of "Black Swans" to mean unpredictable, rare, and extreme events. He argued that there are two varieties of rare events: the narrated BS which are probable to hear about on media; and the "escape models" that nobody is talking about, because they do not seem reasonable. The term BS has come from the story that in the 1600's the Europeans had only seen white swans and they were thought that a BS was hereditarily impossible. But, when BS were found in Australia subsequently, it deeply affected their perceptions and proved that the absences some type of events do not prove that the events are impossible.

Recent literature on this theory, despite the rarity, offers fresh insight into the process of initiating change. Taleb (2007) introduced this discussion of the process of change as it occurs in whole or sub-systems as a result of BS. This theory is to study the rare, unpredictable and extreme events with a view to detect common ones. The theory of BS is driving to stretch the imagination on what makes sense instead of being naïve and commit mistakes when unready. The BS phenomenon is a great puzzle due to, according to Taleb (2007), the fact that we tend to act as if BS do not exist because stability and absence of them encourage risk taking, complacency, and lowered awareness of the possibility of problems. He added, almost all "social scientists" have operated under the false belief that their tools could detect BS and measure uncertainty.

BS events started accelerating as the world started getting more complicated and is moving deeper into extremist (ibid). Models such as the Swiss Cheese; Three Lines of Defence to mention a few, made organizations or systems more robust to uncertainty and able to deal with the 16% of the remaining incidents. However, the remaining 4% of likely events appears to be much more intractable. Therefore, Taleb (2012) presented the concept of anti-fragility as a positive sensitivity to deal with complexity/nonlinearity or the exceptional and unpredictable events. All these events that occurred and considered outside the normal distribution of experience are called BS, unknown unknowns or unpredictable events (Taleb 2007; Zurich, 2008). After 2008, BS events have turned to be the most notorious events, because all the previous extreme and unknown unknowns events that happened have been so-called crisis or disaster or catastrophe events without any division in order to clarify them based on the scale or the degree of the unpredictability and consequences.

BS is a theory or concept or metaphor to describe any event is impossible or not existing yet or standing largely outside the realm of the predictable. Nassim Nicholas Taleb has famously developed a theory in his (2007) book: "*The Black Swan: The Impact of the Highly Improbable*" which is the so-called "Black Swan Theory". The "Black Swan Theory" shows the extreme change that result from unpredictable events. This theory is a metaphor describing an event has three characteristics: surprise, extreme and unpredictable. The BS event is an extremist event which is incompatible with systems and endanger their stability. However, extremist does not always imply BS. Some events can be rare and consequential, but somewhat predictable,

particularly to those who are prepared for them and have the tools to understand them. They are closer in nature to BS, but not quite in characteristics, because they are somewhat tractable scientifically, knowing about their incidence should lower the surprise, since the events are rare but expected they are called a special case of "Grey Swans" (Taleb, 2007).

It can then be inferred from the philosophical underpinning of BS that UR if considered as BS further imbibe the three characteristics of BS which are surprise, extreme and unpredictable. Since previous evaluation on UR have shown the unpredictable characteristics of UR, the two remaining characteristics of BS can also be added to the characteristics of UR to inform the subsequent line of arguments. The two features (surprise and extreme) of BS are added to Figure 2.4 to increase the characteristics of UR which will be evaluated and expected to be managed by risk management strategies in the next chapter.

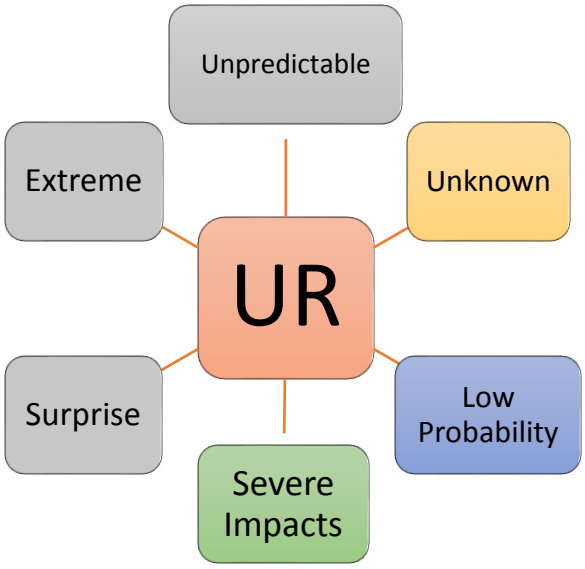


Figure 2.4. UR and its associated characteristics II

Figure 2.4 indicates that UR have five main characteristics according to literature review and further analysis, evaluation and discussions on UR will be based on and examined using these five characteristics as guide. These characteristics are also crucial in assessing risk management strategies suitable and effective enough for dealing with UR. The next section then examines the impacts of UR in general and subsequently its impacts on organisations in order to determine the role of and significance of risk management strategies and resilience in coping with the consequences of URs.

2.4 IMPACTS OF UNPREDICTABLE RISKS

Understanding risk environment and its complex and interrelation is obligatory in organisations. So, to do, risk manager should be aware of types of risks and the degree of their consequences. Organisations at times avoid dealing or rush to deal with bad event without identifying the real problem. Sparrow (2008) recognised that organisations most of the time pull or tug or to make matters worse by jumping into action without understanding the structure of the problem. The lack of attention to observation and scrutiny of the nature of the risk and its structure make the circumstances complex and interrelated, since the assessment of risks and conflicts of interest are different and influencing decisions. Therefore, it is clear that complex systems have crept into all the aspects of organisations and becomes harder to design and control them (Gershenson, 2007).

Furthermore, Celati (2004) stated that organizational complexities have increased over the years. An example of this is the Arab uprisings exert bottom-up pressure for political reform which led to government responses in different ways. This risk made the government seek solutions to cope with it. Spotting the errors of analysing immediate gains without taking into account the long-term side effects is a large mistake (Taleb, 2012). Unfortunately, instead of looking at the real problems, the government jumped by using traditional means that reflected a silo mentality in coping with similar risks. Some of the solutions or strategies that were chosen in dealing with these risks created others risks. For instance, the government attempted to divide the community by sectarian, gender, ideological, and regional, categories in order to direct them away from a union that may imply a common goal of thwarting government domination (Al-Rasheed, 2013). Although these events were societal issues, they were also external risks that influenced organisations in countries affected.

Even though organisations had measures in place and their organizational policy is to stabilize the system by preventing fluctuations, the results tend to be the opposite, therefore, these artificially constrained systems become prone to BS (Taleb, 2012), also known in this research as UR. While several reasons and factors were said to be responsible for the UR events experienced in the last few years, lack of adequate risk management process or strategies made these UR events more severe on organisations (Sparrow, 2008). Furthermore, the impacts of these events also stirred the realisation that general understanding that controlling risk by defining goals, monitoring, and implementing actions that changes the behaviour of the system has different

impacts in real life than in plans. As explained by Hood (1996), risk control process is difficult to be achieve in actual sense due to many reasons such as conflicting goals, different interests, conflicting viewpoints, and agreement among stakeholders.

2.4.1 UR in Organisations

When an UR occurs in an organisation, its impacts can generate a cascading effect that leads elsewhere, causing national and international ramifications and vice versa. It is acknowledged that organisational and individual vulnerabilities are therefore, capable of making a crisis situation evolve toward more chaos and disorder (Roux-Dufort, 2007). As seen today, organisations are confronted with increasing complications driven by the forces of globalization, regulatory scrutiny, competition, litigation, growing concern with technologies and complicated financial models (Saeidi *et al*. 2013). Moreover, it is a matter of definition that organisations exist for a purpose; perhaps to deliver a service, or to achieve particular outcomes. In the private sector the primary purpose of an organisation is generally concerned with the enhancement of shareholder value whereas in the central government sector the purpose is generally concerned with the delivery of service or with the delivery of a beneficial outcome in the public interest.

Whatever the purpose of the organisation, the delivery of its objectives is surrounded by uncertainty which both poses threats to success and offers opportunity for increasing success (Treasury, 2004). Therefore, every organisation should have a risk management strategy, designed to achieve the principles set out in this publication (Treasury, 2004). Further, it is instructive to note that no organisation is entirely self-contained, it will have a number of inter-dependencies with other organisations. These inter-dependencies are sometimes called the "extended enterprise" and will impact on the risk management strategy used by the organisation, giving rise to certain additional risks which need to be managed (Roux-Dufort, 2007). Thus, considerations for dealing with risks that constitute URs ought to include impacts of actions of one organisation on another (Treasury, 2004).

In this vein, many organisations will have inter-dependencies with other government organisations with which they do not have a direct control relationship, especially ones that relate to the delivery of their objectives and the extent to which it impacts or depend on the delivery of the objectives of another organisation. In these circumstances, what one organisation

does will have a direct impact on the risks which another organisation faces, and effective liaison between the two organisations is essential to facilitate an agreed risk management approach which will allow both to achieve their objectives (Treasury, 2004). On the other hand, many government organisations will have a relationship with bodies which they either "parent" or which have a "parent" role over them (Treasury, 2004). Possibly all government organisations will have dependencies on contractors or other third parties, although the extent of these dependencies will vary.

These relationships may range from straightforward supply of goods which the organisation requires in order to function, through to delivery of major services to, or on behalf of, the organisation (Treasury, 2004). As noted by Culp (2002), organisations are just collections of individuals who are tasked to perform a specific task, therefore, it is important develop the culture to resist and cope with adverse consequences of disasters and other risks through the adaptive capacity and resilience that they have (Liu *et. al*., 2011). Moving forward in dealing with UR, organisation ought to put a strategy together to enable it to identify potential crisis situations, minimize risk, and limit crises and disasters (Davies and Walters, 1998).

According to Davies and Walters (1998), organisations can be crisis-prepared and not crisis-prone through an assessment of preventive measures which can reasonably be taken to minimise the risks and by emergency planning to reduce the impact of unavoidable disasters. Knowing potential vulnerabilities allows planning, organising and training. The end product should be that those unpredictable everyday minor crises do not escalate to become disasters. It is obvious that different organisations will have different attitudes to risk. Some organisations may be considered to be risk averse, whilst other organisations will be risk aggressive. To some extent, the attitude of the organisation to risk will depend on the sector and the nature and maturity of the marketplace within which it operates, as well as the attitude of the individual board members (Hopkin, 2010).

However, another major factor that may cause impacts of URs in organisations to be severe is vulnerability. This is because extremes and unpredictability are translated into impacts by the underlying conditions of exposure and vulnerability associated with development contexts (Wisner et al. 2004). For example, there is evidence that institutional and organisational

arrangements and governance weaknesses can transform extreme events into crisis or disasters (Hewitt, 1997; Pelling, 2003; Wisner *et al*., 2004; Ahrens and Rudolph, 2006). PANEL (2012) also states that, vulnerability in organisations is identified by lack of adaptive capacity and resilience which are the two elements that ensure and contribute to the effectiveness of risk management in organisations.

It is therefore believed that probing into sources and causes of organizational vulnerability is important and can complement and add to a converging research agenda on the challenges faced by organizational risk management (Liu *et. al*., 2011). Therefore, it can be inferred that a better understanding of vulnerability in organisations or the focus on enhancing resilience is key to reducing risks of any type in organisations (Liu *et. al*., 2011). Crandall and Spillan (2009) argued that identifying the weakness that exist in organisation is one of the process that may help to improve resilience, since weaknesses indicate that the company may be vulnerable to certain risks and crisis.

While organisations tend to and desire to protect both tangible and intangible assets, identifying vulnerabilities across the whole organisation is not only important, but pertinent. This is because, Okoh and Haugen (2015) argued that there is need to acknowledge that actions taken by organisations to deal with vulnerability both address short term risk factors as well as future catastrophic events (Mileti, 1999). Thus, the next section critically examines the concepts of vulnerability as a factor that makes the impact of URs more severe on organisations and the need to consider it in relation to risk management strategies, resilience and set of guidelines for reducing the impacts of UR on organisations.

2.4.2 Vulnerability and URs Impacts

Vulnerability can be defined as the manifestation of the inherent states of the system that can be subjected to a natural hazard or be exploited to adversely affect that system (Aven, 2011). Vulnerability is a key term that is sometimes taken to mean the opposite of robustness or resilience. Hence, it is relevant to delineate vulnerability as well. Vulnerability in the context of Agarwal et al. (2007), indicates a potential to experience con-sequence which is disproportionately large compared to the amount of damage or perturbation causing it. However, vulnerability according to Asbjørnslett and Rausand (1999) refers to the properties of a system that may weaken or limit its ability to endure threats and survive accidental events that originate

both within and outside the system boundaries. Similarly, vulnerability is also considered as the inability of an object to resist the impacts of an unwanted event and to restore it to its original state or function following the event (NS5814, 2008). Furthermore, ISO Guide 73:2009 defines vulnerability as "intrinsic properties of something resulting insusceptibility to a risk source that can lead to an event with a consequence" (ISO, 2009).

Also, vulnerability is viewed as an error or a weakness in the design, implementation, or operation of a system (Light, 2005). While the views on what constitute vulnerability vary from discipline to discipline, there are four sources of vulnerability that face organisations today, which many organisations are not paying attention to. According to Light (2005), sources of vulnerability are ignorance, inflexibility, indifference and inconsistency. Organizational ignorance which directly impacts ability to measure results, strengthen program evaluation, and setting clear incentives for high performance. The second factor centres on the three characteristics that reduce organizational inflexibility; delegating authority for routine decisions, embracing participatory leadership, and fostering open communication.

The third factor converged on the three characteristics that confront organizational indifference include; surveying customers regularly, investing in new ideas, and setting strong incentives for high performance. The fourth factor focused on characteristics that counter inconsistency, which includes; reducing the barriers between units, strengthening information technology, and increasing access to information. One final characteristic; sharpening the mission, was found in all four factors, confirming that organizational purpose is the centrepiece for both addressing vulnerability and producing value when it is well aligned with and influenced by the understanding that UR events have the potential to impact organisation significantly. These sources are illustrated in Figure 2.5.

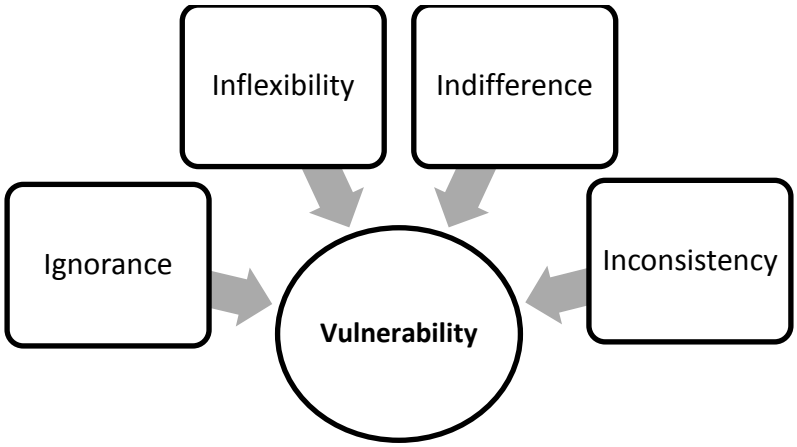


Figure 2.5 Sources of Vulnerability (Adapted from Light, 2005)

The argument of Light (2005) is based on the basis that lack of attention to longer-range threats and opportunities (*ignorance*) or in this case threats and risks that may have severe impacts like URs, subsequently make organisations prone to the impact of inevitable. This line of argument is also applied to the rationale for organisations to create the capability to move quickly to hedge against vulnerability or exploit new markets (*inflexibility*), a process which may not enable them devote and design resilience strategies based on effective risk management strategies (Light, 2005).

Although investing in research and development needed to bring new products to scale (*indifference*) may be good strategic move and venture in pursuit of organisational success, such initiative needs to be carefully undertaken without making the organisation more prone to the impact or occurrence of UR events. The future is considered as unknown in many cases even though organisations have long-term vision and milestones for achieving organisational goals. However, this require careful deliberations and actions that should be undertaken tactically without aligning the organisation to move as whole towards a hope-for future direction, a move that may lead to inconsistency (Light, 2005), thereby making the organisation vulnerable to external and internal perturbations. As such, many organisations are poorly designed and often engage in activities that may them less prepared to respond to the changes that they face, whether because of ignorance, inflexibility, indifference, or inconsistency (Light, 2005).

In this way, Hopkin (2010) posited that for an organisation that is in the start-up phase, a more aggressive attitude to risk is required than for an organisation that is enjoying growth or one that is a mature organisation in a mature marketplace. This is because the attitude to risk has to be

different when an organisation is a start-up operation compared with a mature organisation (Hopkin, 2010). Furthermore, organisational systems are thereby subjected to a broad risk environment and an unpredictable future characterised by internal and external risks and uncertainty (Burnard and Bhamra, 2011) and the ability to reduce vulnerability to URs. Thus, this section has indicated that impacts of URs can be externally and internally generated in society and in organisations (Roux-Dufort, 2007) and its impacts can be severe in an organisation, while the mitigating actions of an organisation in dealing with UR can potentially affect the survival of another organisation (Treasury, 2004). However, adaptive capacity and resilience culture of any organisation may enhance response and risk management strategies for dealing with URs in organisations without triggering a ripple effect on another organisation (Liu et. al., 2011). A strategy which Davies and Walters (1998) liken to crisis-prepared organizational culture.

2.5 MANAGING IMPACTS OF URS IN ORGANISATIONS

Some organisations can pay little or no attention to UR events, which led Drucker (2013) to state that, protected by a stable environment or near monopoly status, strategic life continues to be regular and predictable. Therefore, Ivantsov (2014) wondered about how an organisation be remained unawareness till suddenly finds itself dancing in the minefields and how an UR can unfold and spread out and crash organisation to pieces. Despite evidences that the UR events produce higher cost than their mitigations (Liu et al. 2011), the fact that UR assessment is treated less rigorously by the organisations makes them continuously vulnerable to the impacts of URs. Forecasting errors at times also results from wishful thinking which is the blindness of hope, however, the foundation of that is the knowledge problem and uncertainty (Taleb, 2007). Such knowledge problem and uncertainty in times past have been managed by risk management models which were linear and static (Hale, 2006).

However, the models turned out to be insufficient due to the dynamic nature of risks and risks such as URs, which still remains a major challenge for risk management researchers and practitioners. Systems are dynamic and include several feedbacks and adaptation loops as revealed when risk research started incorporating human and organizational aspects (Hale, 2006; Hale and Hovden, 1998). Risk issues are now understood as complex social issues in which a variety of stakeholders have divergent, though equally legitimate viewpoints. However, these

diverse views are often considered and integrated into policy making to influence how risk and decisions are communicated when dealing with risks (Wiig, 2008), especially those similar to URs. However, risk management strategies used in this sense are often measures taken when the risks and its impacts are already occurring. While some measures are better than no measure, Sparrow (2008) argued that harms producing forces of UR tend to cancel out any efforts to dislodge them. In such cases, small or incremental efforts cannot transform the situation, because they do not produce momentum sufficient to escape the grasp of the equilibrium position (Wiig, 2008).

Furthermore, small changes do not move the situation beyond the natural gravitational pull of its original starting position (Sparrow, 2008). To make that happen would require a radical intervention concentrated within a short time interval. In other words, organisational system would need a big shove and more effective risk management strategies for dealing with URs and for preventing its occurrence as much as possible. However, UR occur because organisations have misperceptions about them and lack capacity to cope with them at an early stage (Sparrow, 2008). Some organisations might consider risk control as the appropriate approach in dealing with UR, while others consider the promotion of some countervailing good is the best way. However, in order to reduce and cope with UR should utilise the both concepts. Controlling risk and meanwhile implementing of some countervailing good are the sufficient approach in assisting and controlling UR. Thus, organisations that are unable to implement the approaches might be susceptible to occurrence of the UR event. Despite UR having low frequency and high-severity, organisation must accept and anticipate it as a normal step in risk management and be ready for the challenge.

Since UR does occur every once in a while, (Zurich, 2008), it follows that no constructive action plan to build the proper risk management framework for extreme risk events have been sufficient and effectively proposed, thus leaving organisations vulnerable to the next systemic crisis (Ivantsov, 2014). As such, organisations often find themselves struggling and in challenging situation in the event of UR events, since the management of risk is not a linear process (Hale, 2006). Rather, it is the balancing of a number of interwoven elements which interact with each other and which have to be in balance with each other if risk management is to be effective (Sparrow, 2008). Understanding this dynamics and requirements further makes UR management

more challenging, thus seeing organisations struggling in dealing with its impacts. Furthermore, risks such as URs cannot be addressed in isolation from each other, the management of one risk may have an impact on another, or management actions that are effective in controlling more than one risk may be achievable (Treasury, 2004).

In dealing with or management impacts of URs, measures and strategies also need to accept that some negative consequences simply cannot be prevented, and suggests that risk or emergency managers need to design self-learning systems that help society or organisations to quickly adjust and recover following such events. However, measures and strategies must not ignore the fact that the degree of risk that is linked to extreme events, crisis and unpredictable events has a close relationship in determining the extent of their impacts on society and organisations (Pasteur, 2011). Furthermore, the threat these events present concept that are closely linked to vulnerability (Aven, 2011). But Pasteur (2011) argued that it is not so much about the threats, but more about the degree to which a population or system is susceptible to, and unable to cope with risks, hazards and stresses. Whereas a threat can also be seen as the adversary that is motivated to exploit a system vulnerability and has significant capacity of doing so (National Research Council, 2002).

Therefore, shifting emphasis from the reactive mind-set towards proactive is a greater process in coping with threat, especially, when this shift is linked to an investigation into the underlying causes of vulnerability (Magrabi, 2011). Taleb et al. (2009), emphasized that instead of trying to anticipate UR events, organisations should reduce these vulnerabilities to them. Integrated risk management improves the risk awareness of organisations and identifies cross-organization risks that may have fallen through gaps in the system and helps organisations to address these own vulnerabilities (OECD, 2009). Unfortunately, many organizations suffer from deficiencies in treating vulnerabilities, fragilities, and gaps across their system for different reasons; gaps which further emphasises the importance and justification for this research. However, identifying vulnerabilities as early as possible allows for much better benchmarking for higher fidelity models and enables organisations to simulate in order to further evaluate other risk scenarios that may impact the organisation (Taleb, 2012).

Indeed, arguments about managing UR events and studies in the same suggest that organisational survival is founded on its ability to selectively adapt to accommodate those problems in ways

that are able to sustain core organisational values and goals (Sparrow, 2008). However, this remain a farfetched reality when dealing with URs especially the severity of its impacts when its occur. While studies suggest that 'selective adaptation' can take a variety of forms (cf. Hood 2011), organisations can draw on strategies that project an illusion of control to sustain external legitimacy while doing little in practice to actually manage problems (Zurich, 2008). Examples of this include turning a 'blind eye' to failures that can be absorbed through organisational slack, stage-managing information disclosure, or creating risk management plans that are akin to what Clarke (1999) has termed, 'fantasy documents' that have little connection to organisational practice. Such strategies may protect core processes that are vulnerable to disruption by external scrutiny, but they can also create classic conditions for disaster incubation by sustaining dysfunctional organisational behaviours and relying on reactive 'fire alarm' responses when disaster eventually hits (Huber and Rothstein, 2013).

However, studies examined in this section and chapter suggest that organisations selectively identify, and adapt to manage particular adverse outcomes so they become vulnerable to other kinds of failure. For example, high-reliability organisations are only able, if at all, to contain one kind of adverse outcome such as failing to launch and land aircraft from ships, at the expense of other problems such as bullying or, most significantly, excessive cost (Huber and Rothstein, 2013). Furthermore, flaws and failures in organisations during the financial crisis also stimulated a push for a new type of risk management. As experienced and noted in the past, three common failures prevent organisations to maximise risk management strategies and these include:

a) Failure to get the right information to the right people
b) Failure to connect the benefits of risk management to its costs and
c) Failure to exploit efficiency and strategic opportunities created by risk management (Culp, 2001; Huber and Rothstein, 2013).

Culp (2001) further argued that these failures can be addressed in large part through more attention to integration and risk indicators. In order to succeed in the integration of risk management, better understanding of risk characteristics, structure, organization, accountability and communication in the risk management system was necessary (Lundqvist, 2014). Despite these requirements, certain reasons still make it difficult to establish a strong scientific platform for risk assessment and risk management especially as it concerns URs, since the different

perception of risk makes it difficult to establish common pillars or effective strategies for dealing with its impacts and preventing its occurrence (Aven and Zio, 2014).

However, Hopkin (2013) argued that in organisations, risk managers often hesitate to accept that risks such as URs may be more challenging to manage using regular or routine measures. Furthermore, impacts of UR risks pose a challenge to manage due to unprecedented contemporary challenges that are present in modern times (Lundqvist, 2014). More significant challenge to dealing with URs is ability of organisation to balance the measures between preparing for and coping with risks on the one hand and the increasing severity of risks on the other hand (Aven and Zio, 2014). The significant sources of this disorder are to unavailability of appropriate elements of human activity both qualitatively and quantitatively, as well as other variables and challenges within organizations along with external forces (Drennan et al. 2014). According to Sparrow (2008) policy interventions and risk-communications may deal deliberately with the class of "irrational individuals" who seem to persistently underestimate particular threats, and who therefore endanger themselves and others. Although organisations voluntarily take risks because the gamble is often associated with the potential to create benefits, and often the bigger the gamble, the bigger the benefit (Hopkins, 2013).

When organisations are stricken by UR event, some set of damage is not sufficiently controlled due to absence of the ability to identify the risk at an early stage. In this type of situation, the system or protocol often does not have a plan for that type of risk (Sparrow, 2008). Therefore, organisations suddenly often find themselves in an astonish state as an outcome of UR event. Also, this event by its characteristics that present surprise, drives organisations to be undermine or trivialise the status quo (Drennan et al. 2014). The organisations do not know what should they do and what is the real problem to be managed. That led Sparrow (2008), to indicate that the appropriate questions which organisation should to ask regarding to the emerged wicked situation is; what the problem is, and what should be done about it. However, these questions are forgotten most of the time or mixed which should be first, identifying the problem or implementing action.

Accordingly, the problems that organisations really face during the UR event are the complexity between patterns of thought and patterns of action. So Sparrow (2008) argued that the dimensionality of consequences is different than the shape of the problem itself. Consequences

are more about a concentration of cause whereas the dimensions of the problem show how it is concentrated (Drennan et al. 2014). Unfortunately, this may not be sufficient as Sparrow (2008) explained that heavy reliance on particular dimensions might even blind the organisation to the very existence of the other types of problems, which in this case is URs. Pulling or tugging the risk without understanding the nature, type and characteristics of the risk in order to fashion a plan accordingly, may end up negatively impacting organisations (Taleb et al. 2014), which emphasises the importance of having effective strategies for dealing with risks.

To ascertain the impact of risks on organisations, Leitch (2012) did a survey to determine the main causes that leads organisations to failure and underestimating risks comes first in (68%) followed by overestimating ability to predict and control the risk (59%), then bias by personal interests (41%). Arguments and outcomes of inquiries such as this, emphasise the reasons why organisations fail in its responsibilities to cope with and effectively manage URs and impacts of its events. Evidently, there is no escaping from the impacts of risks especially one like URs (Vaughan and Vaughan, 2008) and the subject of risk management need to be more than inventive tools, checklists and anecdotal advice (Coleman, 2012), but one that is strategically placed to deal with URs. Therefore, organisations must accordingly seek ways of dealing with it (Vaughan and Vaughan, 2008) and a systematic approach that incorporates both the nature, types and characteristics of UR is needed in coping with UR events.

2.5.1 Preventive Measures

Despite the existence of extensive literature regarding risk management, there still seems to be lack of knowledge in identifying Critical Success Factors (CSFs) in this area (Yaraghi and Langhe, 2011). Although factor analysis and one-sample test are used to refine and rank the CSFs based on the results of a survey which has been performed among Risk Management practitioners in various types of Swedish corporations. But besides this, CSFs are defined from three different perspectives:

I. the factors that have influence on the inclination and readiness of corporation for implementing RMS.

II. the factors that are important during the design and implementation of RMS in corporation and can significantly affect the success of RMS design and implementation and

III. the factors that are crucially important to successfully run, maintain and administrate RMS after the closure of the project of RMS design and Implementation (Yaraghi and Langhe, 2011).

Identifying critical success factors can bridge the gap between literature and practice in the field of risk management. But case studies have shown that rational organizations would focus their limited resource on those things that really make the difference between success and failure (Yaraghi and Langhe, 2011), which may make them vulnerable to URs. By identifying, ranking and classifying the CSFs for risk management systems in three stages of readiness, implementation and administration we have bridged the gap between studies regarding theory of risk management and its practical issues (Yaraghi and Langhe, 2011). In all three stages, strategy is the most important factor for success, because realizing the need and necessity of Risk Management Strategies (RMS) by organization and deciding to have at least a strategy is the first step toward successful RMS (Yaraghi and Langhe, 2011). After having the system implemented and during its lifecycle, strategy is again an essential factor that ensuring that adequate monitoring is in place to identify any UR characteristics and likelihood of occurrence.

Organization must have a prolong strategy and culture toward risk management and keep developing the RMS as new requirements as challenges emerges. More over strategy has a fundamental role in changing and shaping the organizational culture and structure through all the phases of RMS (Yaraghi and Langhe, 2011), thus emphasising the potential effectiveness of one of the preventive measures for URs. However, another preventive measure that is equally important is the need for organisations to put the previous UR in a broader context due to its ability to be an instructive case for what can happen when UR are poorly anticipated (Zurich, 2008). UR signal detection is necessary in order to integrate different kinds of work from regulatory policy for controlling the UR in an organisation to CSFs and best practices (Coleman, 2012).

However, it is a significant process to guide a relationship between pursuing effectiveness in reducing risks and respecting the traditional regulatory values in same time. Reducing UR impact

needs a design and implementation of tailor-made response that can translate into better process of dealing with it (Sparrow, 2008). Although organisations may be somewhat slow to jump into action given the unpredictable characteristics of URs, it is pertinent to however continue to envisage and have preventive measures in place that align with CSFs and effective RMS. According to Sparrow (2008), this may take the form of and time to engage in systematic but open-minded inquiry, seeking first to understand the dynamics and components of the harm.

Sparrow (2008) further explained the preventive process as one that require; slicing and dicing the overall risk, cutting it this way and that, exploring many different dimensions in which concentrations might be specified or become apparent. Then, as significant concentrations or parts of the risk come slowly into focus, and appear worthy of specific attention, these practitioners examine these intermediate objects (the knots, or concentrations) more closely still, modelling and testing different problem-definitions and specifications, setting the scale of the overall endeavour, separating and enumerating the distinct knots they find, and discerning the structure of each one.

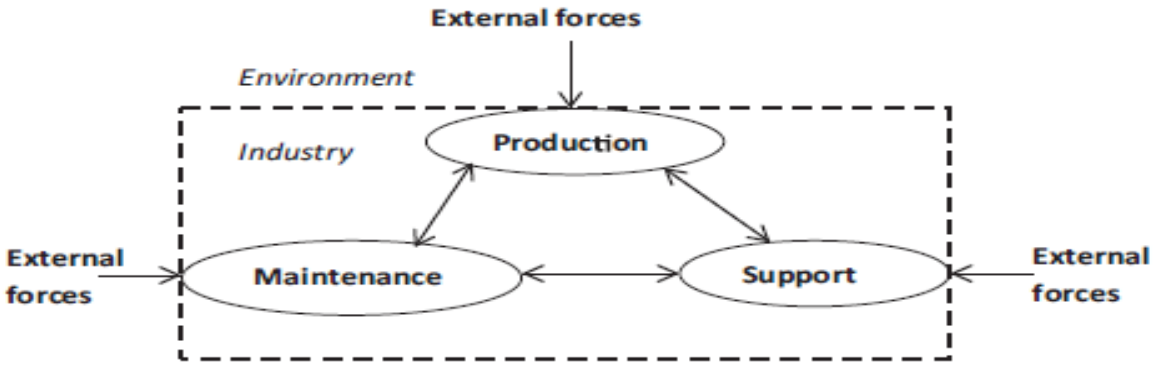
While this process may seem extensive, they are however considered as pre-planning or action-planning phase or stage. However, it is important not to confuse reductions in levels with instances of prevention (Sparrow, 2008). This is because prevention measures imply long-term success whereas reductions measures represent only a small subset of the real preventive accomplishments (Sparrow, 2008). Furthermore, reductions measures may only be available in the short term. Regardless, whatever the protective and preventive measures of organisations, Ivantsov (2014) argued that organisations are not immune because UR is the most difficult and the most complex threat to cope with, although defence mechanisms may prevent the impacts from prolonging.

2.5.2 Organisational URs defence and safety barriers

There are various defence mechanisms which organisations adopt to minimise their vulnerability to potential risks, crisis and disasters (Paton and Hill, 2006). But if the organisation has sufficient structural flexibility, its often better placed to develop its capability to manage significant disruptions (Alesch et al., 2001; Folke et. a1, 2003; Paton, 1997a). The simplified system is consistent with using the metaphor of “organisations as a machine” (Morgan, 2006), which also

suggest that organisations are not completely vulnerable by design, but barriers and measures may not be as effective for as long as required to deal with impacts of URs (Lauder, 2011).

Lack of sustained measures emphasise the relevance of robustness and resilience as a contributing factor to maintaining the integrity of safety barriers. To ensure that measures are sufficient in preventing URs, Okoh and Haugen (2015) explained that organisations ought to investigate maintenance contribution to organisational robustness and resilience by using the various perspectives of organisational or major accidents. Since organisations have system that consist of three elements; production, support and maintenance (Wilson, 2002), it is important that defensive measures for URs incorporates the relationship between systems and structure of



the organisation as shown Figure 2.6.

Figure 2.6 relationship and interactions between organisational system and structure

(Okoh and Haugen, 2015)

Figure 2.6 indicates that there are external forces that may impact internal systems such as production, support and maintenance. Since external forces, as shown in figure 2.6, have the potential to attack different aspects of the industry, it is important that organisations have formidable measures in place that can be applied to better mitigate the impacts of URs. Nowadays the majority of organisations have either been deliberately designed for, or have evolved to operate efficiently and effectively in routine environments characterised by stability and predictability. However, in many organisations, this has increased their vulnerability to the highly volatile and uncertain conditions that appear to becoming the norm (Stern, 2001; Kates and Parris, 2003; Sornette, 2003; U.S.- Canada Power System Outage Task Force, 2004; United States General Accounting Office, 2004, McDonald and Robinson, 2009). Over the last decade,

volatility in our natural, economic and social systems appears to be increasing at rates faster than many organisations can cope. Whilst such fast moving events overwhelm many organisations a proportion demonstrates an ability to either manage or bounce back from the adverse effects of system volatility (Gibson and Tarrant, 2010). There is also a growing recognition that such accidents and failures can be traced to organisational factors that create conditions that make them prone to events of URs or crisis (Madni and Jackson, 2009).

Evolving unforeseen disturbances unbalance organisational functions, provoke crisis situations (Valackiene, 2015), which further emphasises the need for resilience in organisations as well as risk management strategies that incorporates the characteristics of URs identified in this chapter. Strategies as proposed in this research moves away from the "silo" concept in which the different risks are distinctly administrated and sustains the idea that the risk management could create values in the organisation (Nota, 2010). Therefore, risk management is very important to establish and maintain credibility throughout the unpredictable event. In other words, without risk management, the UR event will not well treated and generally develop into a much graver situation such as crisis or disaster Zurich, 2008). Much of the perished organisations often did not have a sufficient risk management strategy (Sparrow, 2008), which indicate that the UR event require risk management strategies to be prioritised in organisations.

Thus, the UR confirms the significance on an integrating approach to risk management that cuts through all layers of an organisation (Zurich, 2008). Which implies that having risk management strategies and one that cuts across all layers of the organisation sensitises organisation to the likelihood and awareness of URs. Despite this possibility, there is no denying that the ambiguity during response phase of UR is often the main source of stress (Sparrow, 2008). The previous URs are however, reminder to all organisations that regardless of the size and degree of smartness, there is need to be equipped with the robust purpose built framework preventing UR (Ivantsov, 2014). But as explained in this chapter, risk management strategies provide an organisation with decisive strategic advantage in the event of an UR. In addition, the ability to identify and understand risks in early stage assists organisations to manage, control, and avoid risk to be escalated into an extremely difficult situation to manage. Above all, the complex and interrelated state of UR necessitate adequate and effective risk management strategies (Zurich, 2008).

2.6 CONCLUSION

This chapter has established that certain terms and concepts relate to URs and can be used to provide better understanding for the nature, types and characteristics of UR events. While URs is fundamentally influenced by specific types of risks, it is important to understand the six characteristics identified in this chapter in order to effectively deal with the onset and occurrence of URs. This chapter has contributed to achieving the first and second research objectives by reviewing and examining relevant literature on UR, its theories and philosophies. Furthermore, the second objective as examined in this chapter indicate that the negative impacts of UR on organisations and that the impacts can be internally and externally generated and detrimental. Therefore, providing insights into areas that mitigation strategies ought to focus on when addressing concerns on URs.

Understanding that the impacts of UR can be widespread and have ripple effects that may affect other organisations and the society and vice versa is key to important in this research going forward. As identified in this chapter and from existing literature, the mitigation strategies for URs ought to possess effective preventive, reduction and management measures which are developed and based on the understanding of the six characteristics of URs as well as the CSFs that inform RMS. Therefore, the next chapter which is another literature review that evaluates risk management processes and models, and other essential concepts required for dealing with URs. The chapter also seeks to identify CSFs and strategies that may be effective enough for dealing with URs impacts, by examining the relationship between RMS and resilience and robustness in organisations.

CHAPTER 3: RISK MANAGEMENT STRATEGIES AND ORGANISATIONAL RESILIENCE

3.1 INTRODUCTION

The aim of this chapter is to build on issues identified in the previous chapter. It specifically examines the concepts of risk management and possible strategies that can improve capacity for dealing with Unpredictable Risks (URs) and the potential use of risk management strategies in enhancing organisational resilience. This chapter is divided into six main sections, with each section devoted to; a critical review and evaluation of concepts of resilience and robustness, risk management processes and models, and risk management strategies for enhancing resilience and robustness of organisations in managing URs. The information evaluated in these sections are crucial for the primary data collection and in determining the effective risk management strategies that may enhance resilience and robustness in organisations in Saudi Arabia. By so doing, this chapter would have ensured that part of the second and third objectives is achieved, while it simultaneously lays the foundation for the primary data that will be used to fully achieve the objectives.

3.2 RESILIENCE AND ROBUSTNESS IN ORGANISATIONS

There are a number of other concepts related to the concept of risk as identified in previous chapter. These concepts include uncertainty, unpredictability, threat, probability and consequences (Taleb, 2007; Zurich, 2008; Green, 2011; Ivantsov, 2014). These concepts and terms further suggest that certain conditions exist in organisations that make URs events possible and cause severe impacts. According to Comfort et al. (2010) society or in this case organisations are susceptible or prone to the impacts of external perturbation which impact their existence and threaten their survival. While explanations on the state of vulnerability increases the impacts of UR events, it also infers that proneness to URs can also make their likelihood frequent in an organisation (Aven, 2011).

To address this issue, Comfort et al. (2010), Pasteur (2011) and Aven (2011) strongly argued in favour of, by emphasising the need for, and importance of adaptive capacity, coping capacity and resilience in preventing, mitigating and dealing with the impacts of external perturbation, which in this case may be interpreted as UR events. Therefore, this section examines the significance of

and components of resilience that may help organisations be better placed and prepared to deal with URs and impacts of its devastating events. These factors also describe the core elements of high-performing organizations: alertness, agility, adaptability, and alignment.

As explained by Light (2005), high-performing organizations must be alert to changing circumstances, agile in addressing vulnerabilities and opportunities, adaptable in taking alternative paths to achieving their organisational goal and survival. However, the concept of resilience that enable it to be sufficient for dealing with extreme events, or unknown unknowns such as UR or BS may be challenging and need to be a continuous process of efforts. This assumption is made based on the fact that any strategy or measure that will aim to prevent and mitigate the impacts of UR ought to recognise the paradox inherent in the notion of preparing for unpredictable surprises (Comfort et al. 2010).

3.2.1 Resilience and URs

Ultimately, predicting the infinite number of unknowable BS is less important than preparing to manage outcomes and effects of URs. The greater tasks lie in the ability of organisations to match the speed of onset of UR events with the velocity of response, if it is to both survive and thrive (Aven, 2011). As such, situational awareness becomes paramount in order to increase survival rate and level. To this end, it is essential that organisation use risk intelligence to develop strategies that promote adaptive capacity that translate into resilience (Zurich, 2008).

Resilience: A Working Definition

The past years has observed resilience being used and inferred to mean different things. Just like risk and vulnerability, its meaning and explanations vary from discipline to discipline. For example, resilience is considered as the ability to accommodate change without catastrophic failure, or the capacity to absorb shocks gracefully (Foster, 1993). According to Asbjørnslett and Rausand (1999), it is characterized by transition to a new stable situation after the unexpected events. This is consistent with the explanation on resilience which views it as a quality encompassing concept, that monitors the boundary conditions of the current model for competence (how strategies are matched to demands) and adjusting or expanding that model to better accommodate changing demands of perturbations (Woods, 2006a).

Furthermore, resilience is also seen by other authors as the intrinsic ability of a system to adjust its functioning prior to, during or following changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions (Hollnagel, 2011). He further clarifies that resilience is dependent on the application and management of capacity to respond to events, to monitor ongoing developments, to anticipate future threats and opportunities, and to learn from past failures and successes alike (Hollnagel, 2011). In the opinion of Paries (2011), resilience is a combination of readiness and creativity, and of anticipation and serendipity. This implies that being prepared both for the expected and the unexpected is a major component of resilience that helps classify resilience as one with;

- features designed into a system as a whole, and
- Features of the elements or the agents (e.g. human agents) that interact with the system.

Paries (2011) further explained that systemic resilience emerges from the interaction of behaviours of individual and the resilience of the individual agents themselves as being partially influenced by the systemic resilience. While, perception on resilience vary and differ from discipline to discipline, the working definition in this thesis influenced by the research scope and aim is that; resilience is the capability to adapt to changing contexts, withstand sudden shocks and recover to a desired equilibrium or a new one while preserving the continuity of its operations (Sundaraj, 2012; Madni and Jackson, 2009; Zurich, 2008). The three elements in this definition encompass both recoverability (the capacity for *speedy recovery* after a crisis) and adaptability (*timely adaptation* in response to a changing environment). However, it is important to note that reaction within resilience context implies immediate or short-term action, while adaptation implies long-term learning (Madni and Jackson, 2009).

As such, the expectations exist that a system designed for resilience will avoid, react, survive, recover and adapt from unpredicted disruptions. However, Sundaraj (2012) argues robustness and resilience need to co-exist within systems to ensure that the preferred efficiency and reliability of the system is attained (Sundaraj, 2012). Thus, resilience is an important component within systems or processes to manage change caused by perturbations and maintain the performance levels for which the systems or processes were initially designed (Sundaraj, 2012). As such, the notion of resilience denotes stability and continuity in the face of turbulent

unexpected disruptive events such as crisis and disaster (Oluwasoye and Ugonna, 2015). Furthermore, the resilience concept as explained by Oluwasoye and Ugonna (2015) relates to the ability of systems to respond to and adapt effectively to the changing circumstances, one of which, in the case of this research are URs.

As stated by Hollnagel and Sundström (2006), a resilient system, or organisation is able to withstand the effects of stress and strain and to recover from adverse conditions overlong time periods. However, this may be impossible to achieve without hierarchical "defence in depth" strategy as a means of achieving the combination of anticipation and serendipity, such that a failure of defence activates tactical operating procedures shifting from detailed protocols for normal situations, to a generic action framework for emergency situations (Paries, 2011). Furthermore, a resilient system may be seen as one with the quality of ascertaining whether the current adaptive capacity is enough to meet future demands, implying that an insufficiency of this quality makes the system vulnerable to sudden collapse and failures (Woods, 2011).

While Woods (2011) emphasised the patterns of anticipation, Leveson et al. (2006) argued that it is important that resilience measures is both reactive and preventive. This is because reactive resilience involves the ability to continue operations or recover a stable state after a major mishap or event (Leveson et al. 2006). But preventive resilience focuses on the ability of systems to prevent or/and adapt to changing conditions that leads to maintaining and controlling a system in view of coping with disturbances. Thus, from an organisational perspective, resilience is seen to represent the capacity of systems within the organisation to effectively anticipate and manage risk through appropriate adaptive actions, systems and processes in order to ensure that its core functions are continuously carried out in an effective and stable condition (McDonald, 2006).

However, it is important for organisation to build capacity and ability to keep and recover quickly from a stable state when needed in order to allow continuity of operations during and after a major crisis (Wreathall, 2006). But this is not always as easy as it sounds on paper, because Okoh and Haugen (2015) argued that the financial or other organisational goals often takes the priority of organisations and prevent them for considering organisational safety as a resilience component. According to Haimes (2009), improving the resilience of a system within an organisation offers major advantages in managing risks, thus stating that improving organisational resilience constitute an integral part of risk management process. But COMEST

(2005) argued that achieving a resilient organisation is consequent on understanding the characteristics of resilience. It is said that resilience has three characteristics, namely;

1) The amount of change the system can undergo and still retain the same controls on function and structure,
2) The degree to which the system is capable of self-organisation,
3) The ability to build and increase the capacity for learning and adaptation (COMEST, 2005)

These characteristics indicate that organisational resilience systems require that relationships between potential source of failure and alternative strength be simultaneously considered (Stephenson, 2010). Resilience is the emergent property of organisational systems that relates to the inherent and adaptive qualities and capabilities that enable an organisations adaptive capacity during turbulent periods (COMEST, 2005; Stephenson, 2010). Thus, the mechanisms of organisational resilience thereby strive to improve the situational awareness, reduce organisational vulnerabilities to systemic risk (URs) and restore efficacy following the events of a disruption (Burnard and Bhamra, 2011). While one of the constituents of organisational resilience is the ability to deal with change, the capacity of the people and systems that facilitate organisational performance, to maintain functional relationships in the presence of significant disturbances as a result of a capability to draw upon their resources and competencies to manage the demands, challenges and changes encountered (Paton and Hill, 2006). Therefore, organisational resilience is viewed as an important element and evidence that an organisation has capacity for response (Gallopı'n 2006), especially in dealing with URs.

Based on the explanations thus far, organisational resilience may be defined as the emergent property of organisational systems that relates to the inherent and adaptive qualities and capabilities that enable an organisations adaptive capacity during turbulent periods (Burnard and Bhamra, 2011). According to Gell-Mann (1994), the ratio between order and chaos is the critical factor in determining the capacity of a system to adapt successfully to systemic surprises. Adaptive capacity (or adaptability) refers to the ability of individuals and organisations to adjust their performance to the current condition. However, where a resilience approach or mechanism is not evident in an organisation, different authors have identified and proposed indication of

resilience, elements, and components of different frameworks that may be used to identify organisational capabilities to cope with perturbations.

3.2.2 Resilience Principles and critical factors for managing URs

There are several terms, originating in different fields that describe concepts that are similar to resilience. These include: safety, reliability, and survivability. While these terms cannot be fully negated because of some overlap, their specific emphasis tends to be different (Madni and Jackson, 2009), regardless, the basis of organisational resilience is a fundamental understanding and treatment of risk (Gibson and Tarrant, 2010). This understanding influence the notion that effective resilience is built upon a range of different strategies that enhance both 'hard' and 'soft' organisational capabilities (Gibson and Tarrant, 2010). For instance, Gibson and Tarrant (2010) explained that resilience is based on six key principles including:

1) Resilience is an outcome
2) Resilience is not a static trait
3) Resilience is not a single trait
4) Resilience is multidimensional
5) Resilience exists over a range of conditions
6) Resilience is founded upon a good risk management

Resilience is an outcome emphasise that resilience is not a product or synonym of business continuity or emergency management, but it is a trait that can be observed and applied in response to generate a substantial change in circumstances. This argument further states that although a trait, it is not a static trait, but one that will change in response to volatility in the external environment and as organisational capabilities change over time. It is neither a single trait, since resilience arises from a complex interplay of many factors, given that circumstances changes and resilience is dynamic, which increases or decreases as context changes (Gibson and Tarrant, 2010). However, the multidimensional principle of resilience stresses that there is no single model that is sufficient for describing resilience, since all existing models have limitations.

As such, Gibson and Tarrant (2010) argued that resilience exist over a range of conditions; from low resilience (proneness or vulnerability to risks) to high resilience. Such a spectrum of resilience can be observed amongst different organisations facing the same event; within a single organisation experiencing different types of events, or over different periods of time; or internally amongst the different functions within an organisation. As an organisation focuses on and invests in enhancing its resilience, it should see an increasing maturity in its resilience capabilities, from a low end highly reactive state (such as a simple emergency response such as an evacuation), improving capabilities through proactive preparedness (for example having in place incident response and business continuity capabilities) eventually achieving a state where it is adaptive to conditions of high uncertainty as shown in Figure 3.1.

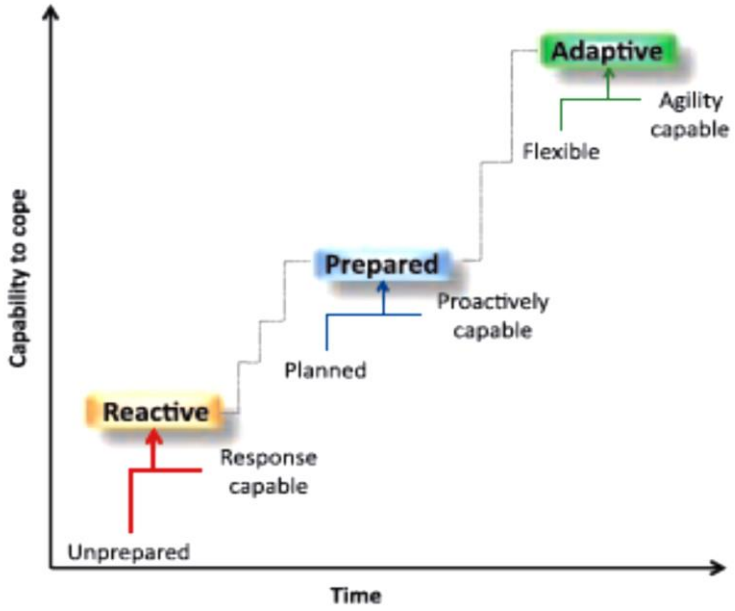


Figure 3.1: The progression of resilience maturity (Gibson and Tarrant, 2010)

As observed in Figure 3.1, being in an unprepared state creates low capacity to cope with crisis or UR events, whereas, if the organisation was to be in a prepared state the organisation would be both prepared and importantly have the proactive capacity required to respond to and subsequently manage UR events. The progression of resilience maturity then shows that organisations rarely demonstrate resilience by accident, but that resilience is based on sound assessment, treatment, monitoring of and communication about risk which are elements of effective risk management process (Gibson and Tarrant, 2010). The last principle, resilience is

founded upon good risk management, which is also the core component of this research emphasise the direct link and relationship between resilience and good risk management. Although these principles help to establish a foundation for other conceptual frameworks for resilience, Gibson and Tarrant (2010) argued that, their evaluation and critique indicate that principles some of the principles such as "resilience is an outcome" are flawed, limited and irrelevant to this research area. However, the integrated model, shown in Figure 3.2, places risk management at its core or centre shows that resilience is dynamic, multidimensional and certainly founded on good risk management.

Figure 3.2: Integrated functions models (Gibson and Tarrant, 2010)

Figure 3.2 illustrate the interactions between essential measures such as emergency management, crisis management, business continuity management and security management which all interact as combined process that generate resilience. Although Gibson and Tarrant (2010) combined the integrated functions model, other authors have examined these measures as individual unit for addressing different types of risk that pose major threat to public safety. Thus, an evolution of this process/management system thinking has seen a number of integrated models proposed, with some implemented successfully into a range of different organisations (including in the organisation of one of the authors). It is believed that the integrated models that are based around

a robust risk management program can be major contributors to organisational resilience. In such models, risk management provides the foundation that links different organisational capabilities such as emergency, business continuity, security and crisis management as seen in Figure 3.2. Risk management provides a common understanding of how uncertainty arising from highly volatile environments can affect the organisation and its objectives and provides the means by which these specialised capabilities can then address that uncertainty (Gibson and Tarrant, 2010).

While it has been established that good risk management includes assessment, treatment, monitoring and communication of risks, which are all essential foundation needed to ensure organisational resilience (Gibson and Tarrant, 2010), organisational resilience must then strive to ensure that organisations endures pressures of URs while maintaining or improving its functionality (Styczynski et al. 2014). Therefore, resilience is a balancing act between risk and resources, between vulnerabilities and escalating or unmanageable catastrophe, which organisations can achieve through anticipating and preparing for crisis and their consequences through knowledge, social collaboration and innovation (Comfort et al., 2010). However, this may not be easy to achieve, since resilience is also considered as a process and multidimensional not a status (Gibson and Tarrant, 2010).

3.2.3 Robustness in Organisation

Organisational robustness is about what happens when UR happen to organisation. This strategy is sometimes called "defence in depth" (Hüser, 2006). Jen (2002) stated that robustness is often thought of as reflecting the ability of a system to withstand perturbations in structure without change in function. Robustness has synonyms such as "physically strong", "strength", "hardiness" or "resistance" which describes structural properties of entities (Hüser, 2006). According to the Oxford Dictionary (2010) robust/robustness - (of an object) means sturdy; strongly and solidly built; strong and healthy; vigorous; (of a system, organisation, etc.) able to withstand or overcome adverse conditions; and uncompromising and forceful (Oxford Dictionary, 2010). Robustness is the noun form of the English adjective "robust" which originates from the Latin "robustus" – it simply means firm, hard, strong. However, in scientific and academic sense, there are different definitions of robustness (Jen, 2005), and as yet, there is no universally accepted definition.

Besides, robustness tends to be misconstrued for resilience sometimes (Pavardet al., 2007). Robustness refers to the insensitivity of performance to deviations from normal conditions. Measures to improve robustness include inserting conservatisms or safety factors as an assurance against individual variation (Aven, 2008). However, in terms of systems, Asbjørnslett and Rausand (1999) explain that robustness is characterized by:

1. Resistance to accidental events,
2. Restoration of functionality and
3. Retention of original stability (Asbjørnslett and Rausand, 1999).

This view is consistent with that of Ferdows (1997) who explained robustness as the ability to cope with changes in the competitive environment without resorting to changes in the structure. It is also viewed as the ability to withstand external and internal shocks (Chandra and Grabis, 2007). As viewed by Agarwal et al. (2007) a system is robust if it does not yield to any damage characterized by significant loss of form and function, and even a single mode of vulnerability renders a system 'un-robust' no matter whether the system is acceptable under other kinds of demand (Agarwal et al., 2007). Furthermore, robustness as seen by Pavard et al. (2007) is the ability of a system "to adapt its behaviour to unforeseen situations, such as perturbation in the environment, or to internal dysfunctions in the organisation of the system. It is the ability to resist and counteract accident events (Okoh and Haugen, 2015).

Although views and definitions vary on robustness, it cannot be denied that robustness is crucial to planning and it requires reliable up-to-date information, since creating robust strategies that incorporate and promote resilience can be dynamic and multi-dimensional (Styczynski et al. 2014). In order to perform well in the event of URs, creating robust strategies that foster resilient development necessitates a decision-making methodology that incorporates flexibility, keeps options open, and performs well over the range of plausible uncertainties. (Styczynski et al, 2014). According to Hüser (2006), in order to make a solution more robust, it is important to exploit the problem structure. However, this optimization problem is directly linked to a robustness/fragility trade-off (ibid). Thus, Sparrow (2008) emphasized that the organisations should embody the managerial systems to organize and support such work to avoid failure. In the

same line, Ivantsov (2014) indicated that regardless of how big and smart the organisation is, it needs to be prepared with the robust framework to prevent enormous and disastrous losses.

In terms of risk absorbing systems especially in organisations, robustness and resilience are two main approaches that can be taken to enhance risk management strategies. This is because a resilient system can withstand or even tolerate surprises which is one of the characteristics of URs. In contrast to robustness, where potential threats are known in advance and the absorbing system needs to be prepared to face these threats, resilience is a protective strategy against unknown or highly uncertain events. Instruments for resilience include the strengthening of the immune system, diversification of the means for approaching identical or similar ends, reduction of the overall catastrophic potential or vulnerability even in the absence of a concrete threat, design of systems with flexible response options and the improvement of conditions for emergency management and system adaptation. Robustness and resilience are closely linked but they are not identical and require partially different types of actions and instruments (Aven, 2008). But Jen (2002) states that robustness leads naturally to questions: interplay between organisation and dynamics; costs and benefits of robustness; and ability of the system to switch among multiple functionalities.

However, there is a problem of complexity which undermines striving to arrive at a holistic concept and theoretical framework for robustness (Hüser, 2006). In his book *The Four Pillars of High Performance*, Paul Light examines the concept of robustness as an organisational outcome. The robust organisation, Light suggests, is set up to cope with increasing uncertainty in the environment. Accordingly, a high-performing, robust organisation has four key characteristics or pillars: alertness, agility, adaptability, and alignment (Light, 2005).

1. **Alertness** is the first pillar of robustness. Organisations have little reason to reallocate, retrain, renew, or realign if they do not see the change coming. Alertness is just paying attention to what's out there because you are under state-of-the world uncertainty. You keep getting more and more data and finally you start to see (Light, 2005).
2. **Agility:** Assume that an organisation actually sets a signpost and discovers that a loadbearing assumption is somehow failing and has the warning time to act (Light,

2005). Survival appears to rest on organisational agility—the ability to adapt quickly to funding opportunities and exploit audience share (Light, 2005).

3. **Adaptability** is not a synonym for innovative. Rather, it is the ability to rapidly adjust strategies and tactics to meet changes in the environment. Adaptability refers to an organisation's ability to react quickly to a diversity of scenarios, some that might seem predictable, whilst others will involve great surprise (Light, 2005). Adaptability requires the organisational capacity to react and involves more than just preparing for surprise. It also involves efforts to stay ahead of the traffic through both continuous and disruptive manoeuvring.
4. **Alignment:** being aligned is about the communication system in an organisation (Light, 2005).

Furthermore, alertness captures the focus of organisation on measuring results and establishing performance expectations. Agility is tied to improved communication and the sharing of decision-making authority throughout the organisation. Adaptability stems from a better understanding of customer needs and internal performance incentives. Finally, alignment is created through extensive information and technology. These attributes are believed to be key to enabling organisations to be high performing in the face of deep uncertainty (Light, 2005). The four characteristics are also considered by Light (2005) as the four pillars of robustness which are also essential for high performance under external instability. Alertness signals the need to adjust; agility provides the speed to adjust; adaptability provides the new strategies and products to hedge against vulnerabilities and shape a hoped-for future; and alignment assures that the organisation acts as a whole (Light, 2005).

Organisational robustness is another element imperative to achieve resilience by resisting disruptions and URs (Mangan et al. 2008). Means through which organisations can remain resilience during disruptions or URs and are further elaborated on by Light (2005) to mean that robust organisations must have created the alertness, agility, adaptability and alignment for high performance. Light further states that:

1) *Robust organisations think in futures (plural) tense.* They prepare for uncertainty by creating landscapes of possible futures; accept the inevitability of surprise; challenge their assumptions about the futures they face; reduce regret by adopting robust, adaptive

plans, avoiding unintended consequences, and reducing vulnerability; and focus on the direct, indirect, and cascading effects of what they do. As such they are highly alert (Light, 2005).

2) *Robust organisations organize for lightning.* They recruit their workforces for maximum flexibility, train for agility by drawing the right lessons from the past, reducing the cost of learning, and cultivating corporate attitudes. Organisations also set just-beyond-possible goals, provide authority to act, and think lean about every aspect of work. As such they are highly agile (Light, 2005)
3) *Robust organisations challenge the prevailing wisdom.* They create both the freedom to learn and the freedom to imagine, aggregate expertise by creating teams and networks; unbalance their scorecards by measuring in futures tense, using multiple measures to avoid complacency and cheating, being careful about what they measure, and inviting intuition; and strengthen command and control to assure that investments are well spent. As such they are highly adaptive (Light, 2005)
4) *Robust organisations lead to mission.* They grow and groom their own leaders; lead in futures tense; communicate through images and stories; anticipate their adversaries through careful study and assessment; and ignore irrelevant issues that impede command. As such they are tightly aligned (Light, 2005)

Organisations must plan against a wide range of 'what-ifs' simultaneously and structure their organisations to move quickly if necessary (Light, 2005). In the long-term, however, robust organisations are expected to produce higher growth and more innovation (Light, 2005). However, robustness requires more than a broad embrace of alertness, agility, adaptability, and alignment (Light, 2005). Robust organisations never stop learning, since they are far from perfect (Light, 2005). However, organisations that are operating under conditions that are close to the "edge of chaos" should be an anti-fragility through the two components of adaptation principles: self-organisation and selection (Dahlberg and Guay, 2015). This is because robustness is used to reflect the credibility of systems (Sundaraj, 2012).

Ultimately building a robust organisation is not rocket science. Rather it requires a blend of common sense, organisational self-awareness, greater rigor, and perseverance. Becoming more alert requires a willingness to confront the possibility that there is not one future. But many

becoming more agile requires an eagerness to delegate and participate, lean out and engage; becoming more adaptive requires a readiness to confront the prevailing wisdom through trial *and* error, not trial *for* error; and becoming more aligned requires a commitment to saturate the organisation with the information and purpose to become greater than the sum of its parts. Getting robust involves more than just the right process for change, however, it must also involve a clear focus on the vulnerabilities that undermine the four pillars of high performance described in this book (Light, 2005).

Although a robust system (organisation) cannot tolerate a large fluctuation, the combination of the two concepts of resilience and robustness provide a better advantage for organisations desirous of managing risks, crisis and disasters (Oluwasoye and Ugonna, 2015). Clearly, there is a need for robustness when facing deep uncertainties, as the outcomes are difficult to predict (Aven, 2013b). Tackling these risks requires an integrated and holistic framework with the capability to identify, evaluate and adequately define responses to the circumstances (Al Berman, 2015). A holistic approach gives organisations a better framework for mitigating risk while advancing their goals and opportunities in the face of business threats. But in order to implement and continuously manage URs, there is a critical need for robustness and resilience need to co-exist within systems and in risk management strategies adopted in order to ensure that the preferred efficiency and reliability of the system is attained (Sundaraj, 2012). This is inferred because, resilience is governed by both endogenous and exogenous factors, while robustness is focused on maintaining system performance from perturbations due to internal and external uncertainties (Carlson and Doyle, 2002; Pal, 2013; Sundaraj, 2012; Styczynski et al. 2014; Light, 2005).

According to Celati, (2004), for all its sophistication, risk management can often be trapped by its own aura of alchemy; here the illusion of control appears an endemic and pervasive problem. Table (2007) believes that BSs are intellectually and conceptually challenging work, because, according to Nolte and Boenigk (2013), uncertainty is a prevalent factor during BS events. However, sometimes this uncertainty is handled well, but not always (Leitch, 2012), also some mistakes are survivable and some not (Woo, 2011).

Again, no organisation can be fully prepared for each BS event (Merle, 2011). Thus, ICM (2013) state that, every robust organisation should have three crises plans in order to cope with the future:

1) Operations plan—what do you do when someone pulls the fire alarm;
2) Communication plan—who speaks for the organisation and what they will say;
3) Continuity/Recovery plan—how to maintain operations during the crisis and how to return to the new "normal" when it is over.

In other words, when organisations are robust, they are alert to change, agile in deployment, adaptive in practice and product, and aligned in purpose (Light, 2005). While all these characteristics are good and important and crucial for responding to and recovering from the impact of UR events, they do not appear to be sufficient enough for preventing URs or BS events from occurring. This limitation emphasises the need to further examine the virtues and characteristics of robustness that may be collaborated with other factors examined in this research.

3.2.4 Critique of Resilience and Robustness

This section has established that resilience and robustness is important in helping organisations better prepared for dealing with impacts and occurrence of UR events. It is seen that resilience driven model; integrated functions model by Gibson and Tarrant (2010) already constitute elements that can help organisations prepare, however, this model lacks arrangements or plans that can serve as guide for adequate preparedness. This gap with resilience and its models and principles revealed the need for and the place of robustness in ensuring that strategies for dealing with UR events and risks are better managed. As explained by ICM (2013) robustness in organisation are developed based on three plans; operations, communication and continuity plans. While these plans cover issues and requirements for actions, dissemination of information and arrangement for survival, they still lack component that may help to identify URs. In a sense and as examined earlier in this chapter, these approaches are still reactive and adaptive, rather than proactive.

According to Gibson and Tarrant (2010) organisations are required to be proactively capable which includes being well prepared and having good planning and plans in place. While

robustness in organisation are a result of three essential plans that target resistance to accidental events, restoration of functionality and retention of original stability (Asbjørnslett and Rausand, 1999), the balancing between risk awareness and identification and robustness characteristics are required in order to better deal detect URs. It is therefore evident that despite the positive characteristics of resilience and robustness, they are still lacking in essential characteristics that can match or surpass the characteristics of URs illustrated in Figure 2.4 in chapter two. Therefore, the combination of resilience and robustness as a concept provide a better advantage for organisations that aim to better cope with impacts of risks (Oluwasoye and Ugonna, 2015), especially URs. Such combination is illustrated in Figure 3.3.

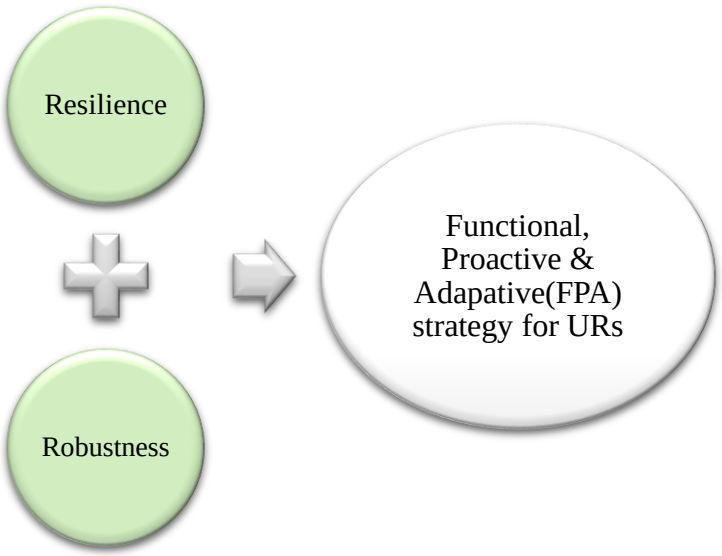


Figure 3.3 Functional Proactive and Adaptive Strategy for dealing with URs

The combination of resilience and robustness as indicated in Figure 3.3 when applied within the organisation, will ensure that organisation is better placed to deal with URs since integrated functions model include risk management, and management arrangement for other form of disruptions such as security issues, emergency, crisis and business continuity arrangement to ensure that organisational activities and mission are not affected (Gibson and Tarrant, 2010). Regardless, such combination may still be limited in identifying potential URs, since the characteristics and activities of both resilience and robustness are proactive, resistance and adaptive in nature. But given that resilience is also viewed by Comfort et al. (2010) as a balance act between risk and resources, between vulnerabilities and unmanageable catastrophe which an

organisation achieves by anticipating and preparing for crisis and their consequences through knowledge, collaboration and innovation, the inclusion of risk management framework becomes pertinent. This is because risk management is about identifying risks, taking proactive measures, and implementing task to prevent, mitigate and manage the risk (Toma et al. 2012). This portrayal of risk management as a way of working, thinking and practice should be embedded into the everyday business of the organisation.

3.3 RISK MANAGEMENT IN ORGANISATIONS

Risk management is a central part of the strategic management of any organisation (AIRMIC, 2010). Moreover, risk management should be a continuous process that supports the development and implementation of the strategy of an organisation (ibid). According to ISO 31000, risk management can be defined as the coordinated activities to direct and control an organisation with regard to risk. Risk management may take different forms, but in principle it requires that risk is avoided, reduced, accepted or transferred (Frenkel, et. al., 2010). Furthermore, it is a process of clear and firm actions that ensure that processes and organisations are adapting the strategic risk management in avoiding crises (Toma et al., 2012).

Other definitions consider risk management as the "coordinated activities undertaken to direct and control an organisation with regard to risk" (BS31100, 2008); but more specifically viewed as "the process of controlling the impact of risk" (Dallas, 2006). The focus of risk management on risks and its impact indicate that the implementation of risk management strategies brings benefits to organisations (Nota, 2010). As explained by Nota (2010), risk management protects and adds value to the organisation and to its stakeholders, encouraging the organisation to achieve its objectives by:

1) Providing an organisational environment which gives the possibility of carrying on the activities in a substantial and controlled manner;
2) Improving the process of taking decisions, planning and making as a priority, by a complete and structured understanding of the business activities, the volatility and project opportunities/threats;
3) Contributing to an efficient allocation of the capital and resources of organisations;
4) Reducing the volatility in the unimportant areas of the business;
5) Protecting and improving the values and the image of the company;

6) Optimizing the operational efficiency (Nota, 2010).

The existing or current use of risk management in organisations shows that it is a known practice used for achieving goals and objectives and for maximising opportunities for profit purpose (Häggberg, 2015). As such risk management within organisational context has prior to now been 'business as usual', perhaps the reasons it has not been sufficient enough to prevent the impacts of and in dealing with URs. This assumption is drawn from the explanations of Nota (2010) who explained that, good risk management allow an organisation to:

1) Have increased confidence in achieving its desired outcomes;
2) Effectively constrain threats to acceptable levels;
3) Take informed decisions about exploiting opportunities.
4) Stakeholders to have increased confidence in the corporate governance of organisations and its ability to deliver services.

Furthermore, Kaen (2005) states that organisations manage risk for the following reasons:

1) Using risk management to lower taxes;
2) Reducing financial distress and bankruptcy costs;
3) Using risk management to encourage and protect firm specific investments;
4) Using risk management to monitor and control managers;
5) Using risk management to improve decision making and capital budgeting;
6) Risk management can be used to assist firms in developing financial plans and funding programs;
7) Risk management can be used to stabilize cash dividends.

The outline of what organisations have hitherto used risk management for shows that risk management has been underutilised given the United States, Department of Homeland Security (2011), explained that risk management would not prevent crisis. Instead, it enables organisations to focus on those things that are likely to bring the greatest damage, and employ methods that are likely to mitigate the events (US Department of Homeland Security, 2011). From this statement, it can be inferred that risk management contributes to the achievement of robustness and resilience by identifying, planning and resourcing to achieve risk reduction in advance and enabling the mitigation of consequences of any crisis that do occur. As explained by Carment (2008) the aim of risk management is to prevent the crises from happening.

However, Taleb (2007) specified that in preparing for BSs or URs, the correct approach is adjusting to them instead of trying to predict or totally trying to prevent them. Petty (2011) argued that, BSs can be minimized or even avoided by the awareness of its potential and by taking appropriate action in a timely manner. However, preparations in organisations have always been delayed until likelihood of a major risk that can cause severe impact is identified (Coppola, 2006). Thus, for URs which are 'unknown, unknown' it infers that organisations may never be able to managed them with such continued risk perception. As explained by Taleb (2007) BSs require a different mentality and better awareness. This goes beyond the explanation by Pate-Cornell (2011) which states that decision makers or organisations may choose to treat the situation according to the classic rationality axioms based on 'mean' (average) probabilities. This approach to URs has not been effective either as many organisations and decision makers often adjust to the unexpected circumstance by escaping from the crisis and pretending they have an avoidance strategy (LaPierre, 1938). Green (2011) in her article stated:

"They often fail to acknowledge the event, stick their head in the sand and hope it goes away, spend time denying responsibility for it, look for someone else to blame for it or are paralyzed by disbelief and indecision. When they do act, they are slow to find a solution, only try one solution at a time or maintain too narrow a focus on solution development and miss obvious options that might have been more immediately available".

There is no denying that planning response structures for events such as URs or BS is a difficult task (Koehler et. al., 2014). Numbers of unpredictable factors curbed the efforts to organize a BS response structure. The type of event that could occur at any time; where; and how it will occur are often unpredictable (ibid). In addition, Harrald (2006) indicated that the organisational system that responds to BS's must be an open system. In fact, BSs or URs present unforeseen conditions and problems, requiring a need for adaptation, creativity, and improvisation while demanding efficient and rapid delivery of services under extreme conditions (ibid). Therefore, Sparrow (2008) believes that the modes of thought and action that make harm-reduction efforts effective are innovations. Innovation as mentioned here has already been identified in this chapter as embedded in the characteristics of resilience and robustness. However, dynamic systems, identified as one of the principles of resilience by Gibson and Tarrant (2010), evolve in

such complex ways, they can often appear irregular to those reviewing them (Koehler et. al., 2014).

Furthermore, BS response needs a dynamic system which consists of, a rule or dynamic, (how a system evolves) which may be addressed through resilience and robustness; and an initial condition which is the system starts, which appears to be possible within risk management strategies. In fact, response systems depend on tight and effective coordination between many different public and private organisations (Koehler et al, 2014). In fact, organisations should immediately respond to a BS before the size/scope of it has been fully assessed and any viable solutions are available (Green, 2011), but this may only be possible with an effective risk identification method or process in place. Thus, the next section examines risk management concepts and components.

3.3.1 Significance of Risk Management Strategies in Organisations

Risk management strategies are important for decision-making before damage takes place (Taleb et al., 2014). It is the process whereby organisations methodically address the risks attached to their activities (Nota, 2010). It increases the probability of success and reduces both the probability of failure and the level of uncertainty associated with achieving the objectives of the organisation (AIRMIC, 2010). Furthermore, integrating risk management into decision-making processes of an organisation will be valuable but many organisations struggle to achieve this in practice (Purdy, 2010) because, it is a continuous process demanding awareness and proactive action (AIRMIC, 2010). Organisations confront challenges in looking for effective decisions to cope with BS event (Green, 2011; Merle, 2011), however, the organisational structure and arrangement could make risk management even more difficult. Thus, it may mean that capacity in managing hierarchy in order to handle risks effectively needs improvement (Sun, N.D.) but Frigo and Anderson (2011) the need to clearly link strategy and risk management in order to manage risk is one of the lessons that many organisations learned from the global financial crisis.

Often risk management is seen as being a separate management discipline, an adjunct to the main management process (Reason 1990). The relationship between risk and other aspects of management is not settled. The work of Prof James Reason (1990) provides an example of the thinking that risk is a separate functional area. Academic and practitioner literature also provides

an ambiguous mix involving performance management, risk management, opportunity management and uncertainty management (Ward and Chapman, 2002). Indeed they are all used to cover the dialectics of risk-reward that is often also articulated as: cost-benefit (Gigerenzer, 2003; Sheffi, 2005), upside-downside or opportunity-threat (Browning in Hillson, 2007). For instance, Ward (Hillson, 2007) uses the term *uncertainty management* to embrace *risk management* and *opportunity management*.

To others, such as the Canadian risk management pioneer Douglas Barlow, all management is risk management (Shaw, 2005). Charles Handy has said something very similar: 'Risk management is not a separate activity from management – it is management, as predicting and planning allow prevention. Reaction is a "symptom of poor management" (Merna and Al-Thani, 2008). Hollnagel (2009) is even more succinct by affirming that; instead of seeing success and failure as two separate categories of outcome, they are but two sides of the same coin. This sees the "risk-reward" dialectic as being the most fundamental of all management dilemmas that every benefit has to be associated with jeopardy, some of which are obvious and others more difficult to identify. Regardless of all these arguments in literature, the practice and impacts of URs have indicated that risk perceptions, management and understanding in organisations are insufficient in dealing with BS or UR events. Even the Integrated Risk Management (IRM), an explicit and systematic approach to managing all the risks from an organisation-wide perspective, is yet to be effective in preventing impacts of URs.

IRM supposes that the risk management system should be integrated with the management system of an organisation (Nota, 2010). This one should use working instruments, communication channels, and specific procedures adapted and correlated with the rest of the component elements of the management system in an organisation (Nota, 2010). Unfortunately, most management system do not include both resilience and robustness characteristics as an integral part. By understanding the organisation, their culture, the staff morality and attitude will assist in estimating the goal of the risk management system that they will develop. BS's may be unknown, yet this is not an excuse for failing to detect precursors and warning signals, because signals can emerge and have to be properly observed and interpreted to permit a fast reaction. Taleb (2012) stated that some events can be rare and consequential, but somewhat predictable. Also, some non-hazardous events turn into a chain reaction almost like the escalation of a disease

that if left unattended can become a catastrophic event (Davies and Walters, 1998). In spite of this, there are often, precursors to such events (Pate-Cornell, 2011).

Moreover, risk is not measurable unlike fragility, which can be measured (Taleb, 2012). In figuring, out the fragility across organisation, from an operational and not a functional point of view, according to Sparrow (2008) and Taleb (2012), thinking and then acting like saboteurs for fragile is far easier than to discover or predict the dynamics of risk. In addition, Taleb (2012) emphasized that using a simple test of asymmetry can detect fragility (and anti-fragility). Accordingly, Taleb (ibid) stated "*in every domain or area of application, we propose rules for moving from the fragile toward the anti-fragile, through reduction of fragility or harnessing anti-fragility*". Understanding the people and the organisational context is therefore crucial to be able to manage risk continually. Estimating the level of risk requires the presence of risk assessment.

Risk assessment, according to Zimmerman and Bier (2002) is a means to characterize and reduce uncertainty to support the ability to deal with catastrophe through risk management. According to the National Research Council (1994), risk assessment is a systematic approach to organizing and analysing scientific knowledge and information for potentially hazardous activities or for substances that might pose risks under specified circumstances. Alternatively, risk management is a scientific approach to coping with the risks that threaten the objectives of organisation or organisational survival (Vaughan and Vaughan, 2008). Thus, for an organisation to become successful in its implementation of risk management, the top management needs to be involved. Some important points to ensure success are:

a) Establishment of a strategy for risk management
b) Establishment of a risk management process for the enterprise
c) Establishment of management structures, with roles and responsibilities
d) Implementation of analyses and support systems
e) Communication, training and development of a risk management culture (Aven, 2008).

According to Berg (2010), sometimes risk management and safety management are seen as the same type of management, but in practice safety management is a main and important part of the risk management. Tracing further, banks are the first organisations that used risk management techniques (Crouhy, et. al., 2001). In addition, the risk management developed by the field of insurance is now recognized as an important function for all businesses and organisations

(Vaughan and Vaughan, 2008). Risk management experts have however, defined the term in different ways. Most of the definitions present two points: risk management as concerned with risk, and it is a process or function that copes with those risks (Vaughan and Vaughan, 2008). Moreover, operational risk refers to potential losses resulting from management failure, inadequate systems, human errors, faulty controls, and fraud (ibid). Also, risk management can be further defined as risk governance, risk communication, and risk-based decisions making (Mauelshagen, 2012) which in the context of this research, it can be referred to as unpredictable risk (UR). It is assumed that UR has to be managed and control just like any form of risk that is associated with organisations.

Thus, the solution for assessing a URs; may dig deeper into BS and build a general rule from observed facts and avoid the precise (Taleb, 2007). Furthermore, context and question as well as type of uncertainty must be specified first in order to achieve a robustness framework (Hüser, 2006). Therefore, Taleb (2007) wondering, why keep focusing on the minutiae, not the possible significant large events, in spite of the obvious evidence of their huge influence? To deal with risk properly means to look forward based on well-informed risk thinking (Zurich, 2008). However, most of the planning and control devices seem to function as if uncertainty does not exist (Otley, 2012). Taleb (2007) specified that high knowledge with high attention to detect often leads to appropriate actions. Nevertheless, in 1964, Knight declared that the analytic methods in any class of problems are always very incomplete. However, in 2011, Woo emphasized that the rate of errors should be declining due to the accumulation of human knowledge and experience accompanied with technological development (Woo, 2011). Taleb (2007) yet, in looking for BS events, history reveals a different story; a severe limitation to learning, and the fragility of knowledge.

An inability of risk assessment approach for predicting UR events not only made the assessment approach inefficient, but also helps in generating a calamity. It is clear that the stage of risk assessment procedures in most organisations around the world need to review. Awkwardly, risk assessment approach by using all its forecasting models did not able to predict the previous UR events (Taleb et al, 2009; Unit, 2010) such as a domestic unrest, japan tsunami, or global financial crisis 2008. According to Hubbard (2009) risk managers need much practical advice and a lot of information about assessing risks. Furthermore, which make matters worse,

predictors for UR events gave confidence to their organisations that URs will not happen (Taleb, 2007) which lead organisations to disregard of the mitigation and preparation for them.

Zurich (2008) states that crisis keeps reminding us, that at the outset of a crisis, many risks tend to be poorly anticipated, and some were flatly unexpected, because nothing in the past can convincingly indicate its possibility and its sources at present have multiplied beyond measurability. As example, the Arab uprisings, which had been unthinkable just a few years ago, now shape political discourse in the Middle East (CSIS, 2013). In the same context, accurate assessments of the URs are real challenge for organisations. All evidence of UR events has approved that any poorly anticipated events possess an extremely catastrophe. In either case risks should be related to objectives.

Therefore, in order to conform its already existing risk management system to a more effective risk management arrangement, an organisation should go through some steps, respectively:

1) Adopting a new model, approach or strategy for the risk and risk management;

2) Realising an analysis on the existing risk management framework in order to see in which measure they detain the necessary elements for the new model;

3) Evaluating the risk management maturity in order to identify the necessary changes and improvements;

4) Developing a strategy for implementing the necessary changes and for the sustainability of an effective risk management, estimation of the budget required;

5) Implementing the strategy and, if is possible, validating the standards implementation through certification or audit (Nota, 2010)

These recommendations influence the rationale and approach taken in this research to identify and integrate elements of resilience, robustness with risk management process with the aim of developing a more risk management strategy for dealing with UR's.

3.4 CONCEPTS AND COMPONENTS OF RISK MANAGEMENT

The proposed risk management strategy would function as the Magnetic Resonance Imaging (MRI). The MRI scan reveals underlying weaknesses in unpredictable risk readiness that may not be apparent via more traditional risk assessment approaches. Nevertheless, the characteristics of catastrophic risks do not provide a sound basis for probability estimation, nor for detecting any reduction in probabilities resulting from control interventions (Sparrow, 2008). Table (2007) believes that BSs demand vivid imagination and the segmentation of complex scenarios in order to engage quite various organisations or institutions. So, they should reduce the fragility (Taleb, 2012) by adopting a broader view for risk to address multiple hazards and vulnerabilities within the organisation.

However, in order to implement that, it requires the mobilisation and coordination of various bodies to increase breadth and depth of risk analysis (OECD, 2009) as well as a critical evaluation of concepts of risk management. According to: Aven (2008), Treasury (2004), Lamm et al. (2010), Panel (2012), and Paraskevas and Altinay (2013) risk management that relates to dealing with disruptive events, unpredictable events or events with severe consequences have concepts such as:

1) Risk signal detection
2) Risk identification
3) Risk assessment
4) Risk response and
5) Risk monitoring

While these concepts are not exclusive to events liken to BS or URs, they are concepts that need to be better understood in view of adapting risk management that can be incorporated with resilience and robustness in strengthening capacity to identify, prevent (where possible) and mitigate the impacts of URs.

3.4.1 Risk Signal Detection

Panel (2012) explained that robust early warning systems play a critical role in reducing the impacts of potential disasters. Paraskevas and Altinay (2013), suggest that the factors influencing signal detection and problem sensing are cultural, structural, psychological and professional

while they acknowledge that exogenous factors may play their role as well. There have also been several attempts to create early warning systems focusing mainly on was the first to suggest a six-step crisis signal detection framework (1993) involving activities grouped into two categories:

1) Activities triggered by a need to define crisis signals - identifying potential signals, locating data in these signals and interpreting the signals
2) Activities triggered by a need to resolve a potential crisis - stabilising the potential crisis, planning a method to avert the crisis and resolving the crisis (Clair, 1993; Paraskevas and Altinay, 2013).

These two main categories justify the need for having an element of risk signal detection in any risk management framework because it is important to use such detection as indicators for determining response actions and mitigation strategies where possible (Treasury, 2004; Paraskevas and Altinay, 2013). According to Clair (1993) the signal detection process should have interim goals that address both the impact and likelihood simultaneously in detection to ensure the ultimate consequences are determined. Accordingly the first goal of early detection is the creation of shared understanding within the organisation about the situation and a consensus of commitment to the crisis response activities proposed.

Subsequently, it is important to establish accountability with regards to these response activities and the third is to boost the confidence for response, especially among key members of the organisation by creating awareness about the emerging crisis (Clair, 1993; Paraskevas and Altinay, 2013). The eventual outcome, defined by Coombs (1999) as the 'crisis sensing mechanism', provides a three-phase crisis communications process that includes: information location, funnelling, and analysis. This process leads to a list of potential sources of information for: issues management, risk assessment and reputation management.

3.4.2 Risk Identification

According to Lamm, et al (2010) *risk identification* is the process of creating a list of the risks that you need to be aware of and potentially manage. Although it's often combined with risk assessment as a single process, we separate them here because they require different methods and practices and can be treated as two separate but highly related steps in your risk management

process. Based on ability to detect events and threats, the analysis will look at causes and consequences, and establish a set of scenarios. In addition, an important task is to identify the most important risk-influencing factors (Aven, 2008). Yeomans (2011) points out that identifying as many risks as possible is a highly recommended best practice, and there are two types of risks; known and unknown. Only those risks that have been identified are possible to manage (Yeomans, 2011). In order to manage risk, an organisation needs to know what risks it faces, and to evaluate them. Identifying risks is the first step in building the organisation's risk profile (Treasury, 2004).

The identification of risk can be separated into two distinct phases as follows:

1) Initial risk identification (for an organisation which has not previously identified its risks in a structured way, or activity within an organisation), and there is;

2) Continuous risk identification which is necessary to identify new risks which did not previously arise, changes in existing risks, or risks which did exist ceasing to be relevant to the organisation (this should be a routine element of organisational activities) (Treasury, 2004)

Risks are often hard to identify, complex because they involve many forces interacting in unknown or unpredictable ways, and frequently made up of smaller risks that are localized within a single organisation. It is further revealed that the final step in risk identification is to classify each risk according to some naming convention. Reinventing the wheel here isn't a good idea (Lamm et al., 2010)

It is also important to understand techniques that can be adopted primarily for Initial Risk Identification and this can be achieved or obtained through a number of different techniques:

1) *Brainstorming*: Get knowledgeable people in a room to share their ideas on critical risks.

2) *Surveys*: Conduct automated (or manual) surveys of individuals on the front lines to help identify risks that each person sees from their unique perspective.

3) *Interviews*: Conduct detailed interviews with key individuals about risk as they see it.

4) *Working groups*: Hold discussions with multiple groups of key people, generally focusing on a specific area of risk.

5) *Industry analyst or thought leader output*: Search related articles or documents related to each area of risk.

6) *Experience from previous projects*: Take advantage of experience that is available either directly from individuals or from project/program documents. *Industry best practices*: Many industry groups have produced lists of risks for certain areas, which can provide valuable information (Lamm et al., 2010)

Thus, it can be noticed that a key to good risk identification is a well-thought-out process to collect and filter initial risk information (Lamm et al., 2010).

3.4.3 Risk Assessment

Risks can only be assessed and prioritised in relation to objectives (Treasury, 2004). As explained by Lamm et al. (2010) risk assessment can be done at any level of objective from personal objectives to organisational objectives (Treasury, 2004). Risk assessment is defined as technical studies and approaches that assess the risks and benefits of various risk options and provide information to decision-makers - who then make risk management decisions (Price, 1989). Assessing risk is considered one of the challenging process of risk management once potential or actual risk is identified and believed to possess potential to harm an organisation or society. As such, risk is assessed at the level of severity, which involves two factors:

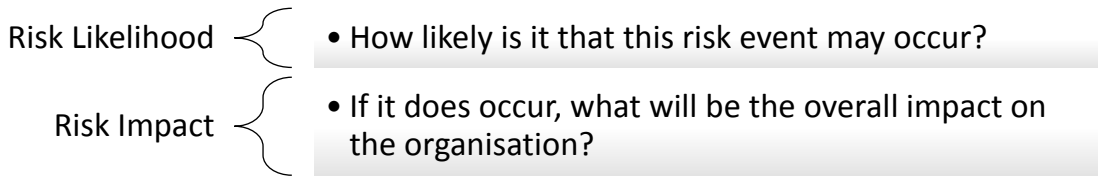


Figure 3.4 Factors in risk assessment (Lamm et. al., 2010)

These two factors influence the quality of analysis that will be conducted in determining the level of severity of risk identified. Risk analysis is based on the PESTLE model, which is identified to have three important principles for assessing risk, these are:

1. Ensure that there is a clearly structured process in which both likelihood and impact are considered for each risk;

2. Record the assessment of risk in a way which facilitates monitoring and the identification of risk priorities;

3. Be clear about the difference between, inherent and residual risk

The assessment needs to be done by evaluating both the likelihood of the risk being realised, and of the impact if the risk is realised. Risk assessment is a part of the risk management framework. Risk assessments help decision-makers make informed choices and thereby prioritise actions and distinguish among alternative courses of action (ISO, 2009b; Skogdalen, 2011). Gheorghe and Vamanu (2005), in their paper *"Disaster Risk and Vulnerability Management – from Awareness to Practice"* introduce in detail theoretical and application-oriented work done to support assessment of risks and vulnerability in the context of modern governance oriented needs, including education and training. It is important to understand the uncontrolled level of all risks that have been identified. This is the level of the risk before any actions have been taken to change the likelihood or magnitude of the risk (Hopkin, 2010). Identifying the inherent level of the risk enables the importance of the control measures in place to be identified. The Institute of Internal Auditors (IIA) has the view that the assessment of all risks should commence with the identification of the inherent level of the risk. The guidance from the IIA states that in the risk assessment, we look at the inherent risks before considering any controls.

The new International Risk Management Standard, ISO 31000, recommends that risks are assessed at both inherent and current levels (Hopkin, 2010). A categorisation of high /medium / low in respect of each may be sufficient, and should be the minimum level of categorisation – this results in a "3x3" risk matrix (Treasury, 2004). There is no absolute standard for the scale of risk matrices - the organisation should reach a judgement about the level of analysis that it finds most practicable for its circumstances (Treasury, 2004). But often, a risk matrix will be used to show the inherent level of the risk in terms of likelihood and magnitude (Hopkin, 2010).

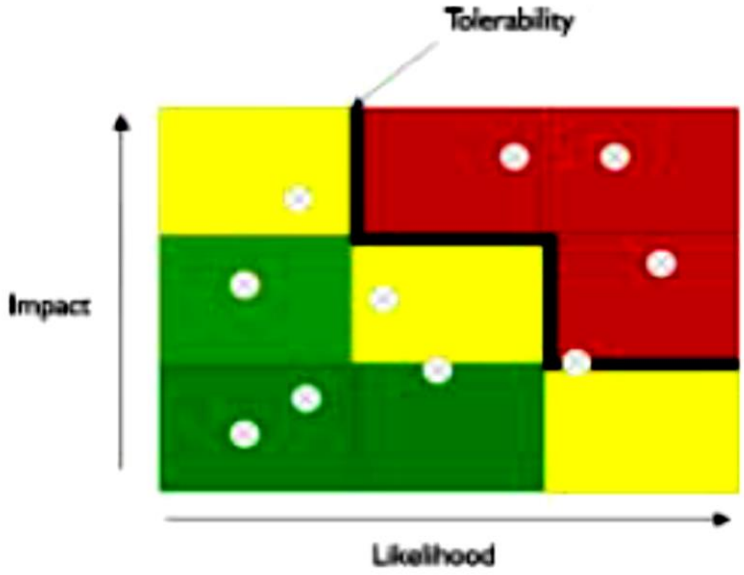


Figure 3.5 Simple risk/tolerability matrix (Treasury, 2004)

The green areas are low impact, low likelihood risk as shown in Figure 3.5 which is 3x3 matrix scale. The yellow areas are moderate impact and moderate likelihood risks, while the red are high impact and high likelihood risks. These areas are defined by a calculation of probability (likelihood x impact) of occurrence based on an agreeable scale to determine. Figure 3.5 shows that while knowing likelihood and understanding impacts of risk are important for risk management, the colour demarcation shows that certain risks when measured may be tolerable, while others may not be bearable. For instance, the tolerability line (black indicated in Fig 3.5), shows the clients boundary for risk management. It is clearly impossible to safeguard against all risk, as risk is a very expensive commodity to trade, so the organisation needs to establish its risk appitite (the risk it is prepared to accept). Once this is determined, risks just below the line, in the moderate zone (yellow coloured sections), would be deemed acceptable but need management, whereas the risk above the line (in the red) area, risks with high likelihood and high impact risk, for which risk management measures may struggle to mitigate its impact (Treasury, 2004) would normally be transferred to another party, such as an insurance company. Whilst the risks in the green and yellow areas that have been deemed within the organisations risk tolerance are treated using the risk management strategies discussed in this chapter and previous chapters making process that ensures that risk within these areas do not escalate in impact into the red areas (Hopkin, 2010). However, risks within the risk matrix have boundaries

and are foreseen, and may be managed by measures already designed for them, which is not the case of URs which are unknowns known, which tend to have elements of surprise.

The use of the risk matrix to illustrate risk likelihood and magnitude is a fundamentally important risk management tool. The risk matrix can be used to plot the nature of individual risks, so that the organisation can decide whether the risk is acceptable and within the risk appetite and/or risk capacity of the organisation (Hopkin, 2010). Risk assessment should be documented in a way that records the stages of the process. According to Treasury (2004), documenting risk assessment creates a *risk profile* for the organisation which:

1) Facilitates identification of risk priorities (in particular to identify the most significant risk issues with which senior management should concern themselves);

2) Captures the reasons for decisions made about what is and is not tolerable exposure;

3) Facilitates recording of the way in which it is decided to address risk;

4) Allows all those concerned with risk management to see the overall risk profile and how their areas of particular responsibility fit into it;

5) Facilitates review and monitoring of risks.

Once risks have been assessed, the risk priorities for the organisation will emerge. Normally, the less acceptable exposure to the particular risk event is perceived to be, the higher the priority given to addressing it. The highest priority risks (the key risks) should be given regular attention at the highest level of the organisation, and should consequently be considered regularly by the Board (Treasury, 2004). Lamm et al (2010) are of the view that the estimates derived from risk assessment process are very difficult to arrive at with a high degree of confidence. This is further explained that risk likelihood is often the hardest value to estimate.

The last step in risk assessment (many would argue that it should be a separate, independent step) is to prioritize the risks and assign owners for them. Prioritization is an important activity because sometimes how you address a risk is not solely related to its likelihood and impact (Lamm et al., 2010). It is of importance to note that risk assessment is fundamentally important part of the risk management process. In order to achieve a comprehensive risk management

approach, an organisation needs to undertake suitable and sufficient risk assessments (Airmic, 2011). According to Aven (2008) the risk analysis process is a central part of the risk management and the process can be presented using a structure that contains the following three key elements:

1) Planning;
2) Risk assessment (execution);
3) Risk treatment (use)

As the value chain based design and production activities have become more complex with more interrelations and interdependencies, and involve new technologies and materials that introducing new risks into a distributed and multidisciplinary environment, the development of integrated approaches and solutions for risk assessment and management is essential. These approaches and solutions are required to address the complexity and reduce the overall risk and impact. As such consideration of: social, technical, ergonomics, organisational, financial and environmental factors during the process of the risk assessment and management is highly recommended (Ruan, 2011).

3.4.4 Risk Response

Risk response includes the mitigation strategy which is a set of plans to act against uncertain events prior to its occurrence (Ruan, 2011). The purpose is either to prevent disturbance or to reduce the impact when it occurs (Lu et al., 2012). A mitigation strategy should tailor specific disturbances or threats, and it is expected that certain costs would be incurred in order to avoid disruption or lower losses (Lu et al., 2012). The Committee of Sponsoring Organisations (COSC) provides guidance in response to a risk. While the type or nature of risk being responded to is not specified, it encompasses four approaches as shown below:

1. **Accept** => monitor
2. **Avoid** => eliminate (get out of situation)
3. **Reduce** => institute controls

4. **Share** => partner with someone

The above four approaches are set in a general direction, but the right mitigation strategy should be tailored to a specific risk (Lu et al., 2012). A clear and comprehensive risk identification plan should be considered in developing an appropriate mitigation strategy that minimizes the impact of a risk. But this is based on the risk treatment that is the process of modifying risk, which may involve avoiding, modifying, sharing or retaining risk (ISO, 2009a). Identifying and mitigating risks is a pre-requisite for an organisation to reduce the impacts of risk (Lu et al., 2012)

3.4.5 Risk Monitoring

Seen as the final stage in the risk management process, this action entails the search and investigation that focuses on identifying new or unknown risks and importantly the process of reassessing risks that have been identified, have occurred or for which further information has become available. This is especially important for known risks that may generate to high impact, high likelihood (Lu et al. 2012). Risk monitoring therefore emphasises the importance of adopting and regularly updating the risk register which provides guide and context for the risk management process as well as in facilitating risk assessment to ensure that early detection of risk is possible. However, Paraskevas and Altinay (2013) argue that, keeping the risk register updated is crucial to effective risk management. Thus, risks need to be monitored continuously in order to help ensure that a plan or planning arrangement is effective and that no emerging risks affect the organisation (Lamm et al., 2010).

Therefore, the goal of risk monitoring is to ensure that people or organisations can promptly identify and immediately report information relating to the status of risk mitigation controls, so that executive or management decisions are based on timely and accurate information. (Lu et al. 2012). However, the types of information that need to be sought or reported remains an issue for debate and general agreed organisational objectives. According to Lamm et al. (2010), Key Risk Indicators (KRIs), a leading indicator of an area of risk for organisational performance provide a commonly used metric that needs to be determined ahead of risk monitoring stage. These metrics are simple, (ideally) easy to capture, and are useful predictors of downstream effects on the business (Lamm, et. al., 2010).

3.5 RISK MANAGEMENT APPROACH AND PROCESS

Risk management has been explained thus far as the culture, processes, and structures that are directed toward the effective management of potential opportunities and adverse effects. Risk management processes involve first establishing the risk context, which includes the level of risk that is acceptable. Then risks are identified, assessed (analysed and evaluated against the acceptable level of risk), and where appropriate treated to reduce the likelihood and/or the consequence (Lu et al., 2012). Risk management process has key phases that are series of interrelated phases (Lamm et al., 2010). However, Careem et al. (2007) argues that the risk management process which involves logical and systematic methods inform the phases and need to be well understood for an effective risk management process. The logical and systematic components are:

- Communication and consultation throughout the process;
- Establishing the context;
- Assessing risks (identification, analysis, evaluation) and treating risk associated with any activity, process, function, project, product, service or asset;
- Monitoring and reviewing risk;
- Recording and reporting the results appropriately (Careem et al., 2007)

The components of such a risk management process, integrated with the essential communication/consultation and monitoring/reviewing processes (Watson, 2005). In 2000, the Standards Committee of the Project Management Institute (PMI) introduced a major shift in the context of how risk management would be applied. The original four-step content on risk management (1996) was discarded in its entirety and replaced with a new set of processes and practices. The PMI approach to risk now comprises six basic steps:

1) *Risk Management Planning.* In this new area, project risk infrastructure is established and a project-specific risk management plan is generated.

2) *Risk Identification.* Events that will have potentially negative impacts on projects are clearly described.

3) *Risk Qualification.* Risks are evaluated according to nonnumeric assessment protocols.

4) *Risk Quantification.* The most significant risks are evaluated according to their numeric probability and impact.

5) *Risk Response Planning.* Strategies to deal with or preclude risks are evaluated and communicated.

6) *Risk Monitoring and Control.* Risk management and response plans are put into action (Pritchard, 2001)

While the rationale for adding project planning to risk management process may seem out of context, figure 3.6 below indicate how the risk management process is described as an interrelated six-step approach to effectively manage risks (Yeomans, 2011)

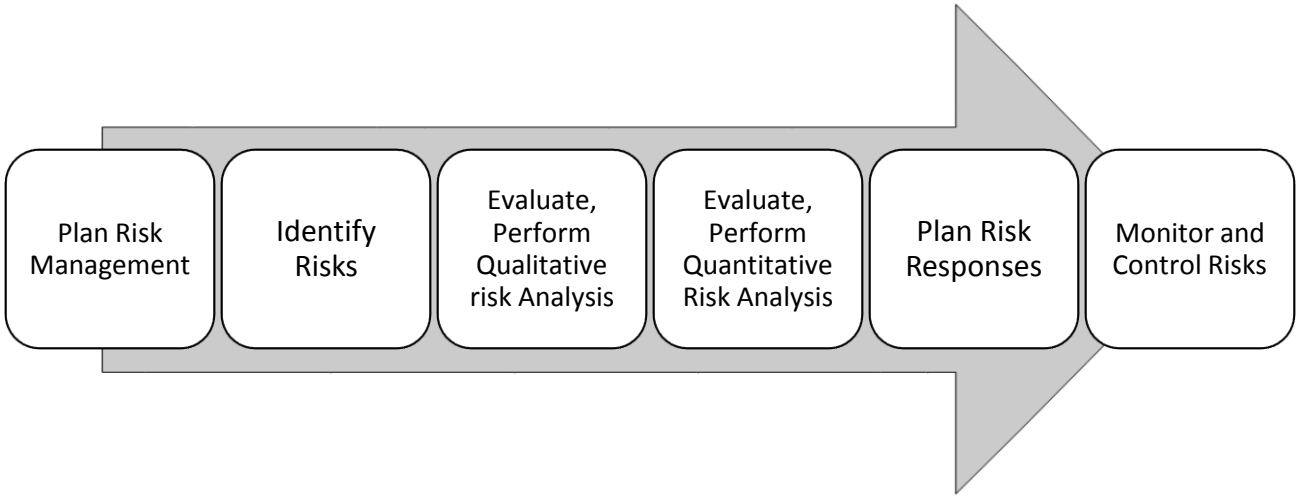


Figure 3.6. PIER-C six-step approach to effective risk management (Yeomans, 2011)

The six-step approach in Figure 3.6 indicates that risk need to be evaluated and performed using qualitative and quantitative analysis method. But this is consequent on risk management plan in place as well as the type and nature of risks identified. Yeomans (2011) and Pritchard (2001) further explained these steps by stating what each step involves:

1) **Plan risk management:** Initiating the entire process is done by planning for how the rest of the steps are to be carried out. This step describes the methodology of how the process is supposed to be accomplished.

2) **Identify risks:** The identification step requires developing a list of risks, the sources from which they originate, set out initial responses, and categorize them. This should be documented in a risk register. Each outcome is to be assigned initial ownership; hence it should be clear who is responsible for managing specific risks or risk groups.

3) **Evaluate - Perform Qualitative Risk Analysis:** This is the first evaluation step, and it is a subjective process. The risk register ought to be analyzed based on the risks´ respective probability and impact.

4) **Evaluate - Perform Quantitative Risk Analysis:** This is considered an optional step. Whether or not this step should be implemented depends on such factors as time, priority, level of effort compared to benefits, and so on.

5) **Plan Risk Responses:** planning risk responses means developing responses to urgent risks that need to be addressed immediately based on the identification and evaluation steps. Responses should strive to address both positive risks (opportunities) and negative risks (threats). Possible third parties may be involved by contractual agreements as a means of support response.

6) **Monitor and Control Risk:** The final step involves searching for new/unknown risks and reassessing the known ones. Keeping the risk register updated is fundamental for the risk management process to be effective. In addition, the effectiveness of the entire six-step process is to be evaluated to look for triggers and for early warning signs.

According to Pickett (2005), the response and whole purpose of the process is that risks are to be avoided, reduced, shared, or to be accepted. High-impact and high-likelihood risks tend to be associated with avoidance and reduction, whereas high-impact and low-likelihood is associated with sharing of risks. Low-impact and low-likelihood types of risks tend to be related to acceptance. The purpose is to understand their impact/likelihood in order to develop an action plan. However, more recently, ISO 31000:2009 *Risk Management Principles and Guidelines*, the international standard on risk management, recommended that risk management should not be a management system, but should be integrated into the management processes in organisations (Leitch, 2012).

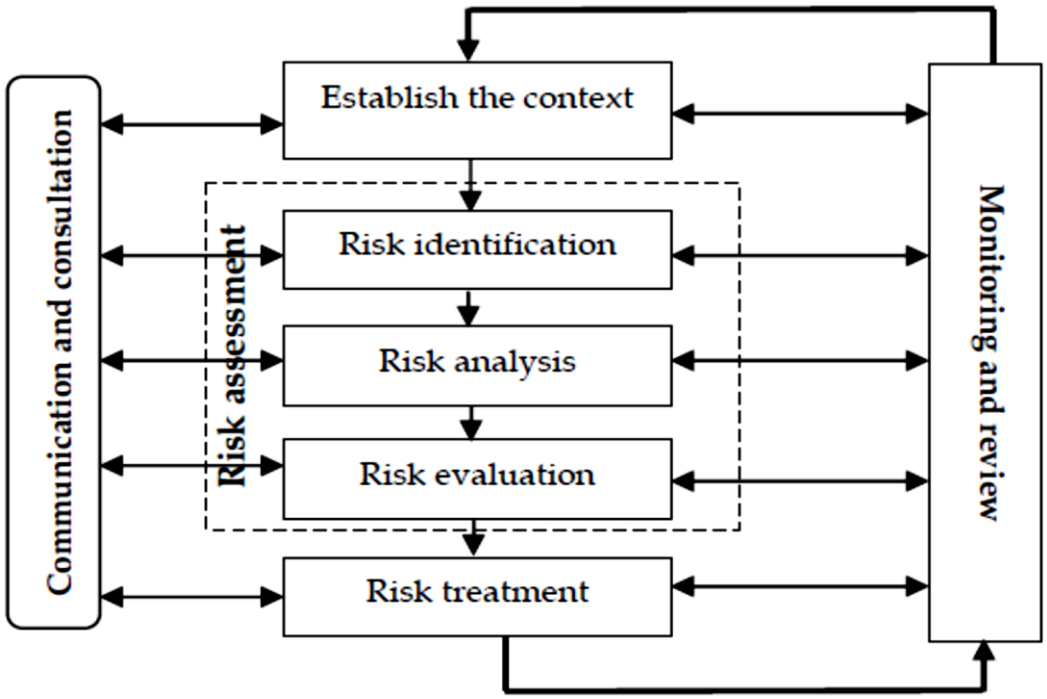


Figure 3.7 Risk management process (ISO 31000: 2009)

As shown in Figure 3.7, the main steps in the risk management process are the establishment of risk context, risk assessment and risk treatment. The difference between this process and that of Yeomans (2011) six-step process is that risk identification, analysis and evaluation are integrated into the risk assessment phase which is continuously influenced by communication, consultation, monitoring and review. This approach to risk management ensures that an event such as UR or BS is continuously monitored and review, while consultation is ongoing and communicated to clarify the context of risk and the necessary steps that need to be taken for risk treatment. This process also demonstrates an improvement on the six-step process by Yeomans (2011) which appears to be a parallel step that does not interact nor influence each other. Although context conditions refer to the internal and external environment of the organisation, the interface of these environments, the purpose of the risk management activity and suitable risk criteria (Skogdalen, 2011), it is important that all phases interact to clarify the potential extreme or surprise characteristics of URs as much as possible.

Regardless, it is safe to infer that risk context in this case is URs which has peculiar characteristics Risk treatment is the process of modifying risk, which may involve avoiding, modifying, sharing or retaining risk (ISO, 2009b). For this reason, when organisations are prone

to URs or BS events, even the most prepared and managed organisations can find themselves in difficult situations (Green, 2011). Maintaining a good decision-making environment during unpredictable events is very hard (Taleb, 2007; Zurich, 2008; Merle, 2011; Evans, 2012) due to many influences, such as stress, fear and panic (Green, 2011). Therefore, decision-making under uncertainty over what may happen often leads to significant failure in coping with the UR events (Woo, 2011). Thus, organisations may need to consider ways to build in redundancies and resilience that reduce the probability and/or consequences of sudden adverse events, further emphasising the importance of effective risk management strategies as well as good risk decision making.

3.6 RISK MANAGEMENT STRATEGIES FOR MANAGING URS

According to Lamm et al. (2010), prioritisation is important and pertinent when a list of risk has been generated or one is identified with the estimated likelihood and impact that it may cause severe impact on the organisation. While it may be easy to determine from risk prioritisation the one to deal with, it is also important to address the question of how to deal with the risk. While Yeomans (2011) Lamm et al. (2010), Lu et al. (2012) and others identified risk treatment as being able to; accept, avoid, mitigate (reduce) and transfer (share) risk, it follows that risk treatment and control measures may not be sufficient by themselves to deal with the nature and impacts of URs.

Although risk treatment explained by Treasury (2004) indicate that risk can be opportunity that can be taken, tolerated, and terminated, may not be possible in the case of URs. This is because it has been established in section 2.4 that the impacts of URs are negative and devastating to organisations and environments. The characteristics of URs that have been identified in Figure 2.4 such as severe impacts, surprise and extreme make it difficult for organisation to tolerate, terminate or take them as opportunities. Therefore, such risk treatment may not be applicable to the concept of URs, BS or UR events. The control measures that have been identified include avoidance, acceptance and mitigation (Yeomans, 2011; Lu et al. 2012). While it may not be possible to avoid URs due to external factors that often trigger them (Green, 2011; Zurich, 2008), they can be accepted and mitigated based on the argument in this chapter.

However, acceptance in this sense aligns with the argument by Lu et al. (2012) and Green (2011) which explained that BS and UR events are unavoidable and as such organisations need to be better prepared to deal with them. Accepting this nature of URs wakes organisations to the reality to improve its strategies and measures in place to incorporate the dynamics and characteristics of URs and UR events. While mitigating, their impacts may be one of the possible ways of dealing with and treating URs. A more effective strategy may be a fusion of strategies that applies a full risk management process as explained by ISO 2009 using the six-step approach by Yeomans (2012) and based on the combined functional reactive and adaptive strategy (illustrated in Figure 3.3), to strategically, tactically and operationally address; every risk or events that have at least 2 or all of the characteristics of UR (identified and presented in Figure 2.4).

The combined strategy of all essential concepts and principles examined in last chapter and this are essential to managing events of UR or BS given the peculiar nature and characteristics of the event.

RM Strategies for URs	Risk management process by ISO 2009
	Six-step approach by Yeomans (2012)
	Functional Proactive & adaptive strategy (Figure 3.3)
	Target at least 2 or all URs characteristics (Figure 2.4)

The role of each of these strategies is to treat different aspects and characteristics of URs. For instance, the strategies have the targets shown in Table 3.1 to treat and mitigate.

RM strategies	UR Characteristics
Risk Management Process by ISO 2009	1) Unpredictable 2) Unknown 3) Low probability 4) Severe impacts
Six-step approach by Yeomans (2012)	5) Unpredictable 6) Unknown 7) Low probability 8) Severe impacts
Functional Proactive & Adaptive strategy (Figure 3.3)	9) Surprise 10) Extreme 11) Severe impacts 12) Unknown

Table 3.1 Application of adapted RM strategies for managing URs and UR events

Table 3.1 shows that RM strategies need to be applied as a consolidated model rather than as individual strategy due to the potential impact and the unknown characteristics of URs. The rationale for this approach and application of this strategies is based on the sets of argument and literature reviewed in this chapter and previous one. While it is given that the nature of UR or BS are challenging and almost difficult to manage, the limitations of resilience and robustness indicate that organisations will need more consolidated strategy for identifying and dealing with URs. Thus, the rationale for the adapted RM strategies in table 3.1 which shows that each strategy has the aim of treating and managing at least four different characteristics of URs. By so doing, the adapted strategies may be sufficient risk management strategies for preventing the occurrence of, treating the onset of and mitigating the impacts of URs in organisations. However, this is subjected to further analysis in subsequent chapters and in evaluating the primary data.

3.7 CONCLUSION

This chapter has critically examined essential factors that relate to the research aim, previous chapter and objectives two and three. It has also contributed to identifying major components that may potentially influence the set of guidelines that need to be developed to validate organisational resilience and robustness in managing UR events and potential URs. This chapter has identified the main components of resilience which are proactive and adaptive responses that enable organisations build adaptive capacity for dealing with perturbations. It has however identified limitations with resilience through some of its principles which indicate that it is

insufficient for dealing with events with unpredictable, extreme and surprise characteristics as UR or BS. While robustness is, another essential component identified, and examined in this chapter, it provides characteristics which are its strengths. Given the unattainability of perfect robustness, a mechanism or strategies by which the system regenerates itself continuously is needed, rather than suffering from extreme and unpredictable (Taleb, 2007).

Evaluating the essence and components of risk management process and approach proved very important in this chapter since it further justified the rationale for adopting risk management as the fundamental focus of this research for managing URs. Chapters two and three present a critical evaluation of the risk management strategies that may be effective enough for mitigating the impacts of URs. In order to determine the point at which effective risk management strategies can be identified, chapter two, examined relevant literature on unknown risk including the associated theories and existing practice. This examination of the literature revealed the characteristics of URs providing the parameters through which the strategies examined in this chapter were assessed against. This process contributed to achieving part of the aim and the first objective of this study. Building on this understanding led to better understanding of the negative impact of URs on organisations and the limitations of current mitigation strategies in reducing the negative impacts of UR identified in chapter two.

An understanding that informed the need to examine elements of robustness, resilience and risk management strategies that helped to arrive at the conclusion of chapter three to have RM strategies structure that comprises of risk management process, six-step process, and functional and adaptive strategy illustrated in chapter three. The potential negative impacts of UR on organisations and current mitigation strategies revealed in chapter two further provides indicators for strategies used for reducing the impacts of UR in Saudi Arabian organisations. While chapter two has contributed to achieving the first and second objectives respectively, and part of objective three, both chapters two and three have jointly contributed to achieving first part of the research aim, while providing indicators for achieving the latter part of the third objective and fourth objective.

Thus, both literature review chapters provide a context for the primary data gathered for examining the practice of strategies in place in mitigating the impacts of UR in Saudi Arabia. The comprehensive arrangement of risk management did not only offer insight into how

unpredictable risk can be managed, the six-step approach emphasised the need to identify, plan for and assess risk both quantitatively and qualitatively. This chapter concluded by explaining the role of risk management strategies adapted for this research for managing URs. The next chapter focuses on explaining the methods used for conducting this research and the justification for using them.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

The purpose of this chapter is to examine, discuss and justify methods selected to conduct the required research inquiry following gaps identified in the literature review. This chapter adopts the research 'onion' by Saunders et al. published since 2009 to explain the systematic process the researcher followed to collect data, examine data and analyse data that formed the basis of argument and conclusion drawn at the end of this research. This chapter also provides justification for selecting the methods used and the relevance of methods to the research area. The last couple of sections in this chapter further discussed the ethics consideration for this research as well as the extent to which validity and reliability has informed the research scope, context and findings. Summary of the chapter then concludes by providing an overview of the content therein and the relevance of this chapter to the findings and subsequent chapters in this thesis.

4.2 RESEARCH METHODOLOGY

Research is a systematic investigation (Burns, 1997). As such, the process involves data collection, analysis, and interpretation of data with the aim of understanding, describing, predicting or influencing educational phenomenon or to empower individuals in the context being investigated (Mertens, 2005). Thus, the steps that are necessary in carrying out the research are significant because they provide the essential foundation that is required in identifying and addressing the research problem. The term methodology is defined as a system of methods that is used in a particular area of study in order to determine or explain its context (Gliner et al., 2009). The definition clearly indicates that methodology refers to a set of instructions or methods, which further shows that research methodology relates to the overall process undertaken to perform a particular study.

Within the process there exist several key elements which assist the researcher in structuring the work towards addressing and achieving the aim and objectives of the research (Saunders et al. 2009). Aligning the key elements and components of research area is important, as it would dictate the outcome of the study. However, Morgan (2007) argued that research methodology is concerned with the processes that constitutes realisation in order to answer the study research

question. His explanations identified the literature review as the first step to identify what it is that needs to be researched and if there is a need for the study to be carried out; by recognizing the problem and how this part of the research contributes to the existing body of knowledge. As it is in the case of this research, the aim of the literature review is to provide an in-depth understanding of the subject area that is being studied (Morgan, 2007; Creswell, 2009). The research aim presented in chapter 1 defines the scale and scope of the study.

Subsequently the research objectives provide the indication and direction in determining which research methods are most appropriate. In order to do so, the researcher has adopted the use of the research methods onion developed by Saunders et.al. (2009; 2011). The layers in the onion comprise of six layers: research philosophy, research approach, research strategy, choices, time horizons and data collection techniques and analysis procedures, as demonstrated in Figure 4.1.

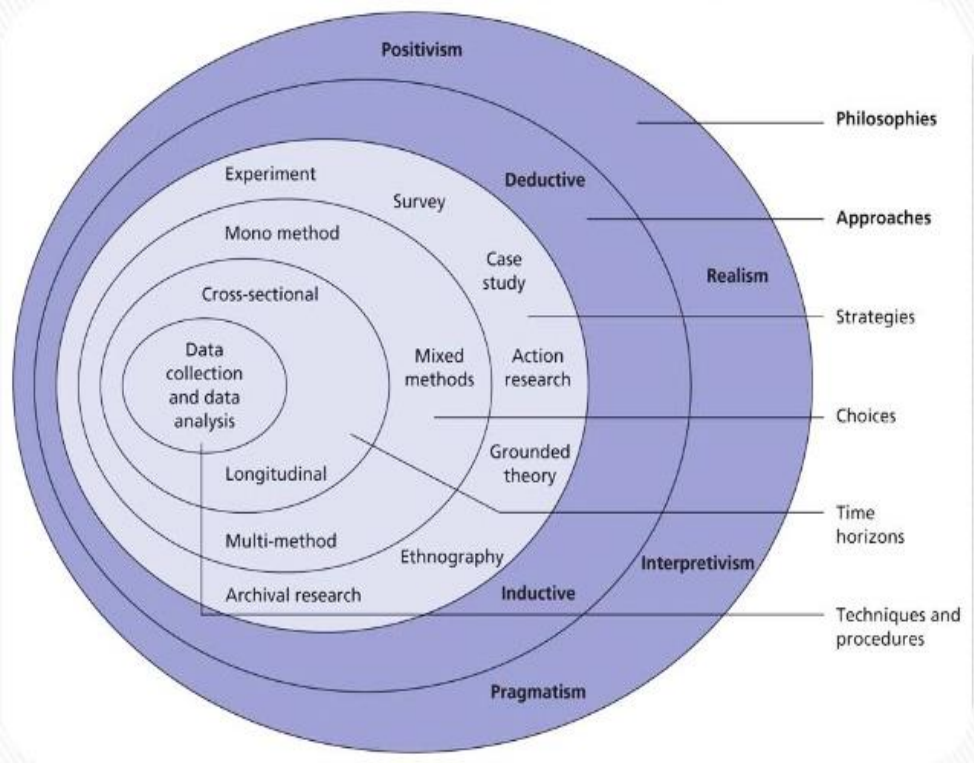


Figure 4.1: The research onion (Saunders et al., 2011)

Using the layers of the onion model shown in Figure 4.1 in progressive manner is key to this research design. Moving from the outside layer to the core of the onion allows the research to explain and establish the relationship between the steps and process followed in this research and

to discuss and justify them in a logical manner. Saunders et al. (2009; 2011) suggests that all layers must be designed and carefully planned, and should inform the research inquiry process in order to lead to valid and reliable data collection, and results. The next section discusses the first layer which is research philosophy and the justification for the philosophical stance adopted for conducting the investigation for this research.

4.3 RESEARCH PHILOSOPHY

The research philosophy is the over-arching term that relates to the development and the nature of knowledge. It contains important assumptions about the way of viewing the world. These assumptions support the process for selecting the research strategy and the methods as well (Saunders et al, 2011). In addition, it has significant impact on what a researcher does and assists to understand what is under investigation (Johnson and Clark, 2006). Approaching the study, the researcher is required to choose between the major ways of thinking about research philosophy of science through; ontological, epistemological, and methodological (Miller and Yang, 2007). Saunders et al. (2009) added the axiological underpinning as another major and important factor that influences research philosophy. Ontological, epistemological, methodological and axiology contains important differences that will influence the approach in which the researcher thinks about the research process.

Furthermore, there is none superior to another, but it depends on the research question which the researcher is seeking to answer which rarely falls neatly into only one philosophical domain (Saunders et al, 2011). The number of perspectives is not limited to those that are mentioned above as the body of knowledge is continuously expanding. However, the discussions further on will be limited to the above. Ontology and epistemology have a competitive ring in terms of a choice between either positivist or interpretivist research philosophy (Saunders et al, 2011). According to Miller and Yang (2007), ontology asks “what is reality” and “what is existence”, epistemology asks “what can we know” and “how do we know what we know”, and methodology asks “how should efforts to know be executed”.

Therefore, this philosophical assumption emphasises that, what the researcher and people value all play a critical role in arriving at the conclusions of the study. A brief comparison between the different philosophies is undertaken in order to define the most appropriate philosophy for this research. Given these underpinnings which Saunders et al. (2011) referred to as branches of

philosophy, there are also different philosophical positions that may be adopted for explaining a way of thinking (Saunders et al. 2009). These philosophical stances include positivism, realism, interpretivism, objectivism, constructivism and pragmatism (Saunders et al. 2009). However, in more recent publication, Saunders et al. (2011) explained that explanations of what exists can be rationalised through positivism, realism, interpretivism and pragmatism. Each of these perspectives has its own distinctive characteristics in developing knowledge and associated research methods (Amaratunga et al, 2002; Easterby-Smith et.al, 2008; Saunders et al, 2011).

The positivism perspective is one that is developed through observations of the social world which is being researched and is carried out in an objective manner supported with empirical findings (Easterby-Smith et al. 2008; Saunders et al. 2011). An alternative by Ghauri (1995) and Jankowicz (2005) is that positivism is viewed as an approach that is carried out through a systematic process that is validated and supported by empirical data and is replicable by others. Explanations by these authors endear the positivism perspective to this study area. Positivism according to Creswell (2009) is closely associated with quantitative methods due to the high dependency on the empirical findings.

The interpretivism or constructivism perspective contrasts with a positivism perspective. The interpretivism emphasises a great deal on the social impact brought about by the human factor that influences the decisions made pertaining to the area of study (Easterby-Smith et al. 2008; Saunders et al. 2011). Jankowicz (2005) states that interpretivism acknowledges individual opinions as sources of information, the impact of social and situational factors, and the reasons to present and justify the findings to academics, experts and the research target audience. Ghauri (1995) claims that the interpretivism approach values individual experiences and the compulsion for empirical data to support findings is not necessarily a requirement. The wider acceptance of qualitative findings based on human behaviour shows a clear link between interpretivism and qualitative methods (Lincoln and Cuba, 1999).

The realism philosophy acknowledges the reality and the independent existence of nature and the environment (Burningham and Cooper, 2001) and is rather non-holistic whereby the outcome of events is independent of the individual human factor and that the presence of larger social forces, structures and processes shape the results (Saunders et al., 2011). This perspective on existence

and life does not relate to this study area since the events that comprises of URs are externally and may be internally influenced and generated as started in Chapter two. This argument narrows the potential philosophical views to apply to this research to positivism or interpretivism. The explanation and context of the two philosophes have been summarised by Collis and Hussey (2009) and presented in Table 4.1.

Philosophical assumption	**Inference**	**Positivism**	**Interpretivism**
Ontological assumption	the nature of reality	Reality is objective and singular, separate from the research	Reality is subjective and multiple, as seen by the participants
Epistemological assumption	what constitutes valid knowledge	Researcher is independent of that being researched	Researcher interacts with what is being researched
Axiological assumption	the role of values	Research is value-free and unbiased	Researcher acknowledges that research is value laden and biases are present
Methodological assumption	the process of research	Process is deductive; study of cause and effect with a static design. Categories in research are isolated beforehand	Process is inductive; study has mutual simultaneous shaping of factors that emerge from research design. Categories are identified during the research process

Table 4.1: Overview of Philosophical stances (Collis and Hussey, 2009)

Table 4.1 expresses the distinctive differences between positivism and interpretivism providing emphasis and justification for research philosophical stance. The methodological position of positivism makes any research context free, but generalisations lead to prediction, explanation and understanding (Creswell, 2014). According to Maxwell (2013), this influences the results and makes them accurate and reliable through validity and reliability as much as possible. However, research with interpretivism perspective is context bound, has patterns that require that theories are developed for understanding and that findings are accurate and reliable through verification (Denzin and Lincoln, 2011). Overall the two research philosophies are unique in their approach and the appropriateness of each is dependent on the research questions that have been developed (ibid). Hence it is important that the area of research and the underpinning philosophical stance align. Accordingly, with the above explanation, the researcher finds

interpretivism philosophy applicable to this research and the rationale for this is further justified in this section.

4.3.1 Justification for Research Philosophy

The aim of this research is to develop a set of guidelines to enable Saudi Organisations to improve upon their robustness and resilience in the event of URs. It is therefore, important to note that the processes of arriving at a suitable guideline require the involvement of all stakeholders, including government agencies. It is understood from the literature that the process will obviously provide different reactions leading to their 'subjective' perceptions about the subject matter and actions as a group 'socially constructed' expressing what risk element, such as unpredictable risk 'phenomenon' and in line with the nature of the research questions in section 1.5 in Chapter 1. It can be identified that this research takes a subjectivism stance in the ontological spectrum. Equally, epistemology takes the view that knowledge is about positivism or interpretivism (Creswell, 1994; Saunders et al., 2012).

As noted in the ontological stance this research largely deals with subjective issues as it is about understanding the phenomena through accessing the meanings that participants ascribe to them (Orlikowski and Baroudi, 1990). From the understanding employed from the philosophical stances deliberations in the previous sections, the emphasis of this research is that it seeks to develop a set of guidelines for Saudi Arabian organisation to be enabled to improve upon their robustness and resilience in the event of URs. Eliciting information from stakeholders within Saudi Arabia organisations in terms of their perception about unpredictable risk can best fit into a subjectivism stance in the ontology reasoning while it lies in the interpretivism stance in the epistemology stance. The interpretivism philosophy is relevant to this research as it emphasises that it is necessary for the researcher to understand differences between human roles as social actors (Adzroe, 2015).

Furthermore, it brings to bear variances between conducting research among people with the meaning they assign to their action rather than about the objects which seek to quantify occurrences Saunders et al., 2012). Finally, axiology which is about studies judgements value as explained by Saunders et al., 2012) influences the researcher in the entire research process in committing to an objective outcome. Since the values the researchers ascribe to research

techniques adopted and the entire analysis process are important, including the way the results are interpreted, it can be deduced that the research is more inclined to be value laden. Therefore, the researcher takes a firm stance and decision in ensuring that interpretivism philosophical view adopted for this research is influenced by the ontological perception and what is considered reality in crisis, emergency and disaster management field.

The epistemology is also based and influenced by the principles, best practice and standards in risk management, robustness and resilience. Thus, in order to achieve the research objectives and answer the research questions, the qualitative research approach that aligns with interpretivist philosophy is adopted for conducting this research. The explanations and justifications provided in this section has formed the foundation for which other sections in this chapter is laid. The next section examines and justifies the research approach and reasoning adopted for the study and inquiry process.

4.4 RESEARCH APPROACHES

According to Cohen et al. (2007), to understand the world, human beings are using three types of reasoning: deductive reasoning; inductive reasoning; and the combined inductive-deductive approach. A research deductive approach becomes required when the researcher adopts a theory and hypothesis (or hypotheses) and designs a research strategy to test the hypothesis. On the other hand, the research inductive approach is a process whereby an observation informs the research inquiry such that patterns and hypothesis are identified in order to develop a theory (Saunders et al, 2011). The third approach is the inductive-deductive approach that combines Aristotelian deduction with Baconian induction. By the combination of these two approaches, the researcher is involved from observation to hypothesis (induction) and from hypothesis to implications (deduction) (Mouly, 1978). In logic, deduction, induction, and their combination have weaknesses and strengths in their contributions to the development of science. Therefore, to understand the nature of the phenomena of research approaches, the deductive and inductive approaches will explain the differences between these two approaches and the implications of these differences.

4.4.1 Deductive Approach

Deductive reasoning or “testing theory” is the dominant research approach in the natural sciences (Collis and Hussey, 2003). According to Cohen et al., (2007), deductive reasoning is based on the syllogism which is different than observation and experience, because it is merely a mental exercise. Furthermore, a deductive approach is known as the "top-down" approach demonstrated in the diagram below (Figure 4.2).

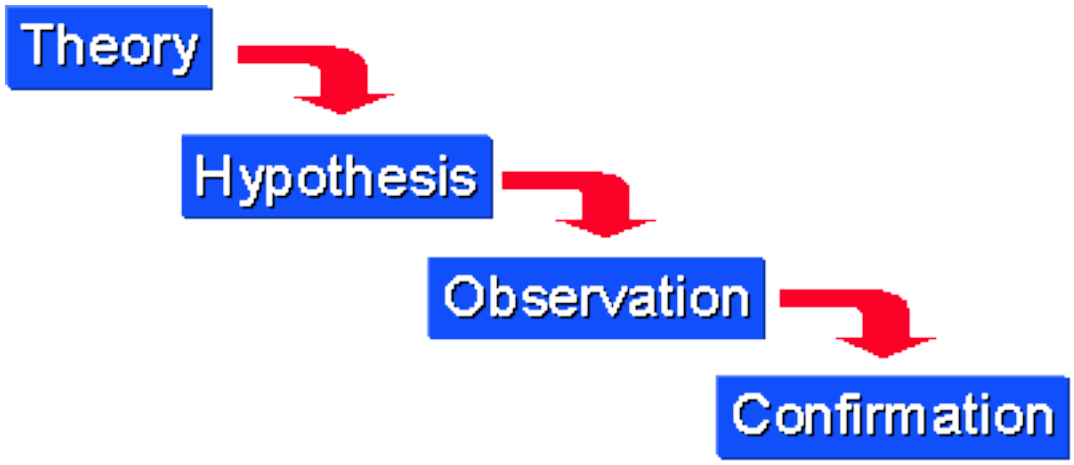


Figure 4.2: Mechanism of deductive reasoning (Trochim, 2010)

As shown in Figure 4.2 deductive reasoning starts with the analysis of theory from which a hypothesis is generated. The hypothesis is subsequently tested by collecting observations through fieldwork or experiments. Analysis of this data then allows the researcher to test the hypothesis confirming (or not) the original hypothesis and validating or adding to the body of work reinforcing the theory informing the work. Saunders et al. (2011) state that deductive reasoning retains several important characteristics including: Explaining causal relationships between variables in the search is one of these characteristics. In addition, controls to allow the testing of hypotheses is a further important characteristic of the deductive approach. It is important to ensure reliability in deductive reasoning by using a highly structured methodology and to facilitate replication (Gill and Johnson, 2002). In addition, the research concepts need to be operationalised in a specific way to be measured quantitatively because, according to Saunders et al. (2011), the research approach (deductive reasoning) owes more to the positivism philosophy. This top-down approach is less engaging and limits the interactions between the researcher and what is being researched, tends to lead to high validity, but not in-depth in its outcomes.

4.4.2 Inductive Approach

An inductive approach or building theory is to understand better the nature of the problem (Saunders et al., 2011). It has its origins in research in the social sciences. Researchers in the 20th century were wary of a deductive approach. According to Saunders et al, (2009) the critique of the deductive approach is that it enables a cause and effect link to be made between specific variables without providing in-depth explanations and understanding for their existence and the way in which humans interpret them in the social world. Other critiques of deductive emphasise its rigid methodology that prevents explanations of what is happening in the world (Trochim, 2010). Thus, William (2010) argued that the inductive approach works the opposite way to deduction that is approaching from observations to wider theories. It is known as the "bottom up" approach as shown in Figure 4.3. Researchers adopting this approach start from analysing the observations made to detect patterns and regularities in order to formulate a hypothesis that can be explored to generate conclusions and theories for the study.

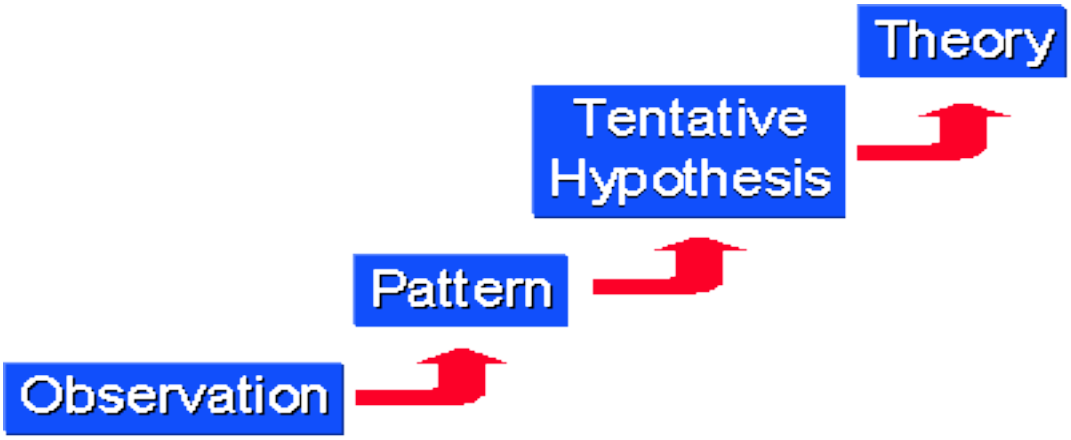


Figure 4.3: Mechanism of Inductive reasoning (Trochim, 2010)

As Figure 4.3 illustrates, the inductive process operates in reverse when compared to deductive reasoning. It can also be seen that their outcomes differ, while the outcome of deduction is to confirm a theory or reject it, the purpose of induction is to develop theory which ultimately contributes to knowledge (Trochim, 2010). Induction is related more to interpretivism philosophy as affirmed by Saunders et al. (2011). Therefore, researchers in the inductive approach are more likely to work with qualitative data and to use a variety of methods to collect these data (Easterby-Smith et al., 2008). However, by examining the two approaches, an inductive process will be used in terms of theory building.

Therefore, the theory will develop from the data. As the aim of this research is to determine how risk management can minimize the negative impacts of unpredictable events within the context of organisations in Saudi Arabia. Inductive reasoning will assist in capturing the elements and effects of the participants that influence the way unpredictable events are managed and operationalised. After identifying the research approach, the following steps of the research process will look into identifying the appropriate tools to be used to collect data. Following the collection of primary data, the data will be analysed using techniques to elicit valuable information related to the problem under consideration. The next three layers can be thought of as focusing on the process of research design (Saunders et al., 2009). Finally, the outputs obtained from the data analysis will be used to address the initial set of research aim and objectives. The following is an explanation of how the researcher will use particular methods in carrying out the research.

4.4.3 Justification for Combining Approaches

Although there are rigid divisions between deduction and induction, it is possible and useful to combine deduction and induction in one research (Saunders et al., 2009). However, selecting whether the research will be deductive or inductive depends on a number of practical criteria (Creswell, 2002). The emphasis of the research and the nature of the research topic are the most important. The sufficiency of literature that enables the researcher to define a theoretical framework and a hypothesis lends more readily to deduction. With induction, new topics and little existing literature, it may be more appropriate to work inductively (ibid). Deductive research can be quicker to complete than inductive because the inductive needs a longer period of data collection and analysis. So, deduction can be a lower-risk strategy (Saunders et al., 2011). Table 4.2 below summarises some of the major differences between deduction and induction.

Deductive emphasises	Inductive emphasises
Scientific principles	Gaining an understanding of the meanings humans attach to events
Moving from theory to data	A close understanding of the research Context
The need to explain causal relationships between variables	The collection of qualitative data
The collection of quantitative data	A more flexible structure to permit changes of research emphasis as the research progresses
The application of controls to ensure	A realisation that the researcher is part of the

validity of data	research process
The operationalisation of concepts to ensure clarity of definition	Less concern with the need to generalise

Table 4.2: Major differences between deductive and inductive approaches to research

(Adapted from Saunders et al., 2011, p.127)

The comparison in Table 4.2 between deductive and inductive approaches is important in ensuring the justification for selecting approach suitable for this research. From the discussions in this section it is therefore understood that deductive reasoning is about developing a theory and hypothesis and using research strategy to test the hypothesis while inductive is about collecting data and then develops a theory based on the analysis and the results from the data collected. From the discussion and in this research, both deductive and inductive philosophies meaning a combination of deductive and inductive reasoning were employed largely to deal with the aim of this research, which is to develop a set of guidelines to enable Saudi Organisations to improve upon their robustness and resilience in the event of URs.

At the literature review stage, a deductive approach was used to review key and relevant literature to arrive at important issues relevant to this research. These important issues were further researched in an in-depth study utilising inductive approach, which formed the major basis for data collection for this research (see Appendix B). Although this research leans towards interpretivism philosophy, data collection for this research employed both deductive and inductive approaches, positioning the researcher to maximise data collection techniques in order to increase the validity and reliability of data collected for this research. The next section focuses on the strategies employed to ensure that all data collected aligns with achieving the research aim and objectives.

4.5 RESEARCH STRATEGY

OUP (2011) defined the term strategy as "a plan of action designed to achieve a long- term or overall aim". A strategy is a planned approach to attaining a desired outcome. The plan comprises precise actions to be executed and is guided through a thought process. From the above explanations, the research design, strategy, choices, time horizon and data collection techniques and procedures are all influenced by the research philosophy and approach adopted for conducting this research (Saunders et al. 2011). According to Saunders et al. (2011) the

researcher should highlight how the philosophy and approach answers the research question. The purpose of the research determines the strategy of research whether it is descriptive, exploratory, or explanatory in nature (Berg and Lune, 2012). Therefore, the researcher is expected to think about the purpose of the research and the research questions as outlined in section 1.5 in order to facilitate the research strategy.

Saunders et al. (2011) further explained that the classification of research purpose most often used may be exploratory, descriptive and/or explanatory. Descriptive research, according to Robson (2002), is to portray an accurate profile of persons, events or situations. On the other hand, studies that establish causal relationships between variables may be termed explanatory research (Saunders et al. 2011). Robson (2002) indicated that an exploratory study is a valuable means of finding out what is happening, to seek new insights, to ask questions and to assess phenomena in a new light. However, Saunders et al. (2011) stated that there are three principal ways of conducting exploratory research:

- A search of the literature
- Interviewing 'experts' in the subject
- Conducting focus group interviews.

According to Yin (2003), each strategy can be used for exploratory, descriptive and explanatory research. Some of the strategies clearly belong to the deductive approach, while others to the inductive approach (Saunders et al. 2011). The strategies that may be considered applicable to this research are, experiment, survey, case study, action research, grounded theory, ethnography and archival research (Berg and Lune, 2012). These strategies are examined and discussed in order to eliminate the ones not best suited for this research, while justifying those most applicable and adopted for conducting the study.

4.5.1 Experiment

Experiment is a form of research that is obligated much to the natural sciences (Saunders et al. 2011). The purpose of an experiment is to study causal links (Hakim, 2000). Experiments tend to be used in exploratory and explanatory research to answer 'how' and 'why' questions. According to Saunders et al. (2011), an experiment will involve typically:

1) Definition of a theoretical hypothesis;
2) Selection of samples of individuals from known populations;
3) Random allocation of samples to different experimental conditions, the experimental group and the control group;
4) Introduction of planned intervention or manipulation to one or more of the variables;
5) Measurement on a small number of dependent variables;
6) Control of all other variables.

As noted above this research does not fall into experiment research strategy, as it is not about definition of a theory or hypothesis, nor is it about controlling variables. This research is about developing a set of guidelines for Saudi Arabian organisation to help improve their capacity in the area of unpredictable risk, which require more social interactions and to investigate views, perceptions and identify patterns or themes that may be helpful in drawing theory or guidelines that can inform practice in Saudi Arabia. Thus, it is about exploring the perception and experiences of experts in the field of URs, who cannot be subjected to natural sciences experiment.

4.5.2 Survey

Survey strategy is usually associated with the deductive approach and most frequently used to answer who, what, where, how much and how many questions (Osborne, 2008). Therefore, it tends to be used for exploratory and descriptive research. The survey strategy permits to researcher to collect quantitative data (Trochim, 2010). This research strategy does not fall into survey research strategy, as it is not about collecting quantitative data. This research is about exploring the perception and experiences of Saudi Organisations in dealing with URs and their ability to explain URs in relation to their organisational experience. Situating it in the subjective orientation by this the research is able to conduct an in-depth investigation into the phenomenon under research.

4.5.3 Case Study

Robson (2002) defines case study as the strategy for doing research that involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence. Furthermore, Yin (2009) clarified that within the real-life boundaries there

exist uncertainties between phenomenon and context. However, to make sense of the phenomenon in depth, the contextual parameters are pertinent to the case study (ibid). According to Yin, the case study method is appropriate when the research problem is not yet clearly structured, and it is necessary to construct a detailed profile of the components and their interactions that constitute the problem in order to design more rigorous research. Case study research could be a single case study or multiple case studies. Yin (2009) argues that multiple case studies may be preferable to a single case study.

According to Saunders et al. (2011) a well-constructed case study strategy can enable researcher to challenge an existing theory and also provide a source of new research questions. The research objectives of how, what and why are suitable for using a case study (Yin, 2009). Although the research questions require that 'how' questions are answered, it can be noticed that no 'what' or 'why' questions need to be answered since the literature review (chapter two) has helped to answer and explain the context and concept of URs which is the 'what' that is being studied. The 'why' has also been critically examined and answered in section 2.4.2 and in chapter three. For the purpose of this research a case study is not entirely suitable although it appears suitable. This is so because, the research intends to explore perceptions and experiences through in-depth interviews, which require a number of participants in order to arrive at an objective outcome.

Thus, the justification for using more than single organisation in this research is due to the need to use more than one organisational context or scenario to expose the existing situation in KSA. This relates to what Yin (2009) explained as illustrative case studies which aim to expose the unfamiliar and help researcher identify common pattern and rationale for the area being investigated. Furthermore, the justification for using more than a single organisation aligns with general statement "all swans are white" which falsify the proposition if only a single organisation is used. By using multiple organisations, it is more objective to make deductions based on common trends in all organisations on URs, thereby increasing the validity and limiting biases in this research.

4.5.4 Action Research

Action research focuses upon and emphasises the purpose of the research. In addition, in action research, the researcher is part of the organisation within which the research and the change

process are taking place (Coghlan and Brannick, 2005). Also, the strengths of an action research strategy are to focus on change. The action research spiral commences within a specific context and with a clear purpose. It is useful for 'how' questions (Saunders et al. 2011). As noted above action research is about investing a proposed change in an organisation. This research is about developing a set of guidelines for Saudi Arabian organisation, which may not require a major change management process, but adoption or review of practices regarding URs. Therefore, action research strategy does not align nor is it applicable to this research orientation.

4.5.5 Grounded Theory

The grounded theory is the best example of the inductive approach because it is theory building. According to Goulding (2002), a grounded theory strategy is the emphasis being upon developing and building theory. In grounded theory, data collection starts without the formation of an initial theoretical framework. Theory is developed from data generated by a series of observations. These data lead to the generation of predictions which are then tested in further observations that may confirm, or otherwise, the predictions. Constant reference to the data to develop and test theory leads Collis and Hussey (2003) to call grounded theory an inductive/deductive approach, theory being grounded in such continual reference to the data. While a theoretical position may emerge from the research findings, the main aim is to develop guidelines that will be applicable in the practice field of unpredictable risk management. Therefore, grounded theory although in principle seem applicable, is unsuitable for this research scope.

4.5.6 Ethnography

According to Saunders et al. (2011), ethnography is rooted firmly in the inductive approach. The purpose is to describe and explain the social world the research subjects inhabit in the way in which they would describe and explain it. In adopting an ethnographic strategy, researcher will be researching the phenomenon within the context in which it occurs and, in addition, not using data collection techniques that oversimplify the complexities of everyday life. Therefore, it is not surprising that most ethnographic strategies involve extended participant observation (ibid). Ethnography is about investing a phenomenon within the context in which it occurs without using a defined data collection technique (Richards, 2005). On the contrary, this research is

about developing a set of guideline for Saudi Arabian organisation to help improve their capacity in the area of unpredictable risk relying on data collected from an interactive forum and opportunity such as an in-depth interview session. Therefore, ethnography research strategy is not suitable for this research.

4.5.7 Archival Research

The final strategy is archival research that makes use of administrative records and documents as the principal source of data (Richards, 2005). An archival research strategy allows research questions focusing on past events and changes over time to be answered, be they exploratory, descriptive or explanatory. Using an archival research strategy requires researcher to establishing what data are available and designing the research (Saunders et al. 2011). Archival research is about investing past events through the consultation of archival materials within the context in which it occurs. This research is about developing guidelines for an event which has characteristics which are unpredictable, evolving and which may be chaotic. Therefore, archival research strategy may be suitable for this research since it is important to collect data which are recent in order to determine the most current impacts of URs, in view of developing most appropriate and effective guidelines that may be applied to dealing with them. Therefore, it can be noticed that the justification for adopting semi-structured interview and focus group session for this research is rational.

4.6. RESEARCH CHOICES

A research choice is a technique of collecting data (Bryman, 2009). It describes the forms of data collection, analysis and interpretation used by a researcher (Creswell, 2009). Conrad and Schober (2008) espouse the adoption of qualitative research when the work is inductive or exploratory, and the aim of the study seeks to understand reasons, motivations and opinions, and consists large of textual data with all the analysis looking at the content and structure of that text. Qualitative is exploratory and inductive in nature to ascertain the actual context and situation in the real work experience (Denzin and Lincoln, 2011) similar to what is being examined in this research. The terms quantitative and qualitative are used in research to differentiate both data collection techniques and data analysis procedures. The most broadly way of distinguishing between the two is the focus on numeric (numbers) or non-numeric (words) data (Trochim,

2010). Quantitative is predominantly used as a synonym for any data collection technique (such as a questionnaire) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data (Osborne, 2008).

In contrast, qualitative is used predominantly as synonym for any data collection technique (such as an interview) or data analysis procedure (such as categorising data) that generates or uses non-numerical data (Conrad and Schober, 2008). Therefore qualitative can refer to data other than words. An additional, as determined above, the qualitative method answers the research questions of "what" and "how" (Creswell, 2009). According to Yin, (2011), it is good to rely on five sources of evidence rather than relying on a single source alone. Bryman (2009) indicated that quantitative and qualitative data collection techniques and analysis procedures each have their own strengths and weaknesses as shown in Table 4.3.

Quantitative	Qualitative
Numbers	Words
Point of view of researcher	Point of view of participants
Researcher distant	Researcher close
Theory testing	Theory emergent
Static	Process
Structured	Unstructured
Generalisation	Contextual understanding
Hard, reliable data	Rich, deep data
Macro	Micro
Behaviour	Meaning
Artificial Setting	Natural Setting

Table 4.3 Differences between Quantitative Methods and Qualitative Methods
(Adapted from Bryman, 2009)

Consideration of the comparative analysis displayed in Table 4.3, together with the need to understand the perceptions of stakeholders within Saudi Arabian organisations, suggested this research adopt a qualitative design for data collection and analysis techniques. This choice has provided the clearest possible opportunity, platform and approach that helped the researcher grasp of the issues being researched. The next section explains the methods for data gathering and analysis adopted for this research.

4.7. RESEARCH TECHNIQUES

Research techniques can be derived from a combination of techniques. For example, combining qualitative and quantitative input into data generating activities (Hussey and Hussey, 1997). The purposes of research techniques are to use reasonable methods to get information about a specific subject under study and research techniques can be useful for a broad range of areas of research. Consequently, data can be generated using structured questionnaires, observation, structured or unstructured interviews or any other technique (De Vaus, 2001). In this research, which is to develop a set of guidelines to help improve the coping capacity of Saudi Arabian organisations in unpredictable risk, the techniques adopted is qualitative data collection and data analysis techniques (Clifford et al. 2010). This section of the chapter is written to discuss the research techniques adopted for this research and data analysis techniques.

4.7.1 Techniques for data collection

According to Easterby-Smith et al. (2002), data gathering techniques are applied broadly but most significantly it depends on the nature and environment the research is being undertaken. Yin (2003) identified six sources of data collection for case study research; documents, archival records, interviews, direct observation, participant-observation, and physical artefacts. As provided in Figure 4.4, this research adopted semi-structured interview and focus group session techniques to collect data. Stakeholders within Saudi Arabian organisation where interviewed ostensibly to solicit their perception on URs. The interview technique is adopted based on the explanation by Conrad and Schober (2008) noting that interview is one of the most significant data sources in qualitative research.

According to Clifford et al. (2010), semi-structured permits the interviewer to prepare a list of predetermined questions that aid in facilitating the interview in a conversational fashion, offering

participants the chance to explore issues they feel are significant. Semi-structured interviews focus on specific themes, but cover them in a conversational style, it is often considered the best way for learning about the motivations behind people's choices and behaviour, their attitudes and beliefs, and the impacts on their lives of specific policies or events (Noor, 2008). Furthermore, semi-structured interviews often provide valuable information that was not anticipated by the researcher (Raworth et al. 2012). Gill et al. (2008) explains that interviews comprise several key questions that help to define the areas to be explored, but moreover allow the interviewer or interviewee to diverge in order to pursue an idea the interviewee in more detail. Bryman (2004) noted that semi-structured interviews provide a flexible environment leading to further questions in response to what are generally seen as significant replies. Semi-structured interview technique is the most suitable technique for this research, because it provides the most flexible environment to explore the most relevant topical areas of interest to the researcher (Adzroe, 2015).

Therefore, it can be inferred that the interview provides means of finding out from people what they do and what they think about any prevailing condition (Strauss and Corbin, 2007). Finally, as part of the qualitative data collection techniques adopted for this research focus group was instituted to further explore key issues arrived at during the data analysis stage of the semi-structured interview data. Yin (2003) and Creswell (2014), recommends multiple sources for data collection for qualitative research, but converging on the same set of findings and which will increase the quality, validity and reliability of the research outcome significantly.

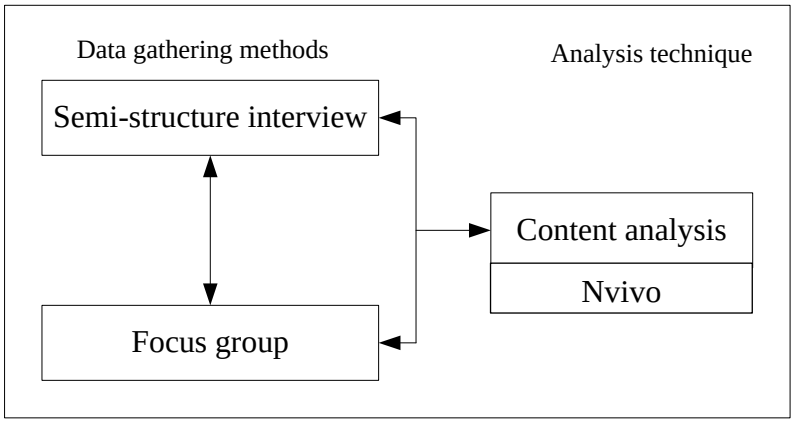


Figure 4.4. Data gathering methods and analysis technique

As illustrated in the Figure 4.4, the data collection has direct correspondence and relationship with each other and towards the data analysis technique. This process aligns with argument by Silverman (2011) who explained that by employing semi-structured technique the researcher is able to explore issues in more details by asking key questions in a flexible interview environment possibly varying questions to clear ambiguities in offering answers. The next section specifies the interview protocol and process.

4.7.2 Semi-Structured Interview

Putting discussion on semi-structured interview in the right context, the usefulness of semi-structured interviews in qualitative research is significant, more so to this study area. The interviewees have different and varying background and positions in their organisations. Their experiences working in that position in the organisation also vary. A demographic information of the participants is included in table 4.4 which shows that a total number of 13 interviewees were recruited for this research process.

Organisation type	Tally	Status	Number interviewed
Educational organisations	2	Professor & Risk Manager	2
Private companies	3	1 Director & 2 presidents	3
Public Organisations	8	5 directors, 1 head of administration, 1 president & 1 undersecretary	8
		Total	13 people

Table 4.4 Demographic information of interviewees

As noticed in Table 4.4, numbers of interviewees from each organisation type vary from organisation to organisation, which is due to numbers of expert available and willing to participate in the research. All the interviews were conducted in Arabic and later translated into English. Translation was possible because the interview and focus group session were recorded after receiving consent from the participants (see appendix A).

4.7.3 Focus Group

Focus group is known qualitative methods which draw from a group of people, their perceptions, opinions and belief regarding a phenomenon. Stewarts and Shamdasani (1990), explained that

represent a group of interacting individuals having some common interest, brought together by a moderator who uses the group and its interaction as a way to gain information about a specific focused issue. Participants are selected based on certain characteristics common to them which obviously relate to the issue under investigation (Stewarts and Shamdasani, 1990). In the process and as laid down by the principles of focus group research, the discussions were conducted in a permissive environment encouraging different perceptions and point of view (Creswell, 2014). In order to determine trends, patterns and most importantly concepts relevant to URs, the group discussion was conducted with the same organisations involved in semi-structured interviews, but with four people who are experienced staff participated in the focus group discussion. However, only two organisations (one private and one public) were engaged in the focus group in order to avoid repetition. Table 4.5 outlines the demography of the focus group participants.

Organisation type	**Status**
Private company	2 Supervisors & 2 senior staff
Public Organisation	2 Senior officers & 2 Supervisors

Table 4.5 Demographic information of focus group participants

Table 4.5 shows the numbers of participants from each organisation type indicating the attempt made by the researcher to ensure balance so that perceptions may be comparative for analysis. The focus group became necessary in order to ascertain the current conditions and thus, through careful and systematic analysis of the discussions in order to garner insights as to how to develop a set of guidelines to help Saudi Arabian organisations cope with unpredictable risk.

4.7.4 Data Collection Criteria and Sampling

The selection of participants for the data collection was based on a number of criteria as indicated in Table 4.4 and Table 4.5 based on the type of organisation. The rationale is to get to the actual participants within the organisation who have involved in dealing with URs and/or are familiar with the operations of the organisation particularly in the area of dealing with UR events. Thus, the sampling method is purposive sampling method, which is non-probability sampling technique. According to Miles et al. (2014), this sampling technique involves the selection of participants based on their speciality and experience that relates to the study area in order to generate more accurate results than using probability sampling techniques. This technique is often used when there is need for the researcher to gather first-hand information and

there is limited pool of individuals who can be considered as subject expert for a study area (Lofland et al. 2006). The interviewees were selected across different organisations based on this reason given the limited numbers of people qualify as expert in each organisation.

Thus, experts who are informed on the topic of URs or risk management were purposively selected based on their knowledge of the research area and ability to answer questions. The selection process was conducted by calling potential interviewees to confirm interests and willingness to participate in research, some were emailed and others were selected based on referral of other people. Although, conducting all survey in one organisation would have encouraged in-depth investigation of the topic, this was not possible for this research. Due to the limited numbers of people who are in charge of risk management in Saudi organisations or/and those who had sufficient knowledge to provide valuable and quality answers for questions that needed to be answered for the research objectives to be achievable. Both interviewees and focus group participants were asked the same questions and a total of ten questions were asked during the interview and focus group sessions. Questions that related to the research objectives and questions were asked in order to further investigate gaps identified in the literature review and probe reasons for the research problems.

4.8 DATA ANALYSIS

Being part of the last layer in the research onion, the data analysis is important stage in any research regardless of the strategies, choices and techniques used (Creswell, 2014). It is important for researchers to manage and process information collected carefully and in continuous consideration of the research aim and the outcomes that is repeatable and objective enough to be transferred (Berg and Lune, 2012). To achieve this end, the data collected from the interviews and focus group discussions were analysed using qualitative content analysis techniques. According to Bryman (2004), contents analysis is an approach to the analysis of documents and texts that seeks to quantify content in terms of predetermined categories and in a systematic and in replicable manner. Silverman (2011) furthermore explained that content analysis is a tool that a researcher can utilise to establish categories for further analysis.

For the purposes of this research, this technique is used to conduct in-depth analysis of key issues identify both in the semi-structured interview and focus group discussions stages (Ahmad

and Ali, 2003). In addition to this, the Nvivo computer software is also used to enhance the analysis process. The text search query is used to identify patterns of responses in specific questions (Miles et al. 2014). Identifying patterns or themes and relating them to research scope and objectives is also an essential part and process of content analysis (Silverman, 2011). This combined technique is used by the researcher to identify and gain in-depth understanding of perceptions of individuals working in within the Saudi Arabian organisational set up and determine the emerging issues from the interview and focus group discussions data.

4.8.1 Validity and Reliability

Despite several advantages of qualitative studies research, its validity and reliability has been subjected to criticism (Shenton, 2004). Test to establish the validity and reliability of quality of data for qualitative studies are significant to determine the stability, credibility and quality of the data obtained (Voss et al., 2002; Riege, 2003). Validity depends on measuring instrument for accurate result which is closely related to positivism philosophical orientation (Easterby-Smith et al., 2002; Patton, 2002; Golafshani, 2003; Heale and Twycross, 2015). Silverman (2003), suggested that validity is another word for truth. However, it has been argued that the validity of qualitative research is affected by the perception of the researcher (Creswell and Miller, 2000; Riege, 2003).

On the other hand, Silverman (2011), refers to reliability as the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions. According to Yin (2014), validity and reliability of qualitative study research can only be achieved by following the test of construct validity, internal validity, external validity and reliability. For a quantitative study Heale and Twycross (2015) discusses two validity tests, namely, content validity and criterion validity, but Yin (2014) discusses four tests to achieve validity and reliability; construct validity, internal validity, external validity and reliability. For the purpose of this research, three tests are found to be relevant.

Construct validity according to Yin (2014) which relates to establishing the appropriate or correct operational measure for a particular research. Yin (2014) also advocated for multiple sources of evidence in qualitative research in order to increase their reliability. Construct validity

was achieved in this research through literature review, semi-structured interview and focus group discussions which is based on the establishment of an appropriate research methodology. While the goal of this process was validity, it also contributed to achieving more reliable outcomes. Furthermore, key informants, including experts were engaged for the purposes of this research. Consequently, interview transcripts were transmitted to interviewees for verification to ensure that their original views and ideas were captured accurately, this process prevented any biases from the researcher and helped to retain the objectivity of the data (Lofland et al. 2006). As such, these research activities are in line with definition and explanations provided by Yin (2014) and Lofland et al. (2006) of construct validity.

4.8.2 Justification for Validity and Reliability

According to Yin (2014), external validity refers to the extent to which a research result can be generalised. In this research, the test of external validity is achieved through review of key literature and utilisation of semi-structured interview and focus group discussions. Furthermore, literature findings were compared at different stages analysis. Content validity is about the extent to which a questionnaire survey instrument adequately cover all aspect of the research area (Heale and Twycross, 2015). In this research content validity was achieved through detailed literature which established the key issues which was explored through semi-structured interview and focus group discussions.

Reliability relates to the ability to demonstrate that the operation of research, i.e. data collection procedures of a research can be repeated with the same result (Yin, 2014). To enhance reliability, Yin (2014), recommends the use of case study protocol, development of case study database and the utilisation of multiple sources of evidence. Multiple sources of evidence were adopted in this research in order to enhance reliability. Triangulation represents the use of more than one method or sources of data in qualitative study research with the aim to corroborate the same fact (Yin, 2003, Bryman, 2004).

According to Bryman (2004), triangulation offers the prospect of enhanced confidence. Since Yin (2003) rejects single source of evidence in case study research as it does not permit addressing research questions with a broader view. In this research, multiple sources of evidence have been employed as shown in Figure 4.4, which is in line with Creswell (2014) and Yin

(2014), recommendation of utilising multiple sources of data in order to provide much more conclusive and accurate findings. The decision to use multiple sources of data also align with the explanations of triangulation offered by Denzin and Lincoln (2011). According to them, Denzin and Lincoln (2011) distinguishes four forms of triangulation as follow: data triangulation, investigator triangulation, theoretical triangulation and methodological triangulation. For the purposes of this research triangulation was achieved as follow:

- **Data triangulation** – the researcher utilised semi-structured interviews and focus group discussions.
- **Theoretical Triangulation** – the research explored literature in different key areas that are relevant to this research. For example, areas such as the unpredictable risk within Saudi Arabian organisations.
- **Methodological triangulation** – although this research is premised in the interpretivism methodology, the researcher used moreover deductive technique which falls within the positivism stance.

4.9 ETHICAL APPROVAL

Ethical approval must be obtained by all postgraduate research students (PGRs) prior to starting research with human subjects, animals or human tissue. Accordingly, the researcher applied for ethical approval in line with the application guidelines provided by the University of Salford to the College of Science and Technology Research Ethics Panel (CST). After thorough scrutiny of the application, CST granted the application (see appendix for sample of ethics document). Ethical considerations were also given to the research investigation process whereby all participants were recruited and participated voluntarily (Creswell, 2014). Participants also consented to their involvement and to be recorded, although most requested to stay anonymous (Richards, 2005). Data were also treated with care and in compliance with University regulation for conducting PhD research and fieldwork.

4.10 CHAPTER SUMMARY

The chapter discusses and presented the research model adopted for this research. The research methodology adopted for this research has drawn inspiration and guidance from Saunders' Research Onion. The elements discussed and justified within this chapter include; research

philosophy, research approach, research strategies, research choices and research techniques. This provided the basis upon which the research inquiry process is conducted, data collection and analysis in order to arrive at the research outcome. The next Chapter presents and interprets the findings of the qualitative data.

CHAPTER 5: RESEARCH FINDINGS AND ANALYSIS

5.1 INTRODUCTION

This chapter has the purpose of presenting findings of the interview and focus group sessions. It analyses the information provided by the participants that align with specific themes and focus of this study. The participants who were recruited and interviewed in Saudi Arabia have provided primary data that aims to help achieve the second and third objectives respectively. Therefore, this chapter is divided into five main sections, the first section, 5.2 presents the demographic information for both semi-structured information participants and Focus Group (FG) participants. The other three sections with each section addressing the findings for the following themes which relate to specific research objectives:

1) Impacts of UR on organisations in Saudi Arabia – this theme relates to second objective.
2) Current mitigation strategies – this theme relates to second objective also since the second objective two parts to it.
3) Effectiveness of Risk Management Strategies – this theme relates to the third objective. This theme and section also includes information and analysis on robustness and resilience in dealing with UR in Saudi Arabia organisations.

Each section presents and analysis the results for each theme, while the fifth and last section summarises the findings and the chapter.

5.2 DEMOGRAPHIC INFORMATION – Semi Structured Interview and Focus Group

This section presents the demographic information for both semi-structure interview and focus group session with the purpose of justifying their involvement and quality of information provided in relation to this study area. This section indicates the background or organisations of participants and their years of experience to determine the extent to which they are informed on this area and ability to contribute to existing knowledge in the field of risk management in general. The first demographic information to be examined is the semi-structured participants which had 13 in total. Subsequently the focus group demography is presented to clarify the code that will be used to represent each session.

High level officers graciously accepted to participate in this research and devote their time to providing information. A total of ten questions were asked and answers were provided based on their experience and expose to issues that concern or relate to URs. Table 5.1 shows the summary of information of participants.

Position	Type of organisation	Name of organisation	Code
Director of monitoring and environment	Public	Ministry of Agriculture	**S1**
Director of the department of fire prevention	Private	Saudi Electricity company	**S2**
Professor	Public	King Saudi University	**S3**
Director of the general administration for safety and secretary of the main committee Sharqiyah KSA	Public	Civil Defence	**S4**
Director of plan and quality	Public	National water company	**S5**
Risk Manager	Public	King Saudi University	**S6**
President of General Industrial Safety	Private	Saudi Chevron Phillips company	**S7**
Undersecretary for teachers and superintendent of school safety and security	Public	Ministry of education (General)	**S8**
Director of administration	Public	Civil Defence	**S9**
President of economical & education	Private	SABIC	**S10**
President of the engineering department of the general disaster organisation	Public	Ministry of municipal affairs	**S11**
Director of operation and training	Public	Medical services division of the ministry of defence	**S12**
Head of administration of risk analysis	Public	Civil Defence	**S13**

Table 5.1 Profile of participants for semi-structure interview

Table 5.1 shows the range of organisations and the position held by research participants. The coding for these participants helps in facilitating the discussion in this chapter and in preventing the identities of the participants. The range of organisations and positions held are also important in assessing their views on URs, risk management and areas they consider as priority for improvements. Therefore, to prevent confusion and ease of discussion, the letter 'S' and a

number (serially ascribed) are used as the prefix for representing participants and in discussing their views on questions asked. Code starting with letter 'S' which is the first letter in Semi-structured interview is used along with serial numbers to represent the participants when presenting and analysing the information provided them. In terms of years of experience, Figure 5.1 indicate the range of years of experience of the participants in the field of risk management or related field.

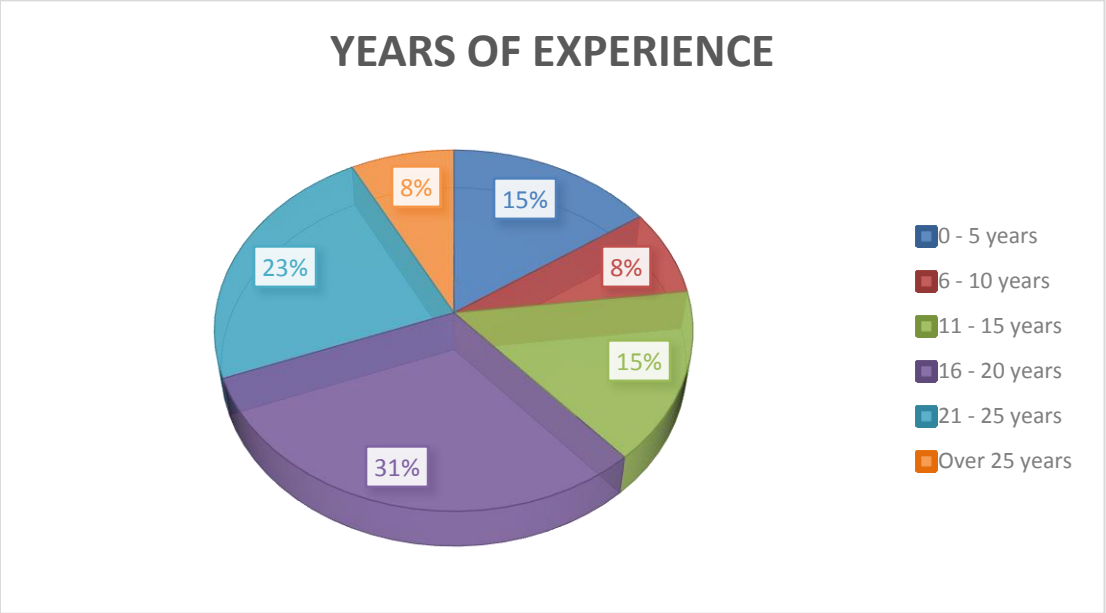


Figure 5.1 Years of experience of interviewees

It can be seen in Figure 5.1 that most of the participants are quite experienced in the study area except for 15% who then to have less than 6 years of experience working specifically in dealing with risk or planning for events that are results of risk. It can then be inferred that due to this good range of experience, the participants are able to provide quality and relevant information provided they have dealt with risk events before or have worked in organisations that dealt with risk in the past. However, the FG had a group of participants with the following profile represented in Table 5.2.

Organisation type	**Name**	**Status**	**Code**
Private company	Saudi Electricity	1) 2 Supervisors 2) 2 senior staff	F1
Public Organisation	Civil Defence	1) 2 Senior officers	F2

		2) 2 Supervisors	

Table 5.2 Profile of participants for Focus Group (FG)

Table 5.2 displays the profile and numbers of participants for the FG, but in terms of experience, that of the FG participants, their years of experience also vary from organisation to organisation as shown in Figure 5.2.

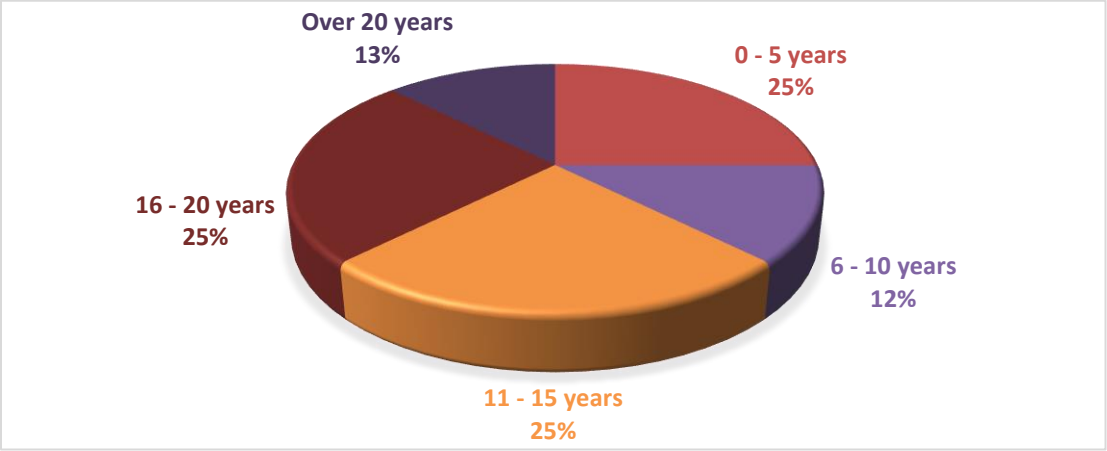


Figure 5.2 Years of experience of FG participants

As seen in the Figure 5.2, 25% of the participant either have 0-5 years of experience or between 11-15 years or 16 -20 years. On the average, it can be said that sufficient numbers of participants are informed and the cases where they are less informed about specific questions, others in the country are able to contribute based on their more advanced experience. Based on this understanding and information about all the research respondents, the researcher presents, interprets and analysis their information in subsequent sections using the research themes.

5.3 IMPACTS OF URs – Results and Analysis

This section presents the information provided by the respondents when asked questions relating to impacts of URs in Saudi Arabia. A total of three questions were asked under this section to identify the understanding on URs, its impacts and how it was managed.

The first question was:

Has your organisation encountered UR before? If yes, please give an example?

To answer this question, S1 to S13 provided answers which were relevant, detailed and helped to determine how previous URs events were managed in Saudi Arabia. For instance, 84% answered "yes" their organisation has encountered UR before, while the remaining 16% answered that

their organisations have not experienced URs or UR events before. While this answer is acceptable, the examples of URs provided resulted in Nvivo result –

> <Internals\\Impacts of URs and UR events> - § 1 reference coded [28.69% Coverage]
>
> Reference 1 - 28.69% Coverage

This result enabled the researcher to further probe the pattern of answers through a 'text search query' to identify words used by the participants to relate to URs. The outcome are as follows:

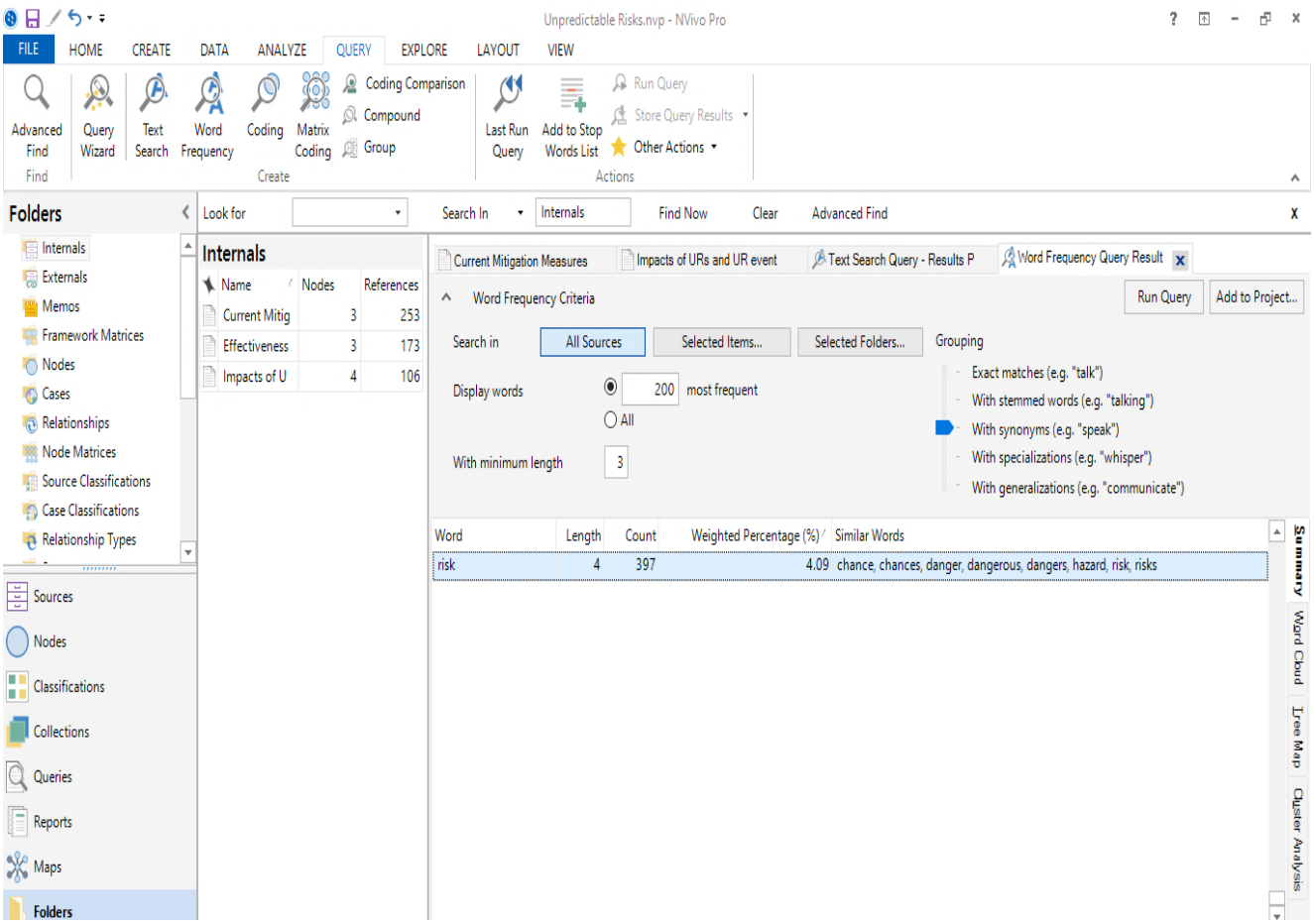


Figure 5.3 Reference to UR risks in interview

The Nvivo screenshot shows that certain words like risk, disaster and accidents were used to describe examples of URs, but as seen in Figure 5.3, risk has the weighted percentage of 4.09

with similar words used in reference to UR being: chance, chances, danger, dangerous, dangers, hazard and risk respectively.

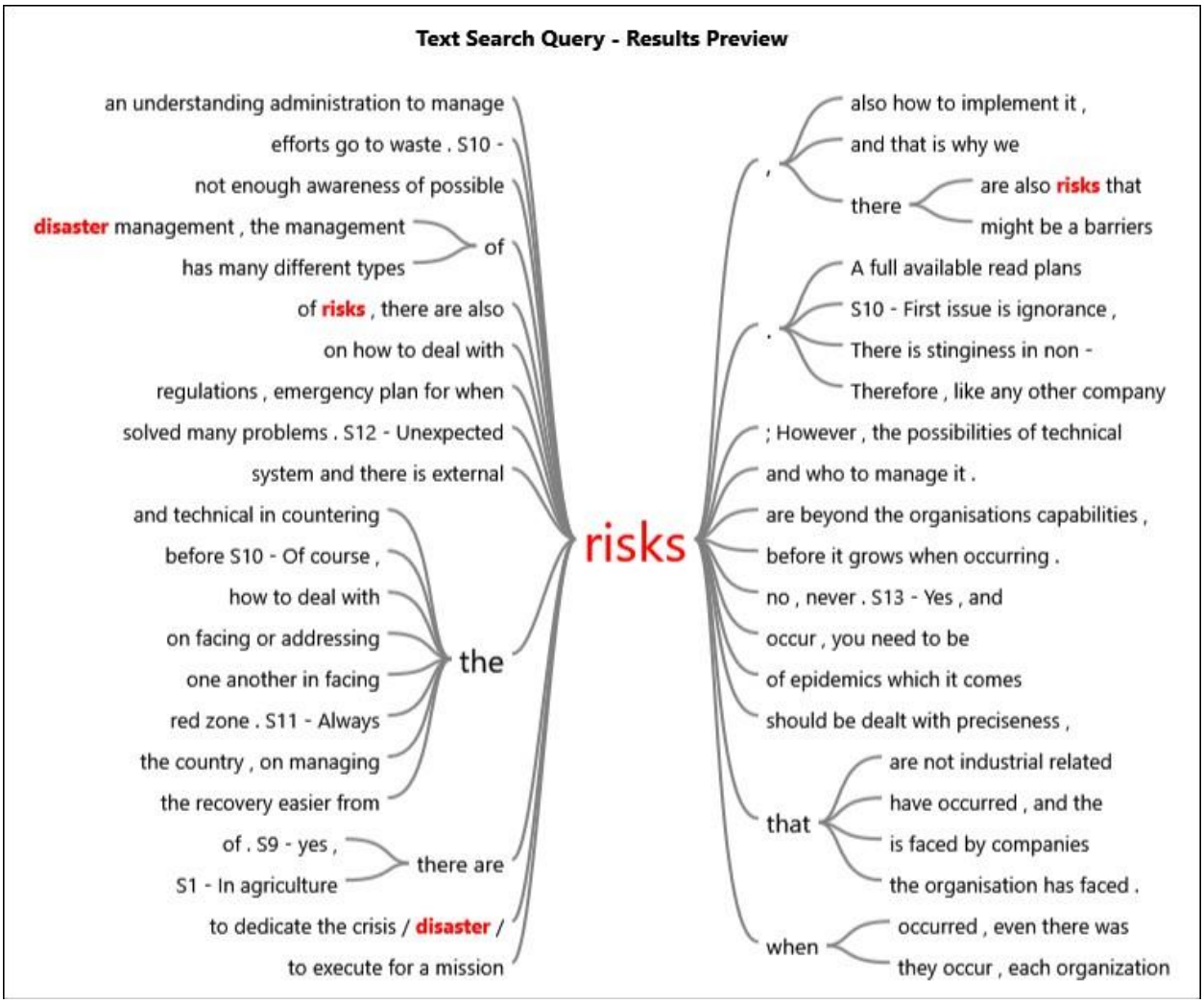


Figure 5.4 Text search query for UR events in Saudi Arabia

The NVIVO analysis of data in Figure 5.4 indicate that risks are generically used, but the text search query indicate that UR events are considered as disasters in Saudi Arabia. However, the information generated from the FG slightly differ in that:

F1 considered the following events such as URs:

1) *Electricity outage*
2) *Exodus of Kuwaitis from Iraq aggression against state of Kuwait in 1990*
3) *Jeddah disaster*
4) *Floods in 2009 and 2011*

Similar to this, **F2** explained that URs are:

1) *Epidemics like Wadie Almotasada fever*
2) *Dengue fever*
3) *SK Karona*
4) *War in Yemen*
5) *Major Electrical failure*
6) *The global financial crisis in 2008*

Based on the result, it appears UR events in Saudi Arabia are more externally generated, or events that impact of larger societal scale. It also appears that they are large scale events that tend to overwhelm capacity for response. In this sense, it is important to identify the way in which these events are dealt with by the participating organisations.

In your opinion, what are the factors for dealing with URs in your organization?

To answer this question, interviewees provided the following answers:

S1 - *Well*

1) *examine the current situation and past experience.*
2) *analysis of expectations for the disasters,*
3) *create awareness*
4) *have the administrations, machinery, and the regulations ready*
5) *then impose on all the organisations to have the knowledge and understanding of the crises/disasters*.

S2 - *Extensive training, increase the knowledge of people and organisation*

S3 - *Provide plans that prevent risk, which is built on 5 steps*;

1) *Understanding the goals of the organisation.*
2) *Risk analysing which revolves around (Risk analysis, hazard identification, identify ways to control the risk) and from those the plan can be built.*
3) *Except the unexpected,*
4) *Resources*
5) *Facilities*

S4 – *Beforehand*

1) *Planning and having solutions laid out,*
2) *more effective coordination and increasing the availability of information*.

S5 –

1) *restructuring and rebuilding in right way in order to meet global governmental safety requirements.*
2) *management that realizes these issues*.

S6- *The most important factors are the existence of a supreme committee with the availability of material and human resources. It is a human resources specialist; they have high qualification and the same time experience, and expertise to easily adopt something is a main to face the unexpected dangers*.

S7- *The existence of an understanding administration to manage risks. A full available read plans and the equipment to execute the plans correctly. Risk assessment, every year*.

S8 –

1) *find a management or a reference within this organization to organize a plan to meet any potential crisis*
2) *practice raising awareness, educate and put in place training functions in a society.*
3) *Have guides and models and legislation in place to face any disaster*
4) *have a sequence, a clear hierarchy in the link for there to be an ease in decision making and flexibility at the same time.*
5) *command is very important*

S9 –

- *The organisation must handle the danger with prudence/carefulness, with concentration and quick at responding.*
- *There must have the availability of materials and human with high potential, and it should be exploit with high efficiency*.
- *The risk must be faced with the correct guidance to mitigate the risk in its place.*
- *There must a well-planned coordination internally and externally. there must be a consideration of other surrounding factors that might have the influence on the crisis itself. trying to dedicate the crisis/disaster/risks before it grows when occurring.*
- *there must be regulation and utilization of the abilities, and coordination and organization with different services on the site.*

Talking about my organization, it does exist, prior planning in disaster management, the management of risks when they occur, each organization or each facility knows the tasks and responsibilities that falls upon them, in their own right under the coordination with other services, because if there was no management, efforts go to waste.

S10 –

5 *Risks should be dealt with preciseness, and prepare before it happens and if it happens deal with it in a certain way, there has to be a manual system then comes the leader ship skills. Decisions itself is risky but you have to take the risk sometimes.*

6 *The most important in managing is the emergency plan,*

7 *take care of your employees provide a safe environment, try to make expectation do not wait for reactions, there needs to be a for cast system you,*

8 *If danger happens to business continuity management (BCM) the role of risk management is not effective any longer*

S11- *Always the risks are beyond the organisations capabilities, so the organisation needs support from inside the organisation and from other organisations as well, so there must be a high and excellent coordination, but sometimes the organisations don't have the enough possibilities in: financial, qualified employees, and technical in countering the risks; However, the possibilities of technical and human expertise in other organisations, so organisations should contribute and help one another in facing the risks, there might be a barriers such as: the right administrative. But, if there is a one administrative and all the organisations follows this administrative department and have all the authorities and possibilities of giving all the support to all the organisations on facing the risk, I think it would make a great change, that will result in facing the risk properly, but as we have talked about one organisation cannot face the risk by itself.*

S12 - *To prepare well, activating emergency plans, training and raising awareness about all trigger factors.*

S13 - *Firstly, is the existence and the preparedness of automated and human efforts. Meaning having enough manpower, and a sufficient number of machinery and the necessary equipment, and the availability of accurate plan on handling occurred emergencies and not hypothetical but realistic plans of the lessons have learned from previous plans, and a full coordination internally and externally. The danger might be in somewhere else, so it requires transferring the machinery and manpower to counter the risk.*

The information provided shows that factors and measures considered necessary for dealing with URs in Saudi Organisations are planning arrangement such as plans, procedures and coordination as emphasised by the respondents. This is summarised in figure 5.5.

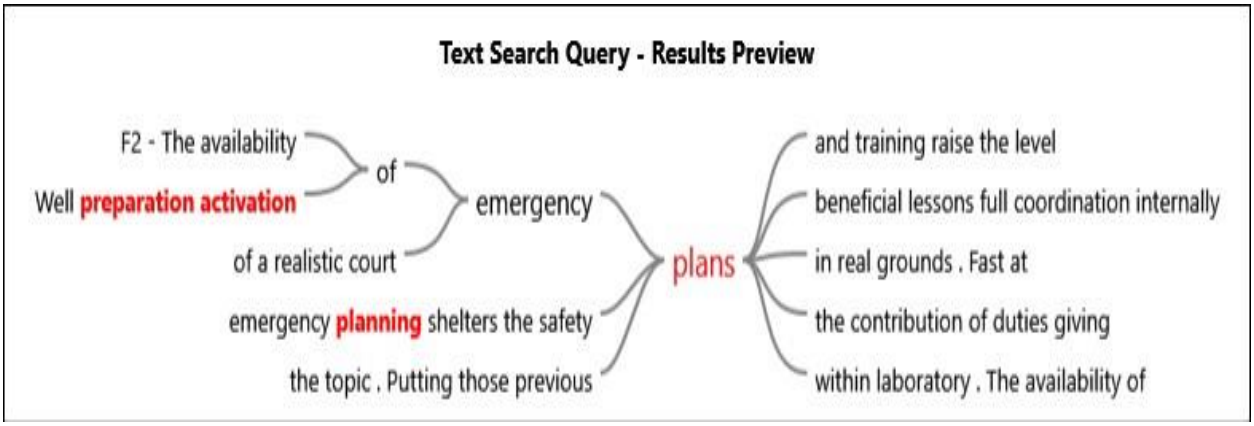


Figure 5.5 Text search query for current measures for dealing with URs in Saudi Organisations

The text search query indicates that current measures for dealing with URs in Figure 5.5 are emergency planning arrangements which are activated for incidents that are occurring and in preparation for incidents known to occur. Figure 5.5 shows that no reference is made to adequate preparedness for unknowns or any events that has characteristics of URs. However, the FG response generated more specific factors and measures such as:

According to F1, Saudi organisations manage URs using the following measures –

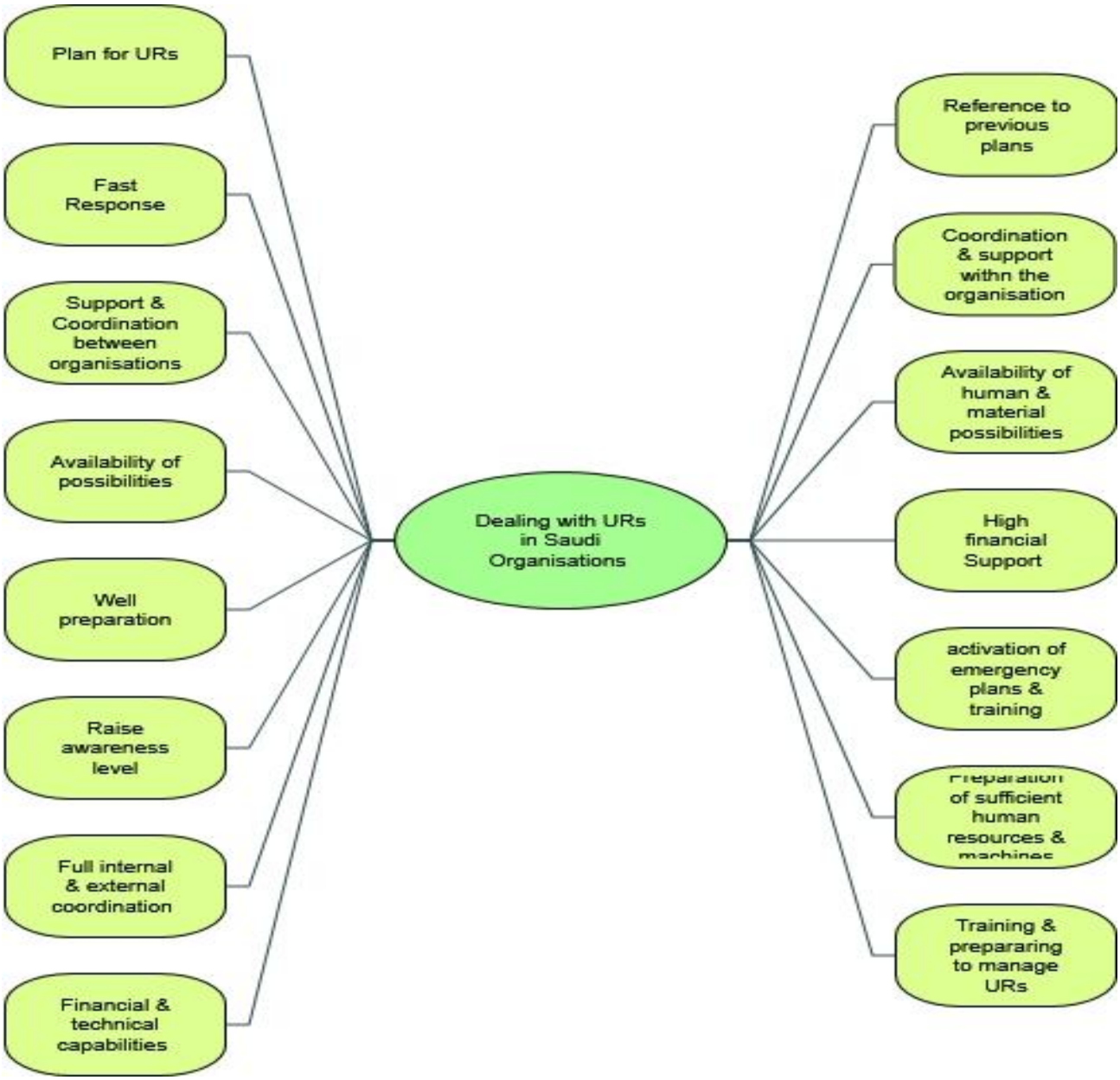


Figure 5.6 Classification map for measures for dealing with URs in Saudi Organisations (F1)

Although Figure 5.6 shows more specific measures for dealing with URs, it can be noticed that all measures are reactive in relation to incidents that are known and none aimed or indicate that any of the characteristics of URs are addressed. F2 also identified most of the measures/factors mapped in Figure 5.6, but included the following factors:

1) *the distribution of duties and assigning authorities*
2) *Evacuation planning*

3) *shelters and the safety plans within laboratory*
4) *The availability of the strong management in making the strong decisions.*
5) *Lessons learned from the experiences of other organizations in dealing with disasters*
6) *Making studies for risk prediction*
7) *the availability of a management that is aware of the importance of risk management specialist team provided*
8) *establish a high specialized committee to deal with threats.*
9) *Increase the understanding of the Organization members in the importance of risk management and have a positive reaction about it*
10) *To expect the unexpected*.

It can be seen that the FG provided very specific measures and factors used and intended for use in dealing with URs in Saudi organisations and in the society.

However, when asked:

In your opinion, what are the main issues or factors that can hinder Saudi organizations from managing URs?

S1 - *The first thing is the lack of experience, because the lack of gained experiences of disasters will weaken the organization ability to survive. The second thing, the side/environment conditions sometimes relay on many things such as; financial, technical, and mentality within the intellectual leadership of the agency/department is not at the standard of the disaster. The leadership management might have the qualifications of finance or business in general,*

S2 - *Some employees lack skills and ability to deal with issues in the first place, there needs to be training from the beginning. Financial support that may not have been provided therefore it may hinder in the management of UR.*

S3 - *We have two problems; first, its individuals, whether it's a manger or an employee, there is not enough awareness of possible risks and who to manage it. Second, financial support, when you want to implement an idea it is one of the hardest elements to make available.*

S4 - *Not enough coordination between government departments. Lack of training for managers and employees. Communication during the crisis. If all departments are so far from each other and the crisis happened there needs to be a clear communication to understand what do.*

S5 - *The problems like we said are considered to be common sense by the organizers. The CEOs are necessary for example Saudi Aramco, the largest header in the circle who consider safety and the environment as the most important points which work has to revolve around, and at the same time they devote expenses and pick up projects to reach the highest level of safety*.

S6 - *Not giving sufficient powers to carry out its main functions*.

S7 - *First, insufficient early planning, yes there is lack of specialized cadres but not having an available plan is what mainly hinders an organisation. Even if there is a lack of specialists that could provide you with a plan bring outside expertise and advisers to guide the organisation risk management wise. Last but not least, culture and environment that surrounds the organisation*.

S8 - *Sometimes administrative bureaucracy does not respond to change rapidly. These functions may vary from one department to another. Therefore, each department should be viewed as an independent.*

S9 - *The constraints may be from Regulatory, there may be barriers to coordination, Regulatory body within the Organisation itself, there are no specific clear regulations. Also, the problem with coordination could be from the surrounding environment/area because they might be unhelpful on the process of facing the risk when occurring. There is a coordination between you and other organisations in the same filed as well as in the same geographical area, this might make difficulties on facing or addressing the risks*.

S10 - *First issue is ignorance, an ignorant will not know the importance of what he is been given, therefore does not see the value of it. The second issue is the lack of resources in some organizations, or requirements available to execute for a mission risks. Also, the lack of reporting tool, we create plans but we don't track it, there is no existing performance management, so when you have a risk and try to identify it on a level one and two of the organization yet the work is not transparent therefore you are not supporting the management you have to make decision on the right time, because these are issues that will hinder the organization in risk management.*

S11- *Not many organisation can encounter the danger by itself, so the everyone must participate on facing the danger and mitigating it causes, because the mitigation of the danger needs the contribution of others and everyone should participate and everyone should be supportive*.

S12- *Not being prepared well*.

S13 - *First: the weakness of not having a budget line specialized for these organizations to spend on such a thing. Second: the lack of integration between the organization with other organizations, meaning the lack of integration of completing each other business and requires that the organization must be at the level of other organizations, so they can have and owe the same as the other organizations. Yes, the awareness of decision makers within these organizations have dropped. Hence, they consider the spending or creating a special item in the budget on these thigs are a waste of money and has no value*.

It can be observed that the factors that can hinder ability of Saudi organisation vary extensively as identified by the interviewees. The FG participants also identified some of the factors mentioned by the interviewees, but other certain factors not mentioned.

According to **F1** – "*the shortage of material resources, lack of integration between this organization with other organizations, lack of awareness of the decision makers. Bureaucracy, weak financial support, traditional administration in dealing with the risks, the lack of caring on risks and ignoring the incident of occurring or don't even have the awareness about it, material cost, importance of expenditures, it spent on more important things, but it does not go on to risk management*"

F2 on the other hand identified more factors being a public organisation. Factors such as:

"*the pace of solving problems, lack of experience, not hiring/consulting experts from outside the organization, do not take advantage or have benefit from the experiences of other organizations, lack of simulation programs for experienced plans, financial aspects, the belief and understanding risk management by senior management is weak, the lack of administrators of the organizations on investing in risk management, to save up on what he's got to pay exponentially to address disaster when they occur. People have lost or forgot the awareness and training, lack of the financial support, the absence of the culture of the organization. lack of awareness of culture amongst leaders and individuals about risk management, lack of financial sources to deal with risks. Ignorance of the importance of risks and its management, lack of material and human resources, unwillingness to invest on other things that don't have fast response*"

5.3.1 Data Interpretation and Analysis – Impacts of UR

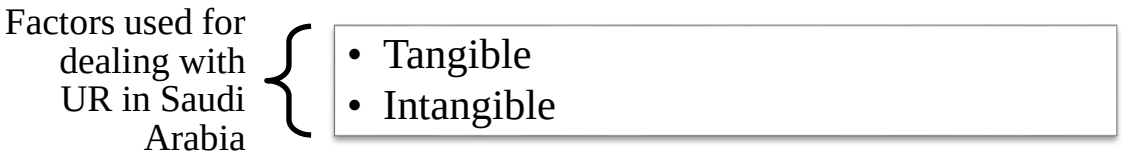
As indicated in the methods chapter, analysis of data collected through semi-structured interview and focus group are analysed using Nvivo and content analysis. This triangulation process is used in this section to analyse findings on the impacts of UR on organisations in Saudi Arabia. The findings from the semi-structured interview indicate that 10 out of 13 organisations or interviewees have experienced or witnessed UR before. In their definition of UR, it can be noticed that most consider events such as crisis, disasters, hazard and accidents as UR. While these are events whose impacts can be overwhelming if and when they occur on a large scale, it follows that they are not of extreme scale as UR events as examined in the literature review (Section 2.2). Regardless, impacts of some of these events may be similar to that of URs based on the explanations provided by the respondents. Based on the responses and examples of URs provided by the interviewees and FG, impacts of URs in Saudi Arabia are:

1) Wide spread (like epidemics)
2) Severe (2009 & 2011 floods)
3) Dangerous and affected normalcy (electricity/power outage)
4) Affected people and led to death
5) Required relief operations and led to relocation of people and rehabilitation of places
6) Breakdown of system and economic loss (2008 financial crisis)
7) Stretched local resources such as housing, food and medicine (Exodus of Kuwaitis in 1990)

These impacts have similar characteristics with that of URs which are unpredictable (like epidemic), severe impacts (like the flood events) surprise (like the exodus of the Kuwaitis) and extreme (like the power outage). As such all these events combined have characteristics of UR events, but no single one has all. Therefore, the impacts of events considered by Saudi Arabia organisations are not as severe as typical UR events.

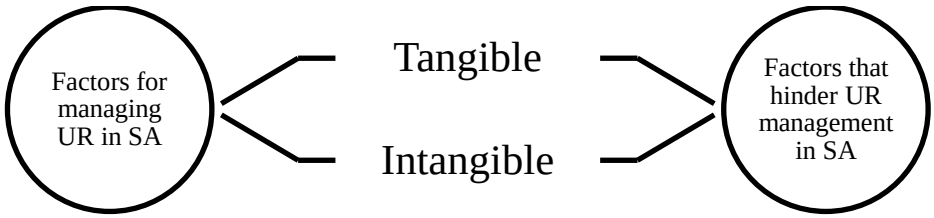
Factors used for dealing with URs and factors that can hinder Saudi organizations from managing URs were also examined in relation to determining the capacity of Saudi organizations in coping with typical UR events should it occur at the ideal scale and impact that URs occur. The findings to these two inquiries revealed that factors for dealing with URs in Saudi

organizations can be classified into two broad categories which are tangible and intangible measures. Tangible measures mentioned and underlined in the responses include, equipment, facilities, human experts etc., while intangible are planning, risk management, training, skills, capabilities, finances, raising awareness, adopting lessons from the past etc. The factors currently used can be illustrated as:



The factors identified as main hindrance for Saudi organizations in managing URs can be classified as intangible and tangible. **Intangible factors** include lack of experience, lack of simulation training, lack of training, lack of administration, lack of financial support, lack of investment in risk management, ignoring incidents, shortage of material resources, lack of integration, bureaucracy etc. **Tangible factors** identified by interviewees and FG participants include; lack of expertise, shortage of material resources, lack of trained people etc.

Using content analysis technique (summary, explication, structuring) and analysis of material, it can be seen that same classification of factors that respondents claimed to be used for dealing with URs are also the ones that may hinder Saudi organisations from managing URs. This having similar factors that can be used to manage and also responsible as hindrance may be insufficient for dealing with URs as there may be gap. The relationship between the two factors is seen below.



Since similar factors are responsible for managing URs and also identified as hindrance in Saudi organizations, it is unlikely that the measures in place are sufficient for dealing with URs and UR events. It can also be inferred that the factors identified by respondents for dealing with URs in

Saudi organizations will be effective in mitigating the impacts of UR events identified in Saudi Arabia. However, the next section and questions which investigate current mitigation measures in Saudi organizations helps to verify this assumption.

5.4 CURRENT MITIGATION – Results and Analysis

This section presents and analyses the results for current mitigation strategies used in Saudi Arabia. This section is also aims to address the second objective and in doing so, it comprises four questions to build on the findings of the previous section.

***Has your organization considered URs before they happen, did you do anything about it? If Yes, what strategies or approaches did you use in your organization to deal with those threats? If not, why*?**

To answer this question,

S1 considered URs in the subject of nutrition - *We request from the kingdom to import most of its food from abroad to reduce the risks of drought. For example, wheat is known to be produced from many countries in the world if it follows that prediction of reduced grain production in the designated State for example in Europe and in America because of drought you must have the risk.*

S2 - *Yes, the strategy of "Emergency Action Plan" which is applied in each department and practiced on, whether building management station or a supply one. Every department dose an assessment of the possible risks they may face, such as floods, gas leaks or explosions etc*.

S3 - *Mitigation, in our university to reduce the consequences, we have created a system for student rights, it is a way for student to express what they feel about their course or want to change in the university*.

S4 - *It needs training. Training is one of the main needs to manage URs efficiently. Secondly, there needs to be a new strategy, because our strategy may be old and needs to be renewed. By studying all the possible risks, precisely what may happen and how to prevent it, and have a plan*

based on what to do before, during and after disasters. Tools to use in preparation for UR, we could use these programs to prepare for risks, for example during Hajj, we The General Administration for Safety face many problems and UR that effect the country and its reputation globally. In addition, we miss coordination between government departments regarding managing UR, they all work when the disaster happens, for example, the incident of stepping and congestion in Mina Saudi Arabia, during the problem everyone started to work, and this is a problem

S5- *Currently no, because it requires concentration of senior leadership and support in safety procedures. Support such as financial and administrative support, and they need to make plans in order to prepare for an upcoming disaster. For example, during pilgrimage season in Mecca, whether it needs updating or not, and if it turns out that it does … safety is the priority*.

S6 - *Our organization is the King Saud University is administered by specialists or distinct cadres and thus it has the expertise and knowledge in many areas, at times we can be little late. However, all quarters that specialise and are existing in all of the capital, all those are in cooperation with us. Therefore, we have committees meet in an emergency situation*.

S7 – *The company is a Saudi American company and it is 150 years old, so there were original risk management processes but we shaped it so it is suitable for our environment. The partner in the organisation has a role in the existence of these programs. There are two strategies that execute risks; First, emergency plan, which deals with Industrial problems such as disaster, fire in building, leaks of any kind, accidents and employees related health problems, so there is plan to manage these types of accidents. Secondly, Crisis plan when it occurs, which deals with industrial crisis, such as fire that cause the death of many, and brought a lot of negative media coverage.*

S8 - *No, of course. Firstly, because I think it needs financial investment, and require significant amount of human resource, as well as the requirement of training, unfortunately till now we have not reached that point.*

S9 - *Yes, there are a specialised organisation work on the sensing the risks there is throughout the year, in such assumptions; for example, certain assumptions for the occurrence of particular accident, where the general arranging of all human and material resources and attempting to*

simulate reality before it happens, and then how to handle the situation on serious grounds. We do have unexpected scenarios, for example flooding or earthquake or volcanoes on particular places, what are the possibilities of the resources that must be provided. Take the necessary precautions with local and governmental organizations in the same location, making arrangements on the basis of being ready if this incident occurs. So, each participant and each organization know their role and duties, that placed responsibilities on the frame and overall coordination with the organization to which it belongs.

S10 - *There were many arrangements that was done by the organization I am in, and of course one of the arrangements is the creation of a management that deals with risk management called enterprise risk management; this unit was set up three or four years ago. Moreover, there were departments concerned with risk. Security and safety departments only manage the safety of the facilities and factories, part of it was to also take care of the environment and the risk that may face the factories. Moreover, it operates on the subject of policies and procedures, guide lines and regulations, the management was available it just was not under the name of enterprise risk management or risk management. For strategies that was applied by our organization to deal with risk. Firstly, strategies in general, the structure or instruction, but of course there is now a management on board level of the committee called risk management. Furthermore, there are two types of risks in an organization; first, the risks within the company, second, the risks of the company's environment. Furthermore, risk rating, every year we work with different organization and we make assessments of what are the potential risks your sector may face; These risks are recognize on three levels, on the level of head sector of the organization or the executive vice president IFB, then on a level 2 and there is risk that are less than level 2 such as what manger define as the risks, after such it is the navigational action, which is what can be done in order to keep risks a way. In addition, we have web system in the company such as the "shield system" this is a progress update so that you are able to follow up at every, it will be seen when there is a risk and we use risk matrix which is a matter that contains two-dimension map; first is the chance of risk happening. Secondly the consequence impact and the I cod and impact we have is high, see which one is high and which one is low quarterly on the matrix. Moreover, when we recognize there is risk we take action and put a deadline and knowing how to end it and its named full obstacle which is a general strategy. In addition, we use three thousand of the audit from risk management when you implement it you will see positive results.*

S11 - *Yes, after the tragedy that have happened in Jeddah, the officials of corporations and organisations have sensed the size of danger that have occurred, so the risk of general management have been created with in the ministry as well as municipalities, and then we took a step toward the right path, we have made the disaster or risk something important and we are required to prevent and mitigate the danger from it. We have started to operate like corporations when facing risks. Previously, the we operate in traditional way on facing or mitigating the disasters/risk.*

First of all, the system of the administration, there should be systematic administrative specialized for disasters and the mitigation from it.

Second step, there should be human cadres, a ready team within the head office, in the ministry and its branches; there should be a human cadres and the capabilities of technical and financial on confronting any danger might occur in the future, and dingoes all the dangers the might be expected to happen within the region, and prioritization of risks for each region, because in every region have its special disaster which is different from other regions, limiting the risks in each region and featuring the disaster in every region and putting weights for this risks, and prioritizing the risks because every systematic excites within all the regions should have the capabilities and preparations of human and technical suitable with the type of risk that might happen in that region.

We give the risk its weight; with clarity, if the topic is regards the west region, we give all the highest weight for the technical disasters, for example, oil leak, chemical leak, biological resources, or the industrial explosions in oil factories, or chemical factories, or petrochemical factories, these risks have the highest weight from other dangers. The other risks, could have a bigger weight in a different region; for example, natural disaster. So, we start to do risk analysis and risk simulation within all the kingdom region, and we study the specific disaster for every region and we try to consists the equipment for human and technical ready for mitigating any risk might happen in every region.

S12- *Yes of course, and usually it is prepared from the lessons of previous disasters, and what services prepare is implementing future plans for future disasters. There are not any indicators of anything that may occur but there should be should a plan ready. for example, Hajj preparations of the occurrence of something unexpected.*

S13 - *Mainly creating emergency plans, and through these plans we can control and adaptation the plans depending on the situation or the type of event, so there could be a high flexibility within the plan, and having alternative plans to cope with any change depending on the disaster/risk.*

The range of answers provided by the interviewees indicate that UR mitigation as understood by Saudi organisations are well considered in terms of strategies that may be used to deal with them. However, discussing these approaches or strategies does not guarantee effective application or implementation. It was discovered through the FG sessions that risk evaluation, assessment and management exists (shown in red) in dealing with URs as shown by the text search query for the F1 and 2.

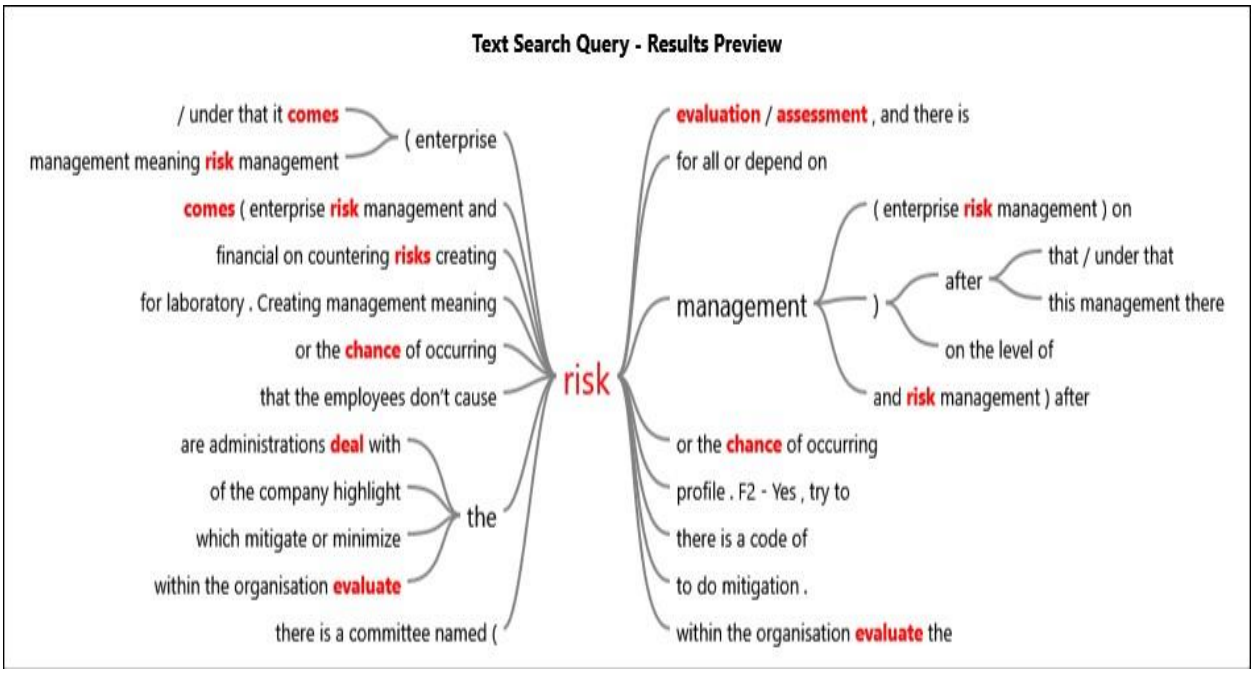


Figure 5.7 Text search query for strategies and measures for URs (F1 & F2)

The findings shown in Figure 5.7 suggest that element of risk management exists in the organisations, however convert. This outcome made the next question important which is:

Does your organization have the ability to cope with or manage URs? If Yes, how? If not, why?

The interviewees provided a wide range of answers which relate to the question, but extend beyond the theme being examined in this section, thus Nvivo was used to streamline the answers, but a complete script in included in appendix B. According to Nvivo analysis, 48 references were identified that relate to the themes as shown below:

<Internals\\Current Mitigation Measures> - § 48 references coded [0.81% Coverage]

There were 48 references to words that relate to strategies, measures, capacities and approaches for dealing with URs. However, the words that received the highest coverage are outlined below

<Mitigation measures> - § 4 references coded [1.58% Coverage]

- Reference 1 - 0.24% Coverage after that/under that it comes (enterprise risk management and risk
- Reference 2 - 0.48% Coverage administrations deal with the risk evaluation/assessment, and there is management
- Reference 3 - 0.48% Coverage deal with the risk evaluation/assessment, and there is management that
- Reference 4 - 0.38% Coverage cause risk within the organisation + evaluate the risk to do mitigation

The text search query shows that abilities to deal with URs are based on both strategies and capabilities shown in Figure 5.8, but see complete interview data script in appendix B.

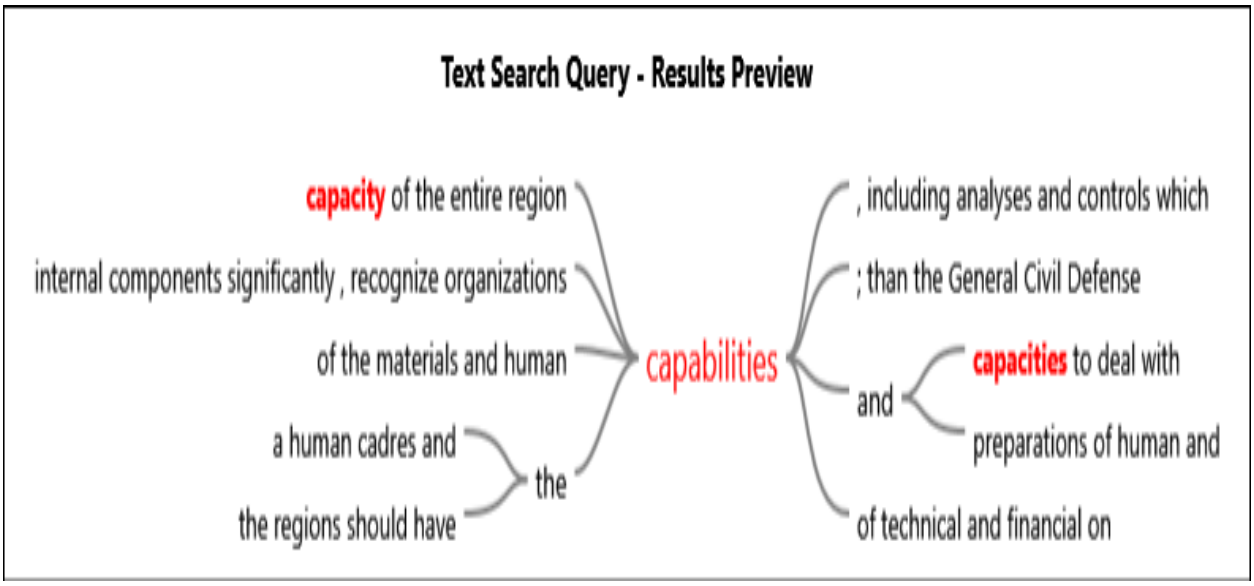


Figure 5.8 Capabilities for dealing with URs

Figure 5.8 further confirms that capabilities for dealing with URs in Saudi Arabian organisations is rather vague and there is much dependence on the Civil Defence for support. However, the FG identified mixed answers and status of ability of organisations in dealing with or mitigating URs. **F1** explained that:

F1 – *Yes, plans and preparations to face existing dangers, the existence of emergency plans, training people on emergency plans and how to activate it in case needed, establishing an exercise on plans. Also, the existence of support plans. Further, phone officers are present to follow up with events and activating plans if needed, as well as hiring consultants from abroad. Our Organisation has the capacity, the available of material and human resources, plus a great interest in the planning and development process. Furthermore, senior management has adopted a risk management policy, the availability of a strategic plan for risk management. Equipment, material and human preparations are ready for plans that deal with risks.*

But some of the participants that comprises **F1** argued that: "*not really, in the shadow of lack of solidarity and cooperation, the organization cannot face UR individually*."

Similar pattern of response was identified in the session with **F2** who said: "*No, because of dependency. To some extent, there still is the awareness of the organisation as a whole and attention substandard, the lack from the organization in the application of scenarios and simulations properly, lack of awareness in risk and managing it for the people in the*

organization. Yes; make plans, provide adequate resources to activate the plan. Also, train an individual and raise their culture and consciousness about threats. We constantly do risk assessment through the making of workshop with employees from various departments, as well as hazards identify (mitigation)."

The follow-up question -

From your perspective, what does an Organization needs to face UR with efficiency? Why? How?

As indicated in Figure 5.9 no major response was distinct, but answers provided by participants repeated some of the information provided before, or a wide range of answers that were not specific to efficiency of dealing with URs.

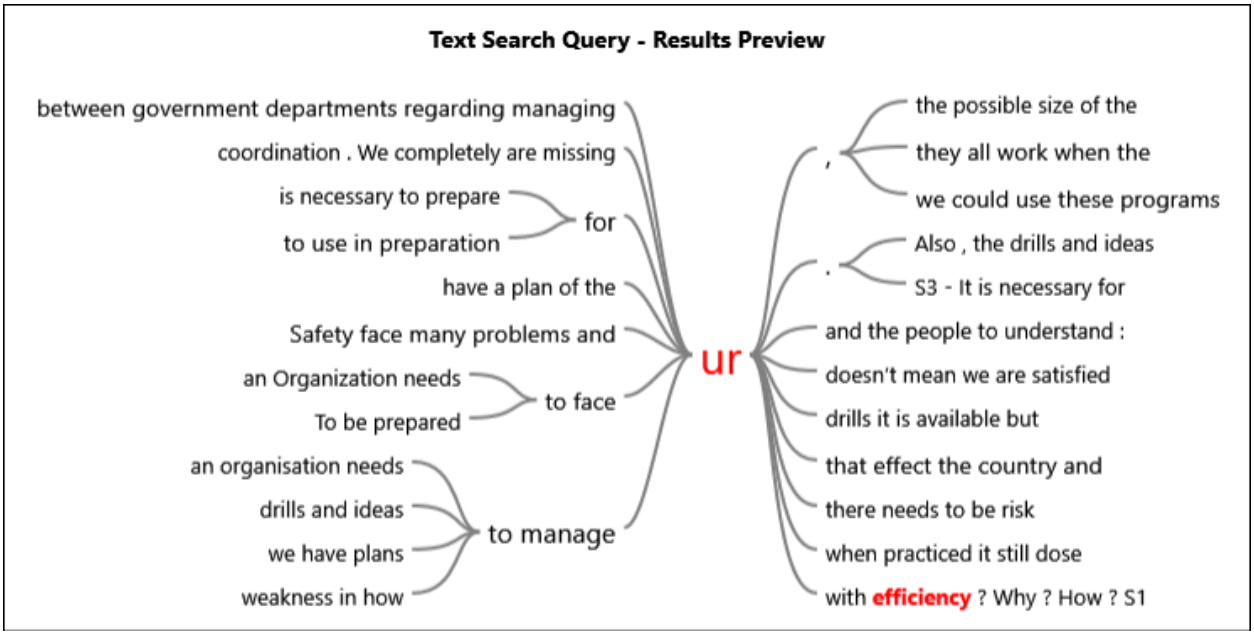


Figure 5.9 Text search for efficiency of dealing with URs

As indicated in Figure 5.9 there is no major answers from the participants that supports quality and effective way of dealing with URs in Saudi Arabian organisations. This indicate that recommendations are highly relevant in the Saudi context.

However, the FG generated the following answers:

F1 – *The general awareness of the organisation for the possibility of risk existence and the effectiveness and need for risk management department. Moreover, increasing the level of awareness of the people, provide training and preparation, financial support, management support, governmental or the support from the organisation management. The availability of foundation structure, machines, tools, equipment, the right staff. The senior management should have the attention and belief in the existence of risk management professionally within the organisation, analysing risks in quantitatively way. In addition, the requirement of qualified/expertise of whom ever is managing the risk management within the organizations. There must be alternative plans (plan B) as well as flexible enough to adopt/foresee the danger. Increasing the level of coordination, communication, and cooperation between all sectors, in order to avoid conflict of responsibilities and avoid repetition of roles.*

F2 - *Creating specialized departments in risk management, also setting out legislations and allowing this department to have the authority to exercise its functions as well as manual guide for its functions. Increasing the awareness of organisations culture by dealing before, during and after the risk. Risk analysis, how to identify risks by understanding the Organization itself and understanding the surrounding organizations, as well as the need to know how to analyse the organization itself. the fact that the organization is not only equipment, but it is procedures, factors, culture, building and concepts to predict risk. Risk awareness, also risk management system written and documented, as well as having a conscious management to help in the implementation of plans. The plan is built on scenarios that might happen recording to risk profile, and drills is done for it. Furthermore, the foundation starts from knowing the possibilities of the organisation, its capabilities and performance, then start by highlighting the risk that exists within the organisation, then evaluate it, meaning trying to feature the system aim to the target needed.*

All underlined words are phrases or statements relating to themes being examined in this section which are further analysed later in this section.

The last question in this section;

What are the successful key factors required by the Organization to mitigate the consequences of unexpected risks/disasters?

The interviewees provided long extended answers to this question (see a full data script in appendix B)

However, FG session generated more specific and related answers to this question. According to **F1;** *the activation of emergency plans and train to activate it; the needed to risk management; need of qualified human resources to professionally manage risk management, and identify the risks that may impact the organization and do a risk assessment as well as risk characterization. Also, develop strategies for addressing the threat. The organization should have (risk profile) and have full consciousness of unexpected risks. Make plans to support either from inside or outside the organization; upgrade coordination and cooperation between organizations; remove organizational policy constraints and make the Organization more flexibility to deal with dangers. The availability of material, artistic and professional human potential; unifying efforts*.

F2 identified key factors such as: *allocating work, decentralization and delegation of authority; make fast decisions about risks; pre-processing of the work team, to deal with dangers when it occur; provision of material and human potential at the scene. Advance planning to deal with hazards, before, during and after training; availability of equipment; select a team to deal with danger; virtualization for each period. Proactive plans to deal with risks when they occur. Activate preventive fissure; business continuity management; and leadership and decision making*.

5.4.1 Data Interpretation and Analysis – Mitigation Measures

The analysis of findings in previous section has shown that impacts of so-called UR events in Saudi Arabia is negative which is consistent with the nature of UR events examined in chapter two. It is therefore important to have good and effective mitigation measures in place that are capable of reducing the negative impacts that UR events may cause. The findings in this section from semi-structure interview and focus group session reveal that strategies are either intangible

or tangible in nature as explained by all respondents. The text search query for any additional description did not bring any outstanding results as shown in Figure 5.10.

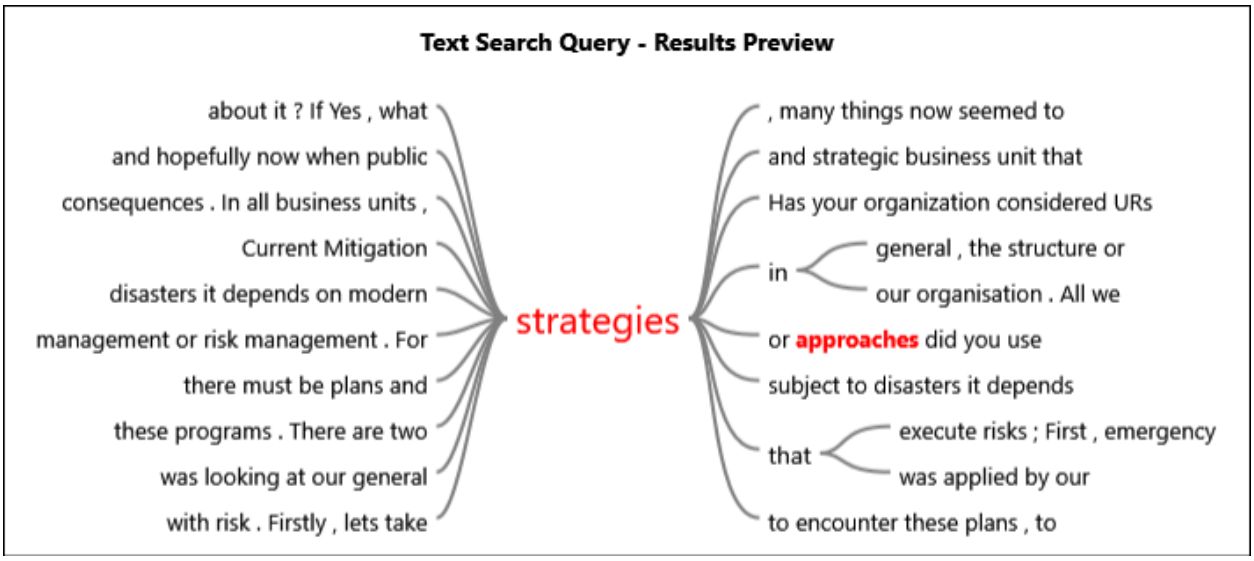


Figure 5.10 strategies for mitigating URs

The diagram above (Figure 5.10) further emphasise the gaps in the Saudi system and the need for improvement in strategies or measures used in dealing with URs. However, mitigating measures that specifically stood out in this section are:

1) Emergency action plan (S2)
2) Risk management processes, emergency plan, crisis plan as well as programmes for crisis management, risk management and administration of accidents (S7)
3) Enterprise risk management (S10)
4) Lessons from previous disasters (S12)
5) Creating risk profile (F1)
6) Business continuity management (F2)

The above words and phrases are distinct and relate to mitigation strategies examined in chapter three, but other underlined words in this section can still be classified as tangible or intangible which were mentioned in previous section. These strategies, especially risk management were emphasised by F1 and F2 as one of the mitigating that is required to effectively face or manage UR. Strategies such as activation of emergency plans, risk management, coordination and

cooperation between organizations and leadership were some of the measures mentioned by F1 and F2 as successful key factors required by organizations for mitigating consequences of UR.

Furthermore, the findings for whether organisations have ability to cope with or manage UR indicate that most respondents talked in the future tense and not in reference to their ability to deal with UR events. Having some participants in F2 and S5 explain that due to dependency and shortage of cadres and insufficient resources, their organisations are unable to manage UR further exposes areas where limitations exist in Saudi organizations. These factors are also tangible and intangible factors as earlier identified in this chapter. Therefore, the analysis of this theme and section indicate that there are elements that indicate that some Saudi organizations may be able to cope with UR events using mitigation strategies outlined above, but these may be insufficient given that these strategies are not all combined as a unified approach for dealing with URs.

- **EFFECTIVENESS OF RISK MANAGEMENT STRATEGIES – Results and Analysis**

This section presents results for risk management in order to examine the effectiveness of risk management strategies used in Saudi Arabia. This section and section specifically focus on addressing and achieving the third objective. It will also attempt to identify elements of robustness and resilience that organisations in Saudi Arabia may possess in helping them deal with UR or/and mitigate its impacts. The first question in this section is:

What are the requirements for risk management to be effective in dealing with UR? Why?

The interviewee responses were also wide ranging for this question, so the main script is included in appendix B. But when ran through text search query, there were no main words, phases that were distinct.

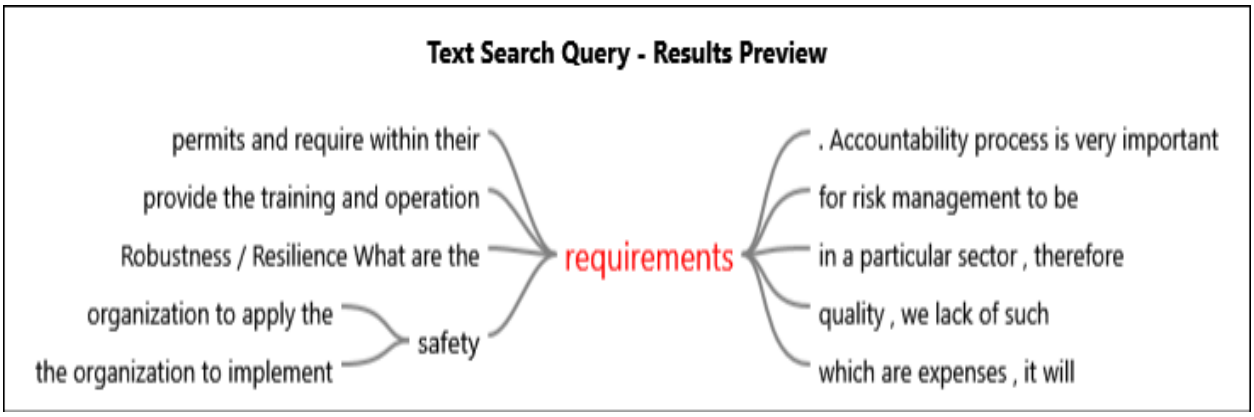


Figure 5.11 text search query for requirements for effective risk management.

Although the themes such as robustness, resilience, accountability of process can be seen in Figure 5.11 which shows that while it is important to this research, respondents did not emphasise them in their response to this question.

In more specific terms, the F1 and F2 respondents identified phrases and words that relate to themes examined and discussed in the literature review chapter. These themes are shown in red in figure 5.12 and 5.13 respectively.

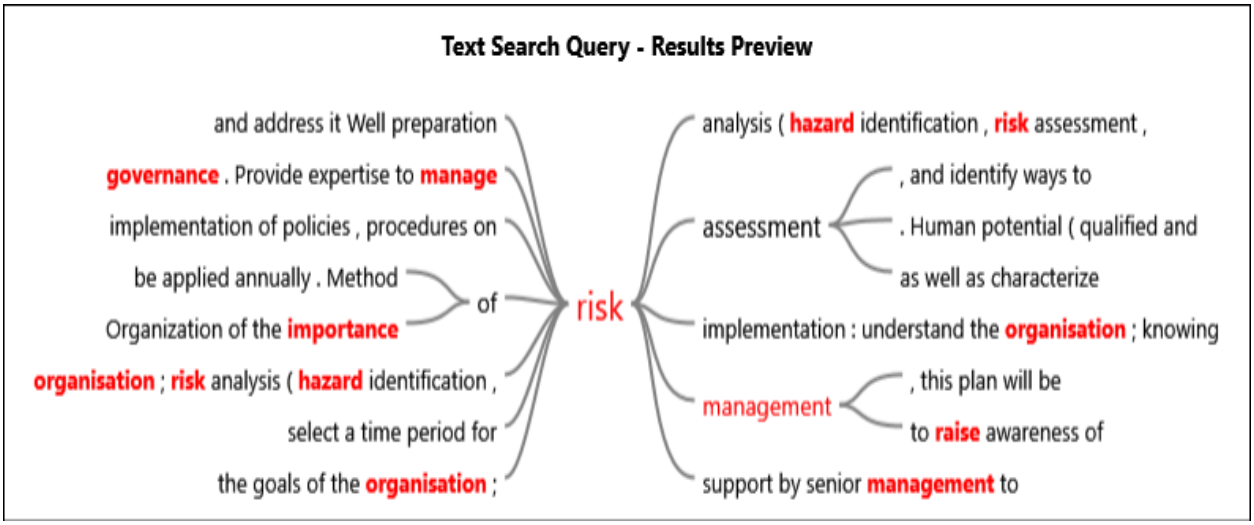


Figure 5.12 text search query for Requirements for effective risk management (F1)

Figure 5.12 shows that some elements of risk management process are evident in the Saudi system, but not all elements were mentioned. For example, no reference is made to risk signal detection, response, risk monitoring, and other elements examined in chapter 3. F2 emphasised that effective management of risk require:

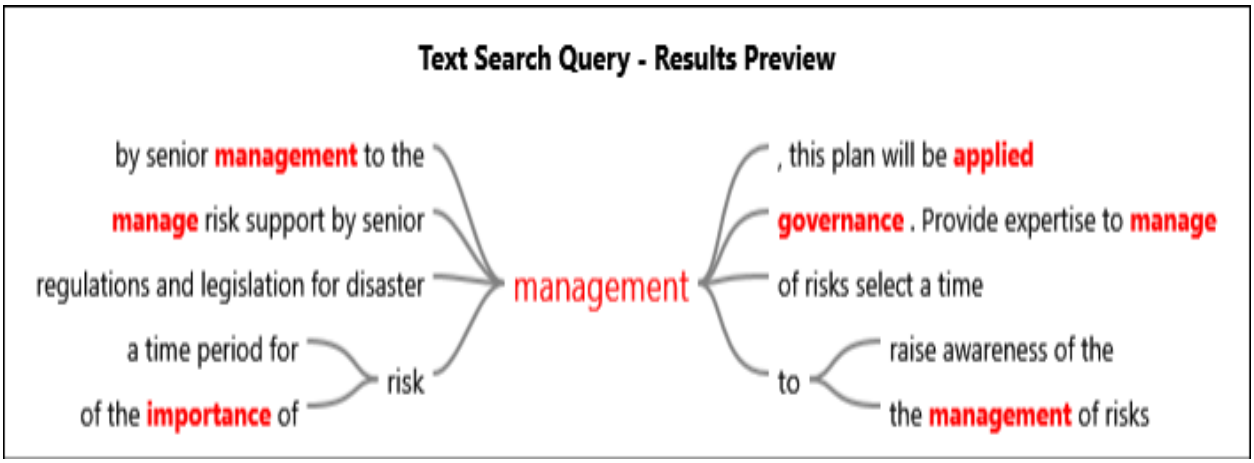


Figure 5.13 text search query for Requirements for effective risk management (F2)

However, Figure 5.13 indicate that there is room for improvements and requirements for effective risk management as identified by F2 are still inadequate for dealing with URs and its severe impacts. The next question that followed this focused on determine the extent to which resilience and robustness in considered in risk management or in preparing organisations in dealing with URs in Saudi Arabia.

What do you think the most important factors for establishing resilience and robustness of the Saudi organizations against unforeseen risks?

The interviewees identified and explained a range of factors they consider important which is also available in appendix B. But the summary of the findings indicates that very little is known and discussed in relation to resilience and robustness.

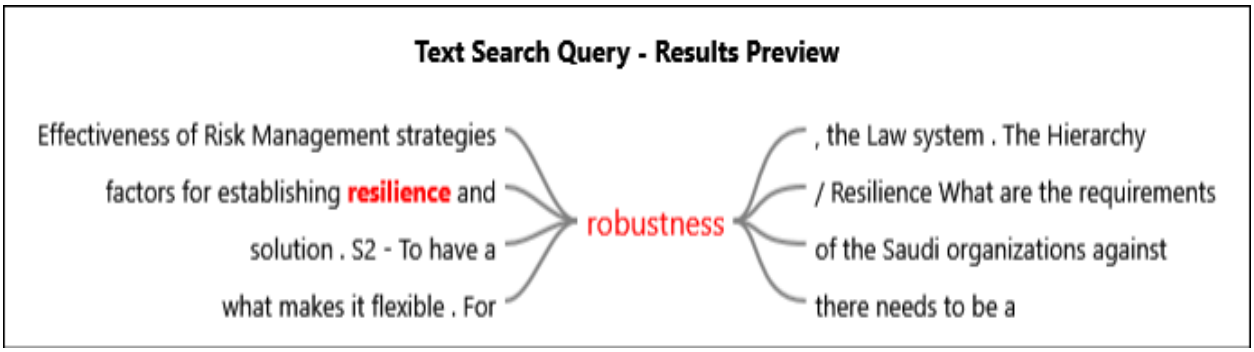


Figure 5.14 text search query for resilience and robustness

When searched synonymous words of phrases, there was still limited discussions and answers that focused on the quality, characteristics of resilience and/or robustness as observed in Figure 5.14. Similar pattern of answers was also identified for the FG sessions. Both sessions did not identify any strong points for resilience and robustness that relate to literature review. As notice,

F1 states that – "*acknowledge the imbalance within the organization contributes to building strength within the Organization; consciousness; training. professional management which identify responsibilities and grants powers. The awareness of decision makers and understanding the dangers; the right training and preparation; providing prevention equipment; active and realistic plans; lessons learned or beneficial lessons. The availability of a strong infrastructure (human potential, potential construction, machinery and equipment, communications, training, transfer and gain experience, learn from the experience of others)*

Financial support; consciousness; solidarity; altruism amongst individuals. professional management that generates plans (a, b, and c) are tested and scenarios are done on them constantly; alternative plans for business continuity; availability of material and human potential. Alternative operational plans in case of danger which ensures the continuation of the organization. The ability to predict danger and analyse its effects; placing plans for the worst scenarios and mimicking it on real grounds, as well as compare the results with your potentials and thus try to address defaults and viruses"

F2 also states that; "*create a general department specialised on dealing with dangers/risks, force all organizations to have procedures on awareness and the understanding on how to deal with dangers/risks; solid construction hiring, or asking for support from international expertise on creating a new system or department; modern and strong legislation; solid and binding; siting out strategies for implementation and monitoring and evaluation. Create and implement whole system (cadres, systems, equipment and supplies); encouraging everyone to participate in risk management, risk identification and to record correctly; Make a virtual simulation increase awareness and flexibility in organizations, existence of proof and clear systems. Building a culture and educate people; guidance and politics; implementing regulations; execution; the example that is taken by leadership. Do not centralize management; engage parties to deal with the event; create a sense of teamwork in the implementation of the organization; the availability of risk management department in the organization to study risks and create files for those risks.*

Take advantage of other organizations previous experiences; proper training; raising awareness and culture; provide adequate equipment. Shift bureaucratic; shorten the proceedings; flexible procedures. Risk apatite or tolerance for risks; the existence of law; and a special department for risk management"

While these answers are not completely wrong, they are generic and do not focus on resilience and robustness as examined and discussed in the literature review.

The last question in this section and for the interview and FG sessions is:

What do you think the most important factors that can hinder Saudi organizations from creating risk management for URs?

To answer this question,

S1 - *The first thing is the expertise; the expertise is not available and if there is they would be a minority. The shortage of having the expertise that specialized in the field of disasters, and the second thing is the weakness of the administrator in understanding the disasters, with the clarity administrators didn't give the field of disasters its value and the supreme importance behind it in the series of the strategies and thought within the creation of the organizations. Now within the intention of creating any of government agency, should have its own risk management department, the meaning of the risk is not only on fir or any of that, risks are not fulfilling your duty unless you have a consideration of the unexpected risks.*

S2 - *Firstly, the culture and understanding of the importance of risk management from the Higher management. Secondly, financial support, because some directors may only look at the main ideas that are already supported and continue it while rejecting any newer ideas.*

S3 - *In the kingdom of Saudi Arabia some people considered doing risk management organizations that is separated from safety management, also some managements tried to do a safety management that is separate from security management. The security managements relationship with safety is linked to the safety risks to reach welfare, because if unforeseen risks are observed they could inaugurate plans for these risks. Risk management has now become*

really important for building plans and strategies for safety, because there will not be plans for safety without meeting or having knowledge on risks.

S4 - *The understanding and culture that is available in foreign countries. Regarding safety or risk assessment it requires cost, some organisation say "well I may face a risk or may not, therefore I don't need to pay money on something that is not certain", in foreign countries they invest in risk management no matter how minimal the possibility may be. Risk management is very important it may be the start or break point for an organisation it may lose so much if there isn't risk management. There are risk management and risk evaluation department I am not denying that however those departments are not given as much importance as there should be.*

S5 - *What hinders Saudi organizations is mentality and considering health and safety as a source of wasting money. Yes, the process of spending, for example the company spends 10% on safety, some people may prefer having the 10% rather than spending it on safety. There must be a full awareness process imposed for this kind of mentality. Recruiting qualified people whose specialized from abroad will be helpful.*

S6 - *In my perspective the most important factors are;*

1. *It is the philosophy of Senior management, their culture and faith. In general, senior management, either at a regular level, limited people, management committee or the culture of the senior management is important in the belief of the existence of risk management. This is an important point which many examples.*
2. *The second constraint is state central authorities, if linking organizations set up in the existence of risk management, it becomes mandatory.*

Yes, an organization by the state that should be centralized, to provide permits and require within their requirements quality, we lack of such thing. These are for me, the most important obstacles. Accountability process is very important in my view for the owners or top management decision-makers or officials.

S7- *There are two elements to hinder the management of RM; First, the lack of awareness from the organisation towards risk management, the company has to be aware of the possibility of the occurrence of accidents such as financial, economic, industrial crisis at any time, even how the*

market feels about your products therefore prepare for it. Second, the shortened of cadres, when you do not employ the right person for the job it becomes very difficult to manage the organisation properly, so you will have to bring outside guidance and this becomes a difficulty the organisation will face.

S8 - *Sometimes administrative bureaucracy does not response to change rapidly, in the sense that you are now in this Ministry and it wants to be flexible, but this for example is linked to civil service, however civil service does not have the convictions to change. Sometimes this regulation issued on all these government agencies and does not keep an account of the nature of the functions. These functions may vary from one department to another. Therefore, each department should be viewed as an independent. Moreover, sometimes a plan may require financial support and in this case, it will be disabled by the Finance Ministry.*

S9 - *A number of factors, but the first and main factor, the senior administration is not serious and does not have the responsibility of the organisation; the lack of interest on the importance of risk as well as lack of awareness. Because if they didn't recognise, or care about, or sense that risk management is essential, it will not support and will not request of creating the department (risk management) within the organisation. The other thing, would be the environment as a general, Saudi organisation is not as the organisations in the West or America; meaning scientific environment, an environment that helps you share information and find specialists in educational environment, that are in your environment to help you in the process of creating and developing risk management, with clarity you can operate properly.*

S10 - *Lack of awareness. Cost, people that operate in the risk management department are not any kind of people, particular in the beginning, it is necessary to hire qualified people, and those that have the know how in risk management. To be more aware of the difficulty of this subject, it is an advance subject that it is not even available in university bachelorette nor Masters. Therefore, it is not problematic to impose someone to introduce this subject or type of culture and create the system from scratch. The cost to creating risk management is expensive thus it is very implacable. There is no future vision amongst people, I mean most companies aim on what they say "quick one" not a sustainable business. A one should have a sustainable business with an aim of the next 20-40 years. If that emption is not available, then there is no aim.*

S11 - *I don't think there is barriers that hinder Saudi Arabia, certainly the Kingdom of Saudi Arabia is proactive in risk management, and the decision was made on the creating of the Committee of Civil Defence before 40 years, exactly on 1387, we are now in 1437 proximately 40 years, and after that the system of Civil Defence have been created in 1406, and the system of the work of the committee and the general council in the committee, as well as the general municipality for the committee, and gave every organisation within Saudi Arabia tasks and responsibilities..*

The Kingdom is one of the oldest countries that have sensed the knowledge of risk management and disaster management, but there must be tasks or responsibilities within the governmental organisations to activate. There should be tasks and responsibilities that must be done and examined by the head department, it testes the system of the preparation of government agencies and the organisations that excites under the shadow of the committee of civil defence, and try to examine the preparation for the unexpected risks.

S12- *Constraints, the first thing you may be neglecting, it could be neglecting to anticipate a problem or a future event or lack of interest, negligence occurs not only when you just don't care It may also when not expected. It might be that it wasn't part of the plan or have no clue to be discussed in the first place. let me give you an example, like now we had the disaster of flooding in the country. Saudi Arabia is dry country and you would not assume particular "flood" will happen in Jeddah unexpectedly, and when there is a lack of interest to the disaster in Jeddah and this is the main reason of the cause of this tragedy, because of the lack of interest from people that were responsible and those that were in charge of it. Yes, the topic to its procedures in legal rights. Also, the lack of awareness this is very important, lack of financial support, also the level of promotions, if we took the opposite it can be the factors the hinder the procedures.*

S13 - *Maybe the disasters/risks do not occur frequently, or opinion leaders in these organisations to a kind of dependence, because there are no recurrent disasters. Hence, there shouldn't create or specialise manpower or entity or administrative unit within these organisations because they want to reduce the financial expenditure of their organisation. In addition, the awareness level never reached the officials in these organisations, to develop or take interest in the topic of risk. Even in such a simple matter such as safety, the organisations tend to avoid spending on safety and not making sure of how well it within the organisation*.

While these factors reflect the views and situation as assessed by the interviewees, **F1** and **F2** specifically identified the following factors as having potentials to hinder Saudi organisations from creating effective risk management for dealing URs.

A. *limited and poor specialized competencies in facing hazards and disasters*
B. *weak understanding of the curator in the subject and the importance of risk and disaster management*
C. *not providing risk management as the core structure of the organisation*
D. *absence of culture*
E. *lack of familiarity and knowledge from the organization regarding the importance of risk management department*
F. *avoiding additional costs of establishing risk management department.*
G. *Lack of awareness*
H. *the difficulty of building a system to establish risk management.*
I. *short-sightedness of senior management about the future of organizations*.

However, a couple of the participants in the FG session said "*there are no obstacles*".

5.5.1 Data Interpretation and Analysis

This section and inquiry aimed to identify and analyse the effectiveness of risk management strategies or the strategies already identified in previous sections. It also aimed to identify and elements of robustness and resilience as examined in chapter three. However, the findings in this section indicate that there is low level of reference to and understanding of resilience and robustness as well as risk management. Figure 5.15 shows the pattern of answers to elements of resilience, robustness and risk management.

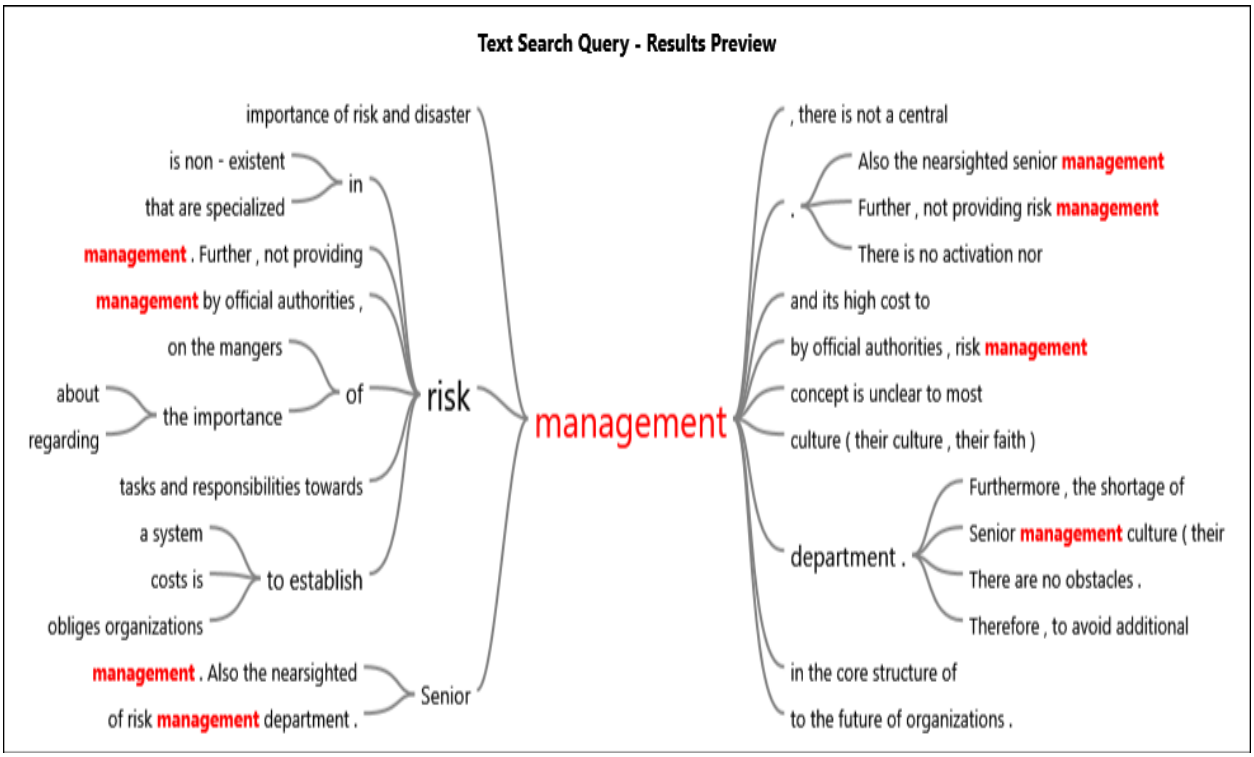


Figure 5.15 text search query for confirming elements of resilience, robustness and risk management

As shown in Figure 5.15, there is no link between risk management, resilience and robustness identified in all the responses to questions in this section. In analysing these findings, it can be inferred that the ignorance displayed on this theme is one of the sources of vulnerability as identified by Light (2005) in Chapter Two (see figure 2.5). Furthermore, there were several 'lacks' of different things mentioned by respondents identified through content analysis which shows elements of indifference to issues of risk management, resilience and robustness. This element is also another factor identified by Light (2005) to be sources of vulnerability in organization and society which makes them prone to severe impacts of URs. Figure 5.16 further confirms the inference made on vulnerability when map was drawn using Nvivo to identify if links exists between the themes analysed using content analysis.

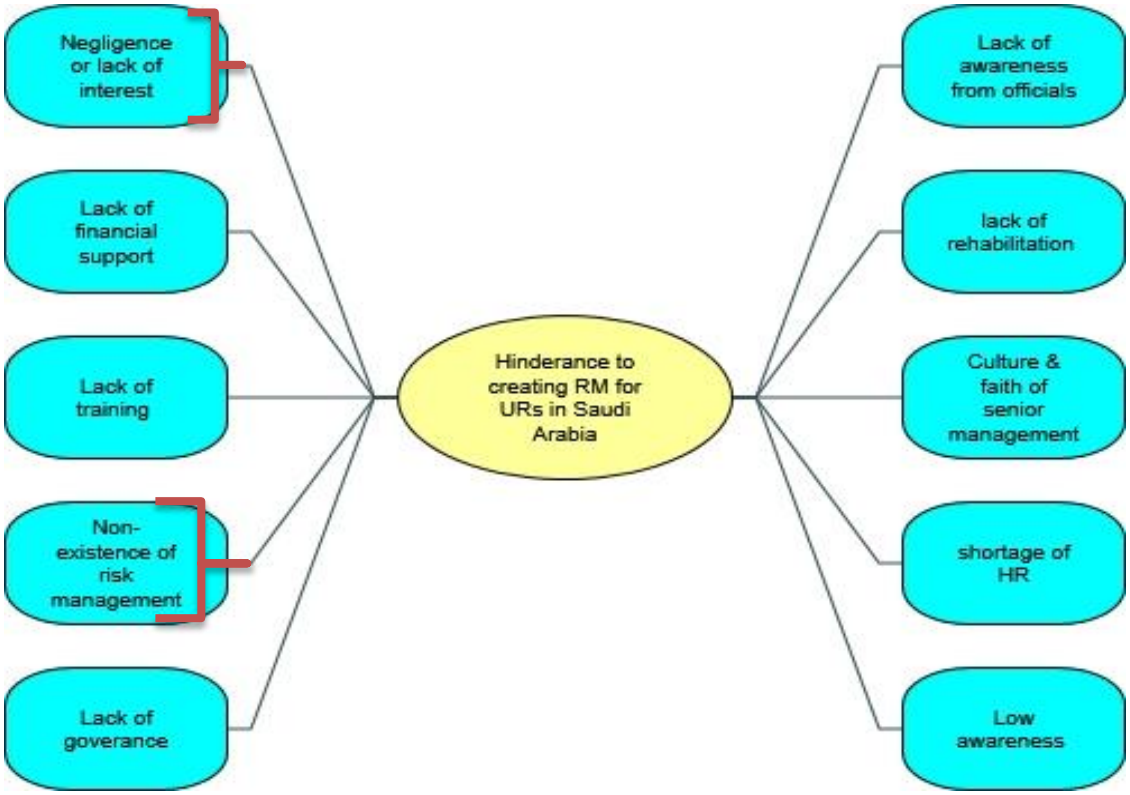


Figure 5.16 Map for themes on hindrance to creating risk management in Saudi Arabia organizations

As shown in Figure 5.16, several 'lacks' were identified as hindrances to creating risk management in Saudi Arabia, even non-existence of risk management and lack of interest in it (marked in red in Fig. 5.16) were identified as hindrance. Therefore, it can be inferred that from the findings in this section, risk management does not exist in some organizations in Saudi and exists at low level in organizations that mentioned it. It can also be concluded that knowledge about resilience and robustness is very minimal or low in all organisation that participated in this research. This leads to strong recommendations and set of guidelines that emphasises the benefits and relevance of resilience and robustness in enhancing strategies for dealing with URs in Saudi organizations.

5.5.2 Explanations on views of Participants

This section justifies the views of research participants that contributed to the research given their varied background and work experience. As noticed from this analysis in this chapter, the views of the FG participants were more precise and more reflective of the situation in Saudi Arabia in relation to information sought in this research. This was noticed by the researcher to be due to the mixed audience of participants for each FG session. As indicated in Table 5.2, two supervisors and two senior staff were in each session, these are officers responsible for overseeing operations and also involved in development of plans and strategies. The views of these reflected their work experience in that plans may not necessarily generate the intended outcomes.

In general, with all research participants, it can also be noticed that the views of the private sector organisations differ from that of the public sector organisations which tend to be vague about URs but more focused on natural and societal disruptive events that cause significant impacts on the community as a whole. Due to the background and experience of the participants from the public sector organisations, their definition or understanding of URs were mostly on epidemics, and flooding, although these are not wrong answers, the answers provided tend to shift the mitigations strategies and arrangement to responsibilities that ought to be shared by other organisations as stated in the legislation.

Regardless of this varied views on what constitute URs and the inadequacy of risk management strategies used by the public organisations and private organisations, it can be noticed that there are also similarities. It was evident that both organisation type identified tangible and intangible factors that are being used for managing UR in Saudi Arabia and similar classification of factors that hinder management of events considered as UR in Saudi Arabia. Thus, although views differ among the research participants and reflected in the way they answered the questions asked, the results exposed similar gaps and problems with strategies used in dealing with severe impact events and in what is considered URs.

5.6 SUMMARY OF FINDINGS AND CHAPTER

This chapter has presented findings gathered through semi-structured interview conducted in Saudi Arabia with experts in the field of risk management in different private, public and educational organizations. This chapter has used the data gathering methods and analysis technique explained in chapter four and have focused on achieving the research objectives. The findings in this chapter have revealed important outcomes that helps to assume the following which will be critically discussed within the context of epistemology set-out for this research and discussions in the literature review chapters. The analysis in this chapter has triangulated information provided through focus group and semi-structured interview by focusing on impacts of URs and UR events, the types of UR events and URs (UR2), current mitigation strategies and effectiveness of risk management as identified by respondents. The triangulation process is illustrated in Figure 5.17.

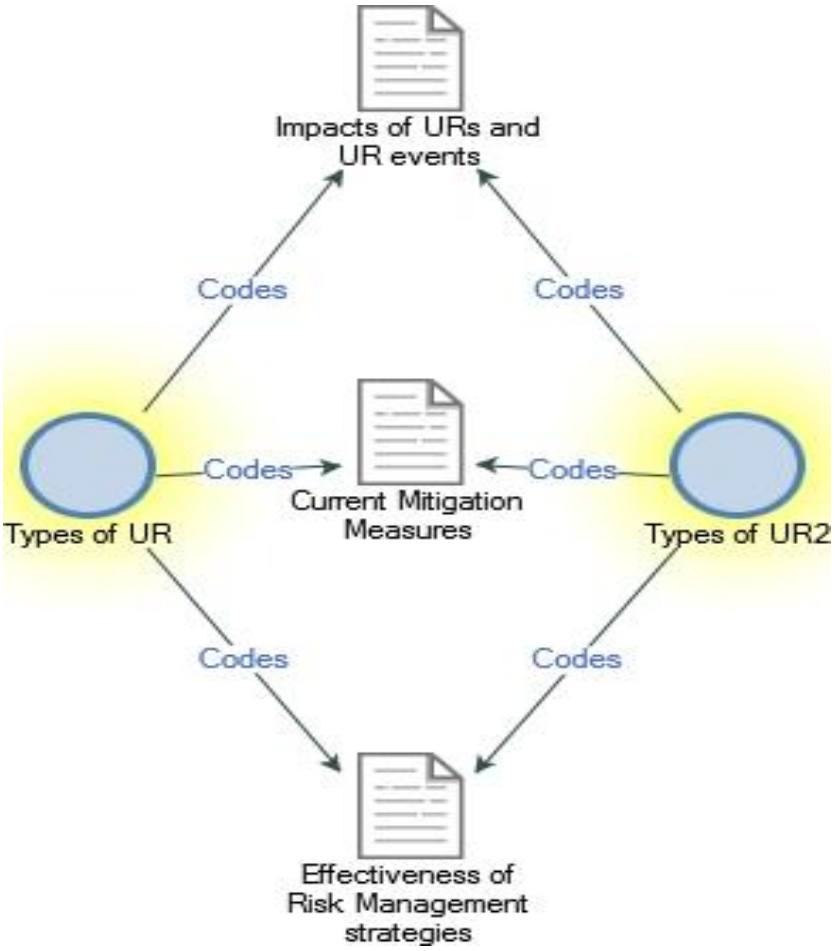


Figure 5.17 Data Analysis triangulation process for validity and reliability of findings

Using the triangulation process illustrated in Figure 5.17, helped to observe the types of UR events and URs identified by respondents have severe impacts on organisations and society. Although there were also current mitigation measures in place used for dealing with the events considered by Saudi experts as UR events and URs, they still appear inadequate compared to what has been identified and examined in chapters two and three. Furthermore, the effectiveness of strategies used is questionable, because the data analysis also indicates that knowledge level on risk management, resilience and robustness is low. Furthermore, there are no emphasise by respondents that indicate strong evidence of effective strategies and links between UR events, URs, current mitigation measures and strategies in place in dealing with URs identified in section 5.3. Therefore, analysis in this chapter has shown that negative impacts of UR exists in Saudi and in Saudi organizations, but the current mitigating strategies used are insufficient in reducing the negative impacts.

While the significance of risk management strategies was identified, and emphasised in chapter three, it was mentioned in a fluid manner which demonstrate low level of knowledge. Hindrances identified also indicate lack of risk management, no reference to resilience or robustness. Based on the findings and analysis conducted in this chapter, strong recommendations in form of guidelines are needed in order to improve capacity for dealing with URs and future UR events in Saudi Arabia. Thus, this chapter has contributed to achieving the purpose of this chapter which is to achieve objectives two and three, while identifying information that can inform discussion of all objectives as well as guidelines that need to be developed. By focusing on these areas, the research questions, which are:

“How would you explain UR in relation to Saudi Arabian organizations?” – the answers to this is found in section 5.3.

“How does Saudi Arabian organizations manage URs?” – the answer to this question can be found in section 5.4.

“Are strategies used for dealing UR effective and sufficient for reducing its impacts?” – the answer to this can be found in section 5.5.

Based on the findings and results in this chapter, the next chapter discusses the implications of this results and the overall results for each objective.

CHAPTER 6: DISCUSSION OF RESEARCH RESULTS

6.1 INTRODUCTION

This chapter has the main aim of discussing the research results. Sections in this chapter will focus on discussing the results for each objective, and evaluation of their implication for conducting this research. The findings of data in the previous chapter is discussed by drawing references from the literature review chapters in order to determine the validity of results, identify unique findings that can contribute to knowledge and emphasising the rationale for conducting this research. Subsequent sections outlines, assess and discuss the development of the set of guidelines proposed as recommendations for Saudi organizations that may help improve readiness and capability for dealing with URs. The last section summarises the content of this chapter and its relevance to the entire research.

6.2 DISCUSSION OF RESULTS

The previous chapter has shown that quality data have been collected through the primary sources i.e. focus group and semi-structured interview conducted with experts in Saudi Arabia. The findings from the primary sources are key in determining the overall outcomes of this research while drawing from the concepts examined in the literature review chapters. The research aim being to "critically evaluate risk management strategies effective enough for mitigating the impacts of URs in order to develop set of guidelines that enable Saudi organizations to improve their robustness and resilience in coping with URs" have been achieved through four main objectives. Ever chapter in this thesis have been dedicated to specific aspect of this research that addresses components of the research aim and objectives. Despite the challenges experienced, the research has reached clear and useful outcomes that enable the researcher to determine the status of risk management strategies in Saudi Arabia, knowledge level of experts and organisations regarding the same and understanding of URs, their impacts and management. Therefore, the following subsections discuss the details for each objective and the outcomes reached through data collected through primary and secondary data and ones analysed using Nvivo and content analysis.

6.2.1 Discussion of results for Objective 1

The first objective; "**to review and examine relevant literature on unpredictable risks; its philosophies, theories and practices**" was achieved using secondary data and by using part of the primary data collected through semi-structured interviews and focus group sessions.

The secondary data from the literature review provided strong background against which certain information gathered through the semi-structured interview and focus group were assessed. The outcomes from examining and analysing the findings from secondary data revealed that there are five concepts or words i.e. crisis, chaos, disaster, Black Swan (BS) and catastrophe. These five words may be synonymously used to infer UR events due to the nature of their occurrence and impacts. As examined in section 2.2 Boudreau (2012) states that these events are VUCA, meaning volatile, unpredictable, complex and ambiguous, however, a critical evaluation of their context indicated that BS relates more to and may qualify as UR events. Based on this finding in the literature review, this research has focused on URs interchangeably used with BS which are events with associated characteristics like; unpredictable, unknown, low probability, severe impacts, surprise and extreme (see Figure 2.4). The literature is clear and extended on the characteristics and extreme nature of URs and UR events, however, the findings from the primary data which helped to determine the knowledge and understanding of Saudi organisations and experts on URs seems to be focused on only disasters and other events that seem similar to it in characteristics.

From the data presented and analysed in section 5.3, it can be seen that UR events are considered in Saudi organizations to mean disasters. Disasters as examined and discussed in chapter two does not have the same characteristics with URs or BS in that disasters are known; they may have high probability of occurrence and may be predictable in many instances once their hazard pattern is understood (Coppola, 2006; Wisner et al. 2004; Lewis, 2006). The result for this objective showed that UR can be explained and better understood through the lens of theories, philosophies (like BS) and practices (as examined in Saudi Arabia). The outcome also showed that the theoretical explanations of UR provides better understanding of its associated characteristics that helps to differentiate UR from other disruptive events like crisis, chaos, catastrophe and disaster. The philosophy that govern UR explains its occurrence as an event

which ‘unknown unknown’ and one that overwhelms existing measures for dealing with them, since its unknown nature prevents adequate and precise preparedness for its occurrence.

However, the practice explanation of UR is interpreted as disaster or any event that cause severe impacts on people, organisation and the society as explained by S1, S2, S3, S4, S6, S7, S9, S10, S11, S13, F1 and F2. The events described by the interview and Focus Group (FG) respondents does not have similar impacts, scales and characteristics as that of BS or UR examined in chapter two. Therefore, the result of this objective has shown that there is link between the theoretical and philosophical explanations of UR, but its practice perspectives differ. It may also be that there is low understanding on what constitute to UR and the characteristics that can help to better understand them. The uncertainty and unpredictability of UR as examined in section 2.3.2 is an indication to determining the uncertainty factor of UR which are disturbance signals and dynamic perturbations (Laloux, 2014; Taleb, 2007). The gap between theoretical explanations of UR and its understanding among practitioners suggest the need for better education and awareness among practitioners on what constitute UR and its associated characteristics. This result informs one of the recommendations that will be made at the end of this research.

6.2.2 Discussion of results for Objective 2

The second objective which is “**to assess the negative impact of unpredictable risks on organisation and current mitigation strategies used in reducing the negative impacts of UR on Saudi Arabian organisations**”. This objective was achieved through the literature review, semi-structured interviews and FG. The data collected through these sources were triangulated and analysed to determine its result. The result shows that negative impacts of URs can be severe and extreme (Taleb, 2007). Such extreme tendencies of URs force errors in its management and ability of government or organisations to deal with them when they occur (Taleb, 2012). The impacts of URs may also be cascading and when met with organisational vulnerabilities, it tends to become worse (Roux-Dufort, 2007).

The findings from the primary sources also reveal that UR have negative impacts which are severe as identified in chapter two. This indicate that the findings on impacts of URs in literature and in practice in Saudi Arabia corresponds and are similar, however, the analysis of current mitigation strategies used in reducing the negative impacts of UR on Saudi Arabian

organisations appears insufficient as Saudi organisations tend to exhibit crisis-prone tendencies as explained by Davies and Walters (1998). According to Davies and Walters (1998) organisations may be crisis-prepared or crisis-prone by assessing their preventive measures and actions taken to minimise risks and emergency planning arrangement in place to reduce the impacts of unavoidable disasters. Unfortunately, the data analysis in chapter five indicate that ignorance, inconsistency and indifference exist in some of the organisations that participated in the research. These factors were identified and examined in chapter two as sources of vulnerability (Light, 2005); meaning that most organisations in Saudi Arabia, especially the ones interviewed are not resilient to impacts of URs and UR events.

Although the current mitigating strategies used in organisations were mentioned, the strategies exhibit failures to maximise risk management strategies explained by Culp, 2001; Huber and Rothstein, 2013), which were discussed in section 2.5. Mitigating measures such as tangible and intangible factors identified by the respondents also have similar classification of factors that hinder them; a contradiction that leads the researcher to infer that the strategies may not be effective and sufficient for dealing with extreme events like URs. The hindering factors for dealing with UR which are tangible and intangible in nature further indicate that interactions within and between organisational system and structure (Okoh and Haugen, 2015) that may help present a formidable approach for dealing with UR is lacking.

Therefore, while the results of impacts of UR is literature is similar to the findings through primary data, the analysis of primary data indicate that current mitigation strategies used in Saudi Arabian organisations is insufficient and may be ineffective in dealing with URs and UR events should they occur. Thus, a strong recommendation is required on this theme of mitigation and strategies that may be effective enough in reducing the negative impacts of URs on Saudi Arabian organisations and in Saudi in general.

6.2.3 Discussion of results for Objective 3

The third objective relates to the two previous objectives and draws from their findings to examine the effectiveness of risk management strategies. The third objective which is to "**examine the significance and effectiveness of risk management strategies in enhancing robustness and resilience of organisations in managing unpredictable risks in Saudi**

Arabian organisations" was achieved by analysing the secondary data from literature review and primary data from semi-structured interviews and focus group sessions.

The objective aims to first examine the significance and effectiveness of risk management strategies in dealing with URs. The second part of the objective focuses on the effectiveness of risk management strategies in enhancing robustness and resilience of organisations in managing UR in Saudi Arabian organisations. In addressing these main focus, the critical examination of risk management strategies in chapter three indicate that risk management is used for different organisational activities (see section 3.3). It was discovered that the strategies were more of a process that controls the impact of risk (Dallas, 2006), protect and add value to the organisation and its stakeholders (Nota, 2010) and for other financial issues (Kaen, 2005). However, none of the organisational use or application of risk management strategies focuses on dealing with URs and its associated characteristics as examined in this research. This indicate that according to literature review, organisations are not using or have risk management strategies that is suitable for dealing with URs. While literature emphasised the significance and ability of risk management strategies to mitigate the impacts of URs (Panel, 2012; Lamm et al. 2010), it also indicates that it is able to inform decisions for being better prepared to deal with (Aven, 2008; Treasury, 2004; Lamm et al. 2010; Yeomans, 2011).

Furthermore, it was discovered from the literature review that risk management strategies may be insufficient for dealing with UR given its complex nature and associated characteristics, hence the importance and significance of combining resilience and robustness with risk management strategies. For instance, section 3.2 critically examined components of resilience and robustness and identified that the progression of resilience maturity entails;

- planned and proactive capability
- adaptive tendencies which include agility capability and flexibility for coping and responding in a timely manner to perturbation (See Fig. 3.1)

Resilience as explained by Gibson and Tarrant (2010) using integrated function models showed that resilience is dynamic, multidimensional and founded on good risk management (see Fig. 3.2). Based on this discovery, risk management that emanates resilience includes security management, Business Continuity Management (BCM), emergency management and crisis

management. This discovery in literature makes resilience a robust and needed element for organisations in building capacity for dealing with UR. This means risk management is key in generating resilience in organisations, but resilience is and needs to be an essential part of risk management (Styczynski et al. 2014). Comfort et al. (2010) further emphasised this position by stating that resilience is a balancing act between risk and resources, between vulnerabilities and escalating or unmanageable catastrophe, which organisations can achieve through anticipating and preparing for crisis and their consequences through knowledge, social collaboration and innovation. Above all, Gibson and Tarrant (2010) argued that resilience is a process and not just a static concept, and Hüser (2006) explained that when robustness is included as a strategy, it adds 'defence in depth' for the organisation. This is so since, robustness is characterised by:

- resistance to accidental events
- restoration of functionality
- retention of original stability (Asbjørnslett and Rausand, 1999).

Meaning that a robust organisation will demonstrate alertness, agility, adaptability (included in resilience progression) and alignment (Light, 2005). An understanding and assessment that led to the design and development of Figure 3.3. The background information on both resilience and robustness influenced he approach taken for examining risk management strategies available in literature and for practice. The PIER-C six-step approach to effective risk management by Yeomans (2011) and the risk management process (ISO 31000:2009) were examined and identified as significant and effective for dealing with UR when combined. The understanding and significance of risk management, resilience and robustness influenced the design and development of risk management strategies for URs in Table 3.1. This risk management strategies addresses specific characteristics of UR making is more effective when combined that when a risk management process or step is used as a single strategy. This discovery and understanding was used in analysing the primary data.

Unfortunately, the research participants identified the significance of risk management strategies, but the data analysis indicated that risk management strategies in Saudi Arabian organisation is not effective and is not be sufficient for dealing with URs. The presence of tangible and intangible factors (see section 5.3.1 and 5.5) that hinder ability to deal with UR and effectiveness

of risk management strategies led to the conclusion that the current status of organisations in Saudi Arabia makes them vulnerable to impacts of URs. The findings in the literature helped to determine the significance and effectiveness of combined risk management strategies (that includes risk management process, six-step approach and functional proactive and adaptive strategy). Furthermore, the significance and effectiveness of risk management strategies is not disputed by Saudi experts that were interviewed since some of the respondents mentioned some components of the combined risk management strategies (see section 5.4.1).

Therefore, the results of this objective as shown that risk management strategies such as resilience, robustness and risk management process when combined as strategies are significant and effective in managing URs, and will be effective in dealing with URs in Saudi Arabian organisations. However, the current status in Saudi organisations is that none of strategies exist in sufficient capacity, in fact resilience and robustness were hardly mentioned and identified in the findings from semi-structure interview and focus group sessions. The insufficiency of current strategies used in Saudi Arabian organisations and the findings in the literature review emphasise the need for strong recommendations regarding resilience and robustness, and for combined risk management strategies.

6.2.4 Discussion of results for Objective 4

The need to achieve the fourth objective has been the core focus of this research since the objective is to: "**develop set of guidelines that may be adopted for use in Saudi Arabian organisations, and to critically assess the capacity of guidelines in improving robustness and resilience of organisations in view of potential unpredictable risks**". This objective is achieved through secondary and primary data, but specifically by using results of the three objectives to develop guidelines that can be used Saudi Arabian organisations to improve their robustness and resilience in view of URs and its management. Developing set of guidelines that may be adopted by Saudi Arabian organisations require a careful assessment of the current status, mitigations used and capacity for dealing with any form of risks, especially URs which is the focus of this study. To achieve this aim, this section translates the results of each objective into an applicable and useable arrangement that may serve as guidelines. The outcomes of data analysis provide indication for areas that require further improvement and guidance, hence emphasising the importance of the guidelines as a framework for directing Saudi organisations

and experts in putting appropriate mitigation and risk management strategies and measures in place that can help them better prepared for managing URs in the most effective manner. Therefore, the following are brought into context in this section:

- Critical findings from objective 1

- The characteristics of URs in section 2.4, and emphasis on the uncertainty and unpredictability factors of UR examined in section 2.3.2
- The gap between theoretical context of URs and its practical understanding in Saudi Arabia, which needs to be closed (section 6.2.1)

- Critical findings from objective 2

- Reduce the negative impacts of URs (chapter two and section 6.2.2)
- Improve mitigating strategies to addressing tangible and intangible factors for managing URs in Saudi organisations (chapters two and five, and section 5.3.2; 6.2.3)

- Critical findings from objective 3

- Risk management, resilience and robustness are significant and effective when combined for UR management (chapter three)
- Dealing with URs requires combined risk management strategies (sections 3.6 and 5.5)
- Apply combined risk management strategies that include risk management process and steps, resilience and robustness (section 6.2.3)

Therefore, the set of guidelines comprise of design which is developed using the above information and specific sections in the literature review chapters are used to assess its effectiveness in the next section. This background justifies the validity of the guidelines illustrated in Figure 6.1.

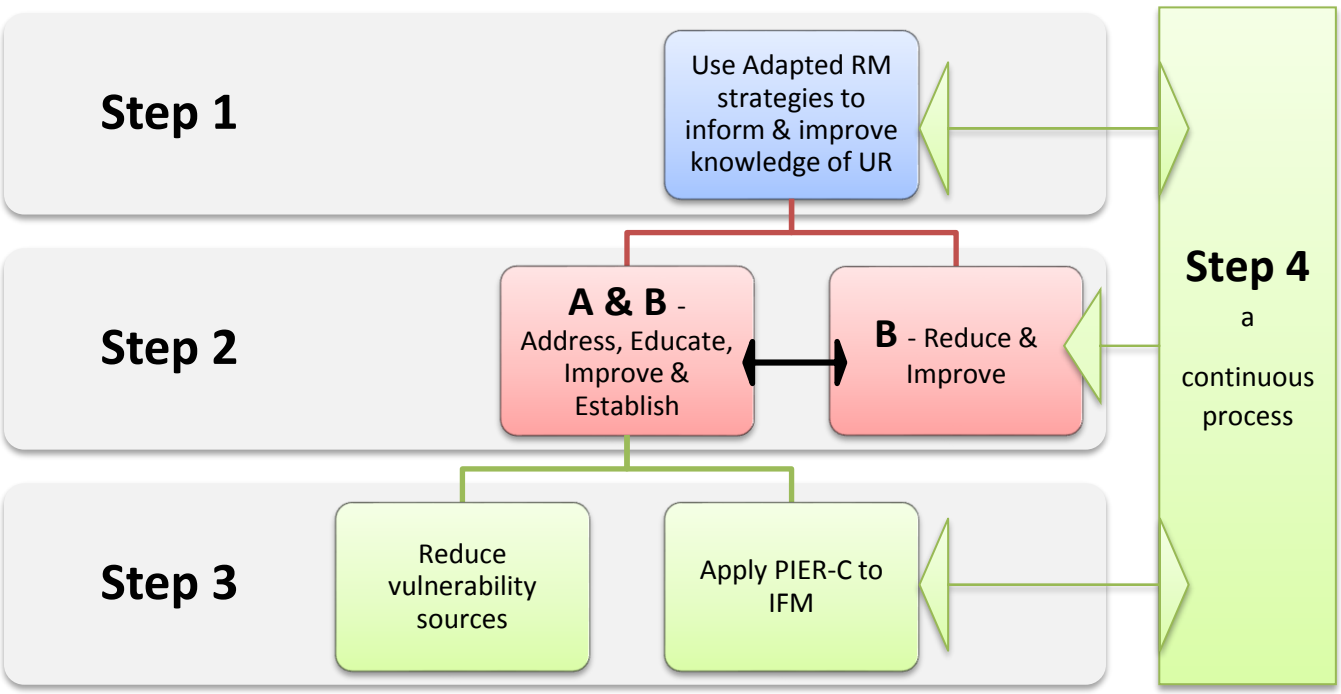


Figure 6.1 Illustrative guidelines for managing URs in Saudi Arabian organisations

As seen in the Figure 6.1, the guidelines require a 4-step process which aim to use the adapted RM strategies to influence and guide the following steps as illustrated in figure 6.1. It can be noticed that step 4 is a continuous process that influences the other steps because of its components (explained later) are important for every step. The green arrows are actions that need to be carried out at every step when implementing content of each step. The blue colour for step 1 means that it need to be understood in order to achieve step 2 which is at a critical stage right the moment based on the research results, hence the red colour. The green colour for step 3 means that it also an action stage that require that components of this step need to be examined in relation to steps 1 and 2. The content and components of each step is further explained as follows:

Step 1 – Use adapted RM in table 3.1 to inform and improve knowledge of URs

Step 2 – Use adapted RM to;

A	B
➢ Address the characteristics of UR ➢ Educate and improve knowledge of UR (define & understand UR) ➢ Establish the context for UR (see Fig. 3.7)	➢ reduce negative impacts of UR ➢ improve tangible and intangible factors for managing URs

Step 3 – Combine steps 1 and 2 to;

1) ensure that they reduce vulnerability sources; ignorance, inflexibility, indifference and inconsistency (check Figure 2.5) and,
2) then apply PIER-C six-step approach to develop components of integrated functions model (security, BCM, emergency and crisis management) to include alertness, agility, adaptability and alignment with dealing with URs and impacts of UR events (Section 3.5)

Step 4 – a continuous process that:

1. communicates and consults risk decisions within organisations and with potential organisations/government department that can provide assistance (Figure 3.7)
2. Monitor, control and review risk profile and context (Figure 3.6 and 3.7)
3. Identify and assess the indicators of resilience; capacity for learning, adaptation, self-organisation and proactive and adaptive function and structure (Section 3.2.2 and Figure 3.1) and determine their ability to reduce sources of vulnerability (Figure 2.5)
4. Identify and assess the indicators of robustness; alertness, agility, adaptability and alignment (section 3.2.3) against tangible and intangible factors required for dealing with URs and UR events
5. determine if organisations has developed sufficient capacity to cope with URs uncertainty, unpredictability, negative impacts and its associated characteristics (Sections 2.5; 3.5 and Figure 5.17)

The findings in chapter five has influenced the need to have a detailed set of guidelines such as this to ensure that confusion is avoided and that adequate and effective measures are developed

in Saudi Arabia for dealing with URs and UR events. The continuous reference to literature examined in this thesis and findings from semi-structured interview and focus group sessions suggest that the application of this set of guidelines will be validated by Saudi Arabian organisations. However, the next section assesses its potential capacity for improving robustness and resilience of organisations in managing URs, but also in ensuring effective management of future UR events.

6.3 ASSESSMENT OF GUIDELINES

This section assesses the relevance of the set of guidelines developed in the previous section in developing capacity of organisations in Saudi Arabia for dealing with future URs. This section examines the relevance of each step to the research context and findings in chapter five which provides an insight into the situation in Saudi Arabia. While this may be subjected to further scrutiny, the task-based assessment method suggested by Pulakos (2005) is used because of its simple and direct approach of using key criteria for determining validity, correlations to performance and evaluation of impacts. Therefore, this section uses reference to epistemology and ontology of risk management, resilience and robustness, impacts of URs and characteristics of UR as examined in the literature review chapters as criteria for assessment.

Furthermore, this section also validates each step by identifying any reference to any section or findings in chapter five which provides information on current situation in Saudi Arabian organisations. Each step is assessed by identifying reference(s) to contents in chapters two, three and five on order to determine the capacity of guidelines to effectively and sufficiently enhance organisational resilience and robustness in Saudi Arabia. Table 6.1 shows the criteria for assessing the set of guidelines developed for managing URs in Saudi Arabia.

Step	Content	Assessment remark
Step 1	Use adapted RM in table 3.1 to inform and improve knowledge of URs	**Adequate and appropriate** - This step makes reference to a comprehensive aspect of this research which covers approach and strategy by various authors include the researcher to focus on UR characteristics which were identified from difference sources
Step 2	Use adapted RM to: **A** ➢ Address the characteristics of UR ➢ Educate and improve knowledge of UR (define & understand UR) ➢ Establish the context for UR (see Fig. 3.7) **B** ➢ reduce negative impacts of UR ➢ improve tangible and intangible factors for managing URs	**Adequate and appropriate** - This step makes reference to UR characteristics and aspect of risk management process identified from multiple sources through critical literature review. It focuses on addressing the low knowledge of UR and the negative impacts of UR identified through primary data analysis in chapter five. It focuses on improving good measures (tangible & intangible) already in place in Saudi Arabia identified in section 5.3.
Step 3	Combines steps 1 and 2: 3) ensure that they reduce vulnerability sources; ignorance, inflexibility, indifference and inconsistency (check Figure 2.5) and, 4) then apply PIER-C six-step approach to develop components of integrated functions model (security, BCM, emergency and crisis management) to	**Adequate and appropriate** - This step makes reference to previous steps that is already adequate and appropriate for Saudi context. It further identifies specific areas in chapters two and three to help the focus of this section. It will ensure that the negative impacts found in chapter five are effectively addressed and

	include alertness, agility, adaptability and alignment with dealing with URs and impacts of UR events (Section 3.5)	planned for. It also focuses on developing capacity for future response.
Step 4	a continuous process: 6. communicates and consults risk decisions within organisations and with potential organisations/government department that can provide assistance (Figure 3.7) 7. Monitor, control and review risk profile and context (Figure 3.6 and 3.7) 8. Identify and assess the indicators of resilience; capacity for learning, adaptation, self-organisation and proactive and adaptive function and structure (Section 3.2.2 and Figure 3.1) and determine their ability to reduce sources of vulnerability (Figure 2.5) 9. Identify and assess the indicators of robustness; alertness, agility, adaptability and alignment (section 3.2.3) against tangible and intangible factors required for dealing with URs and UR events 10. determine if organisations has developed sufficient capacity to cope with URs uncertainty,	**Adequate and appropriate** - This step influences steps 1,2 and 3, so it includes essential elements that can enhance those steps. It has identified and justified the content of this step by using information from chapters two, three and five. This step serves as 'check and balance' for all the steps by ensuring that they cover all strategies to develop organisational resilience and robustness for managing future URs in Saudi Arabia.

	unpredictability, negative impacts and its associated characteristics (Sections 2.5; 3.5 and Figure 5.17)	

Table 6.1 assessment of capacity of URs guidelines and adequacy for future URs management

This assessment has indicated that every step of the set of guidelines developed from the research results is appropriate and adequate for the Saudi context. Each step is developed using element of discussion and justification from chapters of this thesis especially chapters two, three and five. The continuous reference to all these chapters further emphasise the triangulation of data analysis and discussion, and to increase the validity and reliability of results, which eliminates personal biases of the researcher. Despite the validity and capacity of this set of guidelines in enhancing organisational resilience, its application and implementation require careful deliberations and acceptance by organisations in order to be successfully applied.

Therefore, it can be concluded that in theory, the set of guidelines is sufficient for dealing with future URs and UR events in Saudi Arabia organisations and in developing their organisational resilience and robustness. However, its application may witness challenges due to similar hindering factors identified by research respondents as barriers to implementing risk management strategies, thus a recommendation is required to prevent or address these hindering factors.

6.4 CHAPTER SUMMARY

This chapter has discussed the research results which includes the findings from the literature review chapters and chapter five. It has critically examined the results of each objective in order to help determine the extent to which each objective has been achieved. Based on the discussion in this chapter, it can be inferred that all research objective has been achieved, which is also key to achieving the research aim. The development of the set of guidelines in section 6.2.4 specifically shows how the research aim is achieved using information and results of objectives one, two and three to develop the set of guidelines. This rigorous process does demonstrate the commitment to ensuring relevant research outcomes that reflect validity, reliability and objectivity of the research inquiry. Section 6.3 assesses the potential and capacity of the guidelines in building organisational resilience and robustness for dealing with future URs in

Saudi Arabia. While it has been a long process to arrive at this conclusion, the implementation of this guidelines is also subject to acceptance by the Saudi practitioners; a process which will require the researcher to carefully and diplomatically engage with Saudi experts, post-thesis submission.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter aims to conclude this research. It outlines the main findings in this research, explains the recommendations required for both academic and practice field of risk, emergency and disaster management. To cover these points, this chapter is divided into three main sections. The first section outlines the main findings; the second section addresses the recommendations and explains their importance for practice and research, while the last section summarises the research and concludes it. The last section also discusses come limitations and challenges experienced in the course of undertaking this research and the management of such challenges.

7.2 MAIN RESEARCH FINDINGS

Regardless of challenges experienced during this research, certain findings were prominent that made the whole process worthwhile and beneficial to knowledge. Throughout this whole thesis, the following findings were prominent, which further justified the rationale for conducting this research.

J. A nature and characteristics of URs were made clearer from literature review. This made the first objective crucial to the entire research given that UR is a grey area by itself except for few authors such as Taleb (2007; 2012), Hollis (2013), Ivantsov (2014), and Green (2011) who critically examined the concept of BS which is liken to URs in this research.
K. The improved understanding of URs by identifying its characteristics and factors helped to determine and further understand that UR results in negative impacts and there is need to seek ways of reducing the negative impacts of URs. This main finding was possible through the second objective.
L. The second objective also produced another main finding which is the need for more effective mitigating strategies for URs. Through this objective, it become obvious that current mitigation strategies in Saud Arabia can be classified as tangible or/and intangible factors. However, these mitigating factors are not effective enough or sufficient for dealing with URs based on the characteristics identified in the literature review.

Therefore, this finding supports the need for improvement and for recommendations that is discussed later in this chapter.

M. It was also discovered in the course of this research that risk management process and steps may not be sufficient for dealing with URs, except when combined with resilience and robustness as shown in chapter three. This major finding emerged from achieving the third objective.
N. Another major finding is that the understanding of URs and risk management strategies is low in Saudi Arabia. Therefore, there is strong need for recommendations that can focus on improving level of knowledge.
O. The semi-structure interviews and focus group sessions also helped to evaluate the current status and capacity of Saudi organisations in dealing with disruptive events. It was discovered that problems abound from factors that contribute to their ability for response.
P. Resilience and robustness in organisation is also lacking and there is very minimal reference to these two words during the primary data collection process.

These main findings help to identify specific areas in which this research has contributed to knowledge. But more importantly areas that also require improvement which recommendations may be used to address them. Also, areas that can potentially influence further or future research in this field of study or related ones. In light of this discovery and findings, the next section discusses the required recommendations from this research.

7.3 RECOMMENDATIONS

The main findings have shown that recommendations are needed to improve current status of practice in Saudi Arabia organisations, but also recommendations that can influence future research in this study area. Thus, this section first address the recommendations for practice given this is a practice-aligned research.

7.3.1 Recommendation for Practice

In order to improve practice and capacity for dealing with any disruptive event in Saudi Arabia, especially URs and UR events, it is important to hold forums that focus on educating and increasing awareness of the actual nature and characteristics of UR and their likely impacts when

they occur. As identified in this research, they can be extreme and severe when they occur, indicating that their occurrence may overwhelm the capacity of any organisation, thereby emphasising the importance of joint efforts and response approach. Such forum will help to identify capacity needs, and factors (tangible or intangible) that need to be improved the most based on capacity. It is certainly important to improve knowledge and awareness of UR based on the gaps identified and outcome of objective 1 and two.

Secondly, recommendation is required for improve mitigation measures and strategies. The guidelines developed as a result of the research findings can aid the improvement of mitigation and risk management strategies that can be adopted for dealing with URs, disasters, crisis and catastrophe that may occur in Saudi Arabia. Improvement as recommended herein should also focus on all the hindrance identified in Figure 5.16 and section 5.5.

The findings from objective three also indicate the need to increase understanding of the role of resilience and robustness in enhancing capacity for response in any organisation. This recommendation is key and may be married with the first recommendation whereby a forum is used to enlighten practitioners and experts involved in responding to disaster, crisis and UR events in Saudi Arabia.

Last, but not the least, the guidelines developed in section 6.2.4 and assessed in section 6.3 require commitment and deliberate efforts in ensuring successful implementation. It is therefore recommended that head of units and operations are trained and educated on implementation strategies that aligns with the goal and mission of their organisation. It is also important to prioritise organisations who claimed they have experienced UR events in the past, as they may be more receptive to adopting strategies that can enhance their capacity for responding to future events. Furthermore, such organisations will be keen to applying lessons learned from previous experience and keen to prevent history from repeating itself which will be shameful. Successful engagement of experts and organisations is key to consideration and implementing the guidelines developed and assessed as a result of carrying out this research. However, recommendations are also needed for further research to investigate certain aspect of this research which was not the main focus of this research, but also important in view of ensuring a safer society.

7.3.2 Recommendation for future research

This research has shown gaps, and provided information that require further inquiry from academic perspective. For example, the limited reference to URs as a concept in literature attracts attention in a world full of different unpleasant events with severe impacts. In view of gaps and information that came to light during this research, the following recommended as components or areas that can influence further empirical investigation:

5. A critical inquiry into gaps that exists between the theoretical underpinning and philosophy of URs. This empirical inquiry may lead to better understanding why preference is given to words such as disaster, emergency, crisis and accidents in the field of public safety and minimal or no reference to UR.
6. To evaluate the merit and demerits of combining risk management strategies for dealing with URs and challenges that may occur from the same.
7. Investigation into the specific roles of resilience and robustness in public sector organisations such as the Civil Defence who are responsible for responding to wide range and scales of disaster events.

While these recommendations for future research have been identified in the course of this research, they can also be a good starting point for either further inquiry in this study area or for starting new ones. Regardless of this, some of the findings of this research and recommendations may also influence researches similar to ensuring safety in organisations and in the society in other countries with limited capacities even though this one has focused on Saudi Arabia as a case study.

7.4 RESEARCH LIMITATIONS AND CONCLUSION

Like most researches, this one has also experienced major challenges and set-backs that almost made the research impossible. The continuous interruptions in research process, change of supervisors and personal challenges to mention a few have all posed a major threat to the conclusion of this research. In addition to these challenges, the research itself had constraints and limitations such as availability of time when conversing with each respondent during the data collection phase. This is because a research with topics relating to safety is considered sensitive in Saudi Arabia, and in some cases, not possible. Therefore, this constraint forced the author to

extend the study period to 4 years, in order to generate a sufficient amount of information. This research was based on the implementation of risk management strategies within Saudi Arabia, which could be seen as a limiting factor. Since what works in one country may not work in another, and a wider scope of study area may have yielded results that could be directly applicable across countries.

Nonetheless, the research results may be adaptable to context of public safety in other countries given its heavy reference and reliance on existing literature which can make the research repeatable. The incentive behind this was not only because this research was fully financed by the Government of Saudi Arabia, but also because Saudi Arabia is in a volatile area of the middle east where several threats and crisis exists at the time of conducting this research. The researcher has carefully focused on the research objective using it as guide for every inquiry phase and in retaining focus on the study being conducted. In instances where secondary data were lacking on Saudi Arabia due to lack of documentation, the semi-structure interviews target high level officers and experienced ones in order to collect quality information which were later assessed against existing literature in the study area.

Therefore, in conclusion, the methods used for conducting this research, the structuring of each chapter have played critical role in contributing to the completion of this research. Using both secondary and primary data sources did not only help to manage the research limitations, but contributed towards achieving more valid and reliable research outcomes which facilitated the process for analysis and triangulating data. Using Nvivo and content analysis helped to reduce the excess information and select the ones relevant to the themes being investigated. The extended literature review provided strong basis for analysing and discussing data, which also informed the recommendations made, but more importantly the development of guidelines for improving capacity for dealing with future URs and UR events in Saudi Arabia. Although the effectiveness of the guidelines may not be clear at the moment, it is a positive towards improving organisational capacity, resilience and robustness if and when adopted for use in Saudi Arabia.

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APPENDIX A: Ethical Approval

University of Salford MANCHESTER

Research, Innovation and Academic Engagement Ethical Approval Panel

Research Centres Support Team
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4 November 2016

Ref: Faisal Bin Shauiah

Dear Faisal,

RE: ETHICS APPLICATION CST15/13 – Risk Management Framework for Coping with Unpredictable Events in Saudi Arabia

Based on the information you provided, I am pleased to inform you that your application ST CST15/13 has been approved.

If there are any changes to the project and/ or its methodology, please inform the Panel as soon as possible by contacting S&T-ResearchEthics@salford.ac.uk

Yours sincerely,

Prof Mohammed Arif
Chair of the Science & Technology Research Ethics Panel
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Participant Information Sheet and Consent

Appendix 4

Participant Information Sheet

Title of Study: Risk Management Framework for Coping with Unpredictable Events in Saudi Arabia.

Study Subjects

You are being invited to participate in this research which studies the increased frequency of so-called unpredictable events and to encourage decision-makers to think strategically about risk and the need for a change in the Saudi Arabia risk management culture, in order to build robustness and antifragility for unpredictable events. Before you decide to take part, it is important for you to understand why the research is being done and what it will involve. Please take your time to read the following information carefully. You may also wish to talk to others about the study. Please ask if there is anything that is not clear or if you would like to have more information and please take time to decide whether or not you wish to take part in this study. Thank you for reading this.

What is the purpose of this study?

The specific aim of the study is to operationalise the research question as follows: A Risk Management Framework for achieving improvements in decision making strategies in coping with unpredictable events in the Kingdom of Saudi Arabia.

Do I have to take part in the study?

Participating in this study is completely voluntary and you may withdraw at any time. Also, even after agreeing to participate in the study, you are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

You will be interviewed at a location of your preference. The whole interview will take approximately 60 minutes to complete. The transcribed data will be sent to you for confirmation. With your permission, the interview will be recorded. The recorded interview and information will only be used anonymously and for academic purposes. It will not be possible for any participants to be personally identified. Information on individuals (such as name, gender, age, ethnicity, religion and so on) will not be revealed under any circumstances.

Meanwhile, we would like to indicate to you the following points for which your consent is needed. This is completely up to you. We will only use the records in ways that you agree to:

1. In any use of these records, your personal information will not be identified;
2. The anonymised records can be studied, transcribed and analysed by the interviewer only according to the research aims;
3. The anonymised records can be used for scientific publications and/or meetings;
4. The anonymised records can be shown in presentations to scientific or non-scientific groups.

Please be assured that confidentiality is highly protected for this survey. The transcribed interviews will be kept with no identifying information. The personal information collected about you in the beginning of the interview is only for discerning patterns in the data collected and could never be used to identify you personally. All data collected will be kept and accessed only by the researcher and the supervisor of this research and will never be made available for other parties or be made public.

What do I need to do?

If you decide that you would like to take part in the study, please contact the researcher (XXXX e-mail: XXXX, who will arrange a convenient appointment time for you to participate and for us to answer any questions you may have. If you consent to the information on this sheet, you need to sign a consent form. Please be ensured that you can withdraw at any time even after signing the consent form.

What are the potential benefits from taking part?

The Kingdom of Saudi Arabia is facing a critical historical moment with a lot of challenges and risks. Understanding the foregoing catastrophes of the so-called unpredictable events is significant for mitigation, and antifragility strategies to avoid escalating chaos. This work will help to sensitize the Saudi Arabian organisations to the increased frequency of so-called unpredictable events and to encourage decision-makers to think strategically about risk and the need for a change in the Saudi Arabia risk management culture, in order to build robustness and antifragility for unpredictable events. This research will develop a Risk Management Framework for achieving improvements in decision making strategies in coping with unpredictable events in KSA.

What are the potential risks, discomforts and inconveniences from taking part?

There will be no possible disadvantages and risks whatsoever for participating in this study. There are no risks of injury or discomfort that might occur. This is because the research study only deals with limited respondents and only deals with the technical issues. As participation is voluntary, you may wish to discontinue the interview at any time or choose not to answer any particular question or not to participate at all.

Will I be paid for taking part?

You will not be paid for your participation in this research, but research results can be made available upon request.

What will happen if I don't want to carry on with the study?

You are free to withdraw from the study at any time without giving a reason.

What if there is a problem?

If you have any concerns about any aspect of this study, you may want to speak with the main researcher (see contact details below), who will answer your questions. If you remain unhappy and wish to complain formally, you can do this by contacting the main supervisor (YYYY; Email: YYYY.

Will my participation in this study be kept confidential?

All information obtained in connection with this study will be treated as confidential. All information will be anonymous so that you cannot be identified, except by a single Participant Identification Form, which will be saved electronically on a password protected computer. The results obtained from this study will be kept for possible use in future studies, but all personal data will be deleted three years from the completion of the research.

What will happen to the results of the study?

The findings will be published in the form of a report, which will be included in a thesis that forms part of a post-graduate student's Doctorate degree. Furthermore, it is also likely that the researcher will write a scientific paper based on the findings of this study, and this paper will be published in professional journals or at conferences.

Who is organising and funding the study?

This is a post-graduate research in fulfilling the requirements of a PhD in Risk Management Framework for Coping with Unpredictable Events in Saudi Arabia at The University of Salford.

The research is organised by the School of the Built Environment at The University of Salford and funded by the Kingdom of Saudi Arabia Ministry of Defence.

It is being led by XXXX (a PhD Candidate at The University of Salford) and supervised by YYYY at The University of Salford.

Who has reviewed the study?

The researcher's supervisors and The University of Salford Ethics Committee have reviewed all aspects of this study.

Contact for further information

For further information, please contact:

Name: XXXX, PhD Candidate

Address: Room 344a/b, School of the Built Environment, 3th Floor, Maxwell Building, The University of Salford, M5 4WT, Manchester, United Kingdom

Tel: +44 (0) 7538454145

E-mail: XXXX

Supervisors contact details:

Name: YYYY

Address: Room 418, School of the Built Environment, 4th Floor, Maxwell Building, The University of Salford, M5 4WT, Manchester, United KingdomTel: +44 161 295 5222

E-mail: YYYY

Yours sincerely,

XXXX, PhD Candidate

Appendix 4

Participant Consent Form

Appendix 3

PARTICIPANT CONSENT FORM

Title of Research Project: Risk Management Framework for Coping with Unpredictable Events in Saudi Arabia.

Name of Researcher and addresses of Researcher: XXXX, School of the Built Environment, The University of Salford Manchester, Greater Manchester, UK. Tel: 00447538454145

Sponsor: The Kingdom of Saudi Arabia Ministry of Defence.

Please use the check box to the right corner after the statements.

1. I confirm that I have read and understood the Participant Information Sheet explaining the above research study and that I have had the opportunity to ask questions about the project. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without providing a reason. ☐
3. I agree to take part in the above research study. ☐
4. I understand that, if I decide to participate in this study, then the results obtained from this study, may be kept for possible use in future studies. ☐
5. I understand that my anonymity is assured and that only the researchers involved in this study at the University of Salford Manchester, UK, will use the data. I thus give permission for these individuals to use this information as they wish within academia if they agree to preserve the confidentiality of the information as requested in this form. ☐

Include the following statements if appropriate, or deleted from your consent from:

I agree to the interview being audio recorded. **(Yes/No)** ☐

I agree to the use of anonymosed quotes in publications.(Yes / No) ☐

Participant's Name	Date	Signature
Researcher's Name	Date	Signature

Copies: *Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent. A copy of the signed and dated consent form should be placed in the project's main record (e.g. a site file) which must be kept in a secure location*

APPENDIX B: Interview script

Impacts of UR on organisations in Saudi Arabia

Q - Has your organisation encountered UR before? If yes, please give an example?

S1 - In agriculture there are risks of epidemics which it comes sometimes and be the cause, epidemics sometime can cause a spread of the disease to the stage of crisis, the Kingdom has already been through the crisis of dryness and hunger, that was in old era not modern. But to make him sick like Rift Valley fever now that epidemics of dengue fever has a role with agriculture because its related to the topic krona, but does it mean its unexpected or will it reach a point where it can't be controlled? This is what I think, I see that now, it's easy to take control of it because of everyone's contribution which has reduced its severity.

S2 - To our organisation yes, the war in Yemen, in particular the border between Saudi and Yemen. We have an electricity stations near the border and it has faced danger in resisting to be affected from the war.

S3 - For the University, there was not any big unexpected risk it is due to the availability of plans for evacuation shelter and safety in laboratories these plans were place by the cooperation between Security and safety with the Civil Defence 15 years ago.

S4 - Yes, the tread "running over" of Almaessam, the terrorist explosions that happened in Mecca, Saudi Arabia, also the Gulf war

S5 – No Never

S6 - Yes, I will give you an example, of course, it is non-deployment and only for scientific purposes, we had a power outage from the main company Saudi Electricity company (SCE), This company is what provide the university with electricity, there is power stations back-up, and was interrupted for a certain period but what had minimized the risk of a serious threat is that it happened at a time of non-working hours. Thankfully, the risk was managed well. We have generators available in case of an emergency, and plans ready for this kind of risk. The

source of the electricity company was transferred, the source of electricity generators and we turned on the main facilities, such as the hospital and the IT center.

S7- Yes, Industrial field has many different types of risks, there are also risks that are not industrial related externally. The unexpected risk that has occurred was in 2003 the terrorist booming, as you know we are an American company based in Saudi, so there were a lot of foreign employees. The company had to follow the safety process on how to calm the employees and make them feel safe. Furthermore, the attack was very unexpected. Yes, I do believe it was managed well. In my company there is a management named crises management, this program prepares mangers on how to deal with risks, also how to implement it, electronica programs were prepared and scenarios were created and taught to mangers how to follow it. The Crisis management was the largest program in the company, so when the crises happened we were prepared, we activated the program. Moreover, we had a meeting as high general managers and divided the work upon each management, for example the accommodation department was told how to protect the area and neighbourhood, we made a safety process on how to deal if any risk arises, as well as provide a substitute accommodation in Bahrain. Regarding the company, we made a process on how to advance the security system. Therefore there was plans and a processes on how to deal with the risks, and that is why we managed it professionally.

S8- None that I know of.

S9 - yes, there are risks that the organisation has faced.

Example: Flooding, that have happened before a while in Saudi Arabia. When the flooding has happened, the sector or the organisation, my organisation was one of successful administrator on facing this disaster, from both sides physical force and workforce that was located at the site. People's relief operation, operation rescue, mitigation process, then rebuild and rehabilitate the situation to what it was before

S10- Of course, the risks that is faced by companies in general, is two types of risk; there is internal risk from the system and there is external risks. Therefore, like any other company that is in the field of petrochemical, we faced the financial crisis in 2008, it was for us unexpected,

these examples alone shadow any other example. (Thank god) the general management that was lead by Engineer Mohamed Al-Mady, took a bold decision in the crisis not to stop production and continues with the production, and with absorptive powered production lines or factories. Furthermore, within a stocked time, once the that the market started to rise, SABIC was then the organization where I work, the company was at a time when people seemed to produce again and our budget was full, so it benefited from it and then it boomed in the years following 2008. Based on who emerged, the organization managed the risk well.

S11 - The lies of the flooding in the east of Jeddah, the flooding that occurred in 2009 and 2011 were recurrent, two years after each other, it was surprising to us in our field, the amount of rain came was unexpected, and the amount of the loss of life and properties was unexpected, this was the closest that our organisation attended. The organisation has participated with many of other organisations in the country, on managing the risks when occurred, even there was a participation of the civil community departments, that made the recovery easier from the risks that have occurred, and the fast recovery. We have participated with other organisations and government agencies, and everyone have contributed of what they have of abilities, and did the duties of what they have been giving to solve the problem and the recovery form the risk.

The organisation has been supported from the head department which the ministry. I requested from near municipalities which was Jeddah municipality, to support Jeddah municipality with technical and manpower. There are many municipalities as the level as Jeddah municipality have contributed such as: Makkah, Taiff, Madinah Al-Mnourh, Al-Qassim, al-Riyadh, all of them have directed from the administrative of the ministry. Also, the municipalities have supported the affected municipality with all the possibilities such as: financially, workforce/manpower, and technically; also, this have reduce and minimize from the edge of tragedy on what have happened in the city of Jeddah, the try to recover quick from it. Of course I have rushed to held an operation room with participations, straight away after the disaster when it has occurred, and all the supportive municipalities have been to the affected area with in 24 hours, with clarity when Jeddah municipality have asked for support and assistance, all the machinery and equipment gone to Jeddah to support Jeddah municipality of its tragedy.

I have looked into the reports that have written; of course, when after the problem have ended,

the performance of the participated municipalities was very positive and excellent, and have reduced and mitigated the problem. Of course, there was some barriers and negatives, but thanks to Allah, the cooperation of government agencies and non-government, from the corporations of civil community and government corporations, solidarity and cooperation from authorities it have mitigated and reduced the problem and have solved many problems.

S12- Unexpected risks no, never.

S13 - Yes, and the risk is the evacuation from neighbouring countries, the evacuation of the Kuwaitis from Iraqi aggression in 1990. Yes, we were able to absorb the situation and manage it in a good form. By implementing plans, and those plans was designed to deal with small groups, evacuation and sheltering plans, and creating shelter camps, and we were able to absorb the large number and provide them with housing, food, and medicine.

Q – In your opinion, what are the factors for dealing with URs in your organization?

S1 - Well the first thing, we examine the current situation and past experience. Secondly, what are the disasters that have already occurred, then we should have analysis of expectations for the disasters, which considers as a disaster; for example: insects or injury. now the biological control/combat sometimes have strong agricultural pesticides; sometimes could be a vital diseases hit the animals. So, how could we have the awareness of it, even sometimes we know the things that's under our management but there are disaster things might come and we do not have the briefed of the disaster. So we should have the administrations, machinery, and the regulations ready from now. Also, we always get distraction from the most of developed countries, so we always work at the last minute and the reaction is really strong and the percentage of benefit and the waste of it is very high. That's what we wish for. To create a supreme headquarter for the disasters on the kingdom level, sometimes on the level of the administrator with high power and then impose on all the organisations to have the knowledge and understanding of the crises/disasters.

S2 - Extensive training, increase the knowledge of people and organisation

S3 - Provide plans that prevent risk, which is built on 5 steps;

6) Understanding the goals of the organisation.

7) Risk analysing which revolves around (Risk analysis, hazard identification, identify ways to control the risk) and from those the plan can be built.

8) Except the unexpected,

9) Resources

10) Facilities

S4 – Beforehand Planning and having solutions laid out, for example, how many beds are available, amount and types of blood needed, there should not be a case of when an ambulance arrives to a hospital they say "oh it full" that panicking situation I do not want, the ambulance should now from the accident spot where to go. So it is, more effective coordination and increasing the availability of information.

S5 - In the case of my organization it needs many things. The need for specialists is the most important now for us because there are only two or three. I am from Aramco and my friend is privileged, we need cadres from Saudi and foreign, and we need a spending process (of course) spending on the right thing, the process of re-examining all our company followed sites because there are websites you need to fully qualify because it's an old legacy of the company (means) not in the new company! I've taken an old legacy that needed restructuring and rebuilding in right way in order to meet global governmental safety requirements. We need a management that realizes these issues. Sure of course I pointed it out to them, the Director of administration of the requirements and things needed but the company says not yet. Yes

S6- The most important factors are the existence of a supreme committee with the availability of material and human resources. It is a human resources specialist; they have high qualification and the same time experience, and expertise to easily adopt something is a main to face the unexpected dangers.

S7- The existence of an understanding administration to manage risks. A full available read plans and the equipment to execute the plans correctly. Risk assessment, every year.

S8 - The first thing you need (I means) is to find a management or a reference within this organization to organize a plan to meet any potential crisis, this is first. Secondly, to practice raising awareness, educate and put in place training functions in a society. Three, for their to be, this Administration that has guides and models and legislation in place to face any disaster. Fourthly, also for it to have a sequence, a clear hierarchy in the link for there to be an ease in decision making and flexibility at the same time. The purpose of the Ministry of education, I'll give you an experience of the Ministry of education, when their wasn't an intended management, so whenever it faces a disaster or trouble they couldn't deal with it and they couldn't coordinates the right approach to deal with safety issues in the country either. If we take, for example, civil defense, for example, the Red Crescent, they don't know which direction within the Organization to coordinating with them, today, for example, you will find them working with a buildings agency, and the other day with the financial and administrative affairs, and the other dealing with the Department again, which does not accumulate experience nor a reference or a clear and specific responsibility in this area.

Its newly established. It was established in year 2012. Yeah of course, first we had indicators, indicators of reduced accidents which has became number one for us. Two, during a follow through of these things, it was pointed out that after a year and a half of establishing the Department, accident rates fell about 30 percent. No, I think that is very important, and I have a great belief in this topic, for two reasons; first, that we as a Department, (what we thought) is that safety is a community and cultural issue and needs to be exercised by the whole community too, so it must be (I mean) in the direction of Ministry of education, to train and educate people, because you're containing a third of society, if you train and sensitize one third of this society, so God can he convey this culture to the other two-thirds of society. This command is very important. Two, the incidents that become in educational establishments sometimes become a disastrous accident, because of rising numbers of injuries or deaths, I think it should be an order to take a stand on the issue, in General.

S9 - The organisation must handle the danger with prudence/carefulness, with concentration and quick at responding. There must have the availability of materials and human with high potential, and it should be exploit with high efficiency. The risk must be faced with the correct guidance to mitigate the risk in its place. There must a well-planned coordination internally and

externally. there must be a consideration of other surrounding factors that might have the influence on the crisis itself. trying to dedicate the crisis/disaster/risks before it grows when occurring. For example, if you have an earthquake in any specific location, you must first when the earthquake is located at a specific location, you must move your financial potential, flying potential , first aid, trucks, food material, hideouts, shelters, you must be ready and take advantage of it in the right way, you might be in a position of need for, shelters, tents, or might be in another position where the only need is cellars, the air ambulance may be on a site and the mobile ambulance at a different site, and from coordination with other facilities in the area or close to the site, you may need the sites that are on the North or south of the disaster, there must be regulation and utilization of the abilities, and coordination and organization with different services on the site. Talking about my organization, it does exist, prior planning in disaster management, the management of risks when they occur, each organization or each facility knows the tasks and responsibilities that falls upon them, in their own right under the coordination with other services, because if there was no management, efforts go to waste.

S10 - Risks should be dealt with preciseness, and prepare before it happens and if it happens deal with it in a certain way, there has to be a manual system then comes the leader ship skills. Decisions itself is risky but you have to take the risk sometimes. As an example, in 2008 when I made the decision to run full capacity as a decision that may have many consequences, but we have seen its profit after a year by witnessing our profits are high while others were till trying to produce. The decision is made on spot and be honest it relies on the leader and his wisdom. The most important in managing is the emergency plan, for example, a hospital has an electricity meter back up, once electricity shuts down the electricity is turned back on using the back up. There are two things that are important to me; first is to make money, and to do so you need employees, for the employees to work well you need to make them safe, so know you have a circle that revolves around employees, share holders and profits. These are necessary to be managed well, so protect your People as I said once you do they will deliver to you, once they do, you will make money resulting in the happiness of your shareholders, this is the cycle. So take care of your employees provide a safe environment, try to make expectation do not wait for reactions, there needs to be a for cast system you, your should expect losses and profits, for example, what is the temperature expected to be in 2050, what will the situation be and make

decisions based on that, we may move factories, offices or even move a factory a little distant back from the sea. Therefore it is very important you have a clear system and qualified people.

If danger happens to business continuity management (BCM) the role of risk management is not effective any longer, let us take an example, people expect that a risk is a factory explosion, it is not a great deal for me, I mean unexpectedly lowered prices is a big risk that may face my organisation, the resigning of critical people from the company, contract problems with suppliers will make me lose a lot of time which is also is a problem. Another example, let us take a factor, it is one of these matters that has available guidance on how to run the equipment and shut it down. So let me repeat the most important, there needs to be leader ship, system procedure available, a clear written rules and regulations, emergency plan for when risks occur, you need to be focused so that when you are faced with 20 types of risk you can not resolve it all therefore, you need to have Risk mattress that I mentioned in the beginning. The bigger the risk the bigger the consequence, so focus on the red zone.

S11- Always the risks are beyond the organisations capabilities, so the organisation needs support from inside the organisation and from other organisations as well, so there must be a high and excellent coordination, but sometimes the organisations don't have the enough possibilities in: financial, qualified employees, and technical in countering the risks; However, the possibilities of technical and human expertise in other organisations, so organisations should contribute and help one another in facing the risks, there might be a barriers such as: the right administrative. But, if there is a one administrative and all the organisations follows this administrative department and have all the authorities and possibilities of giving all the support to all the organisations on facing the risk, I think it would make a great change, that will result in facing the risk properly, but as we have talked about one organisation cannot face the risk by itself.

S12 - To prepare well, activating emergency plans, training and raising awareness these all trigger factors. We have extra load, for example how to wake the patient, you have trained employees in the hospitals, but the other side which is very important and must not be overlooked is how to alert the patient that there is threat coming. Moreover, how can we say that the krona's disease is dangerous, how do we knowledge people to protect themselves so it dose

not burdens you in the treatment and the follow-up process, we the other side consider the patient or the (consumer) is a problem on the organisation so how should we work on spreading awareness this why its essential to raise the level of awareness.

S13 - Firstly, is the existence and the preparedness of automated and human. Meaning having enough manpower, and a sufficient number of machinery and the necessary equipment, and the availability of accurate plan on handling occurred emergencies and not hypothetical but realistic plans of the lessons have learned from previous plans, and a full coordination internally and externally. The danger might be in somewhere else, so it requires transferring the machinery and manpower to counter the risk.

Q In your opinion what are the main issues or factors that can hinder Saudi organizations from managing URs?

S1 - The first thing is the lack of experience, because the lack of gained experiences of disasters will weaken the Organization ability as they can't overcome small disasters, so you must simulate disasters as a system so the person knows how to be accurate when the disaster accrues.

The second thing, the side/environment conditions sometimes relay on many things such as; financial, technical, and mentality within the intellectual leadership of the agency/department is not at the standard of the disaster. The leadership management might have the qualifications of finance or business in general, you might find a technical specialist but doesn't have any knowledge on the respective of disasters on their own field. The disasters could be segmented in multi ways such as; food disasters, safety disasters, health disasters, financial disasters, functional disasters, water disasters, and they are all different from one another. How to create a team that needs the existence of a team spirit and a management that has predictions and monitors payments. Because issues now days needs an amount of a budgets or an investment, therefore the country should have the intention and plans of investing ready for the end and reduction of disasters. Certain disasters will be in need of an investments and whatever have been invested will be a lot less than what is needed to recover from the disaster.

S2 - Some employees do not know how to deal with issues in the first place, there needs to be

training from the beginning. Financial support that may not have been provided therfore it may hinder in the management of UR.

S3 - We have two problems; first, its individuals, wither it's a manger or an employee, there is not enough awareness of possible risks and who to manage it. Second, financial support, when you want to implement an idea it is one of the hardest elements to make available.

S4 - Not enough coordination between government departments. Lack of training for managers and employees. Communication during the crisis. If all departments are so far from each other and the crisis happened there needs to be a clear communication to understand what do.

S5 - The problems like we said are considered to be common sense by the organizers. The CEOs are necessary for example Saudi Aramco, the largest header in the circle who consider safety and the environment as the most important points which work has to revolve around, and at the same time they devote expenses and pick up projects to reach the highest level of safety.

S6 - Not giving sufficient powers to carry out its main functions.

S7 - First, Not a sufficient early planning, yes there is lack specialized cadres but not having an available plan is what mainly hinders an organisation. Even if there is a lack of specialists that could provide you with a plan bring outside expertise and advisers to guide the organisation risk management wise. Secondly, Public space, if you ask me where to place a factory it would be in an urban area, such as Jubail Saudi Arabia because there are factories and national organisation, therefore employees area ware of our surroundings, we plan meetings and talk about the possible risk and how to face them. But if you are not in an area of much productivity it will slow down your employees' activity and motivation. Last but not least, culture and environment that surrounds the organisation.

S8 - Sometimes administrative bureaucracy dose not response to change rapidly, in the sense that you are now in this Ministry and it wants to be flexible, but this for example is linked to civil service, however civil service does not have the convictions to change. Sometimes this regulation issued on all these government agencies and does not keep an account of the nature of the functions. These functions may vary from one department to another. Therefore, each department should be viewed as an independent. Moreover, sometimes a plan may require

financial support and in this case it will be disabled by the Finance Ministry.

S9 - The constraints may be form Regulatory, there may be barriers to coordination, Regulatory body within the Organisation itself, there are no specific clear regulations. Also, the problem with coordination could be from the surrounding environment/area because they might be unhelpful on the process of facing the risk when occurring. The situation might happen to me personally, maybe the danger happens within (your house), or your neighbour's house, but after a while the danger might happen in your own home, if you are not cooperative/helpful. There is a coordination between you and other organisations in the same filed as well as in the same geographical area, this might make difficulties on facing or addressing the risks.

S10 - First issue is ignorance, an ignorant will not know the importance of what he is been given, therefore does not see the value of it. The second issue is the lack of resources in some organizations, or requirements available to execute for a mission risks. There is stinginess in non- quick profit, therefore, investments are not being invested positively, particularly at the level of the CIMS Medium size enterprise. Also, the lack of reporting tool, we create plans but we don't track it, there is no existing performance management, So when you have a risk and try to identify it on a level one and two of the organization yet the work is not transparent therefore you are not supporting the management you have to make decision on the right time, because these are issues that will hinder the organization in risk management.

S11- Not any organisation can encounter the danger by itself, so the everyone must participate on facing the danger and mitigating it causes, because the mitigation of the danger needs the contribution of others and everyone should participate and everyone should be supportive. So the organisation can on its own face any type of risk, but only with the participation and suppuration of other similar organisations.

S12- Not being prepared well.

S13 - First: the weakness of not having a budget line specialized for these organizations to spend on such a thing. Second: the lack of integration between the organisation with other organizations, meaning the lack of integration of completing each other business and requires that the organization must be at the level of other organizations, so they can have and owe the

same as the other organizations. Yes, the awareness of decision makers within these organizations have dropped. Hence, they consider the spending or creating a special item in the budget on these thigs are a waste of money and has no value.

Current Mitigation Strategies

***Q Has your organization considered URs before they happen, did you do anything about it? If Yes, what strategies or approaches did you use in your organization to deal with those threats? If not, why*?**

S1 - It wasn't, but the subject now in nutrition we should request from the kingdom to import most of its food from abroad so that the all risks will happen in the world, for example, if you speak on the subject of wheat, wheat is known to be produced from many countries of the world if it follow that prediction of reduced grain production in the designated State for example in Europe and in America because of drought you must have the risk, that's not my job, but for the culture I know you won't find expectations for the agricultural sector as it is always closer to prospects and risks becoming expectations.

S2 - Yes, the strategy of "Emergency Action Plan" which is applied in each department and practiced on, whether building management station or a supply one. Every department dose an assessment of the possible risks they may face, such as floods, gas leaks or explosions etc.

S3 - Mitigation, in our university to reduce the consequences, we have created a system for student rights, it is a way for student to express what they feel about their course or want to change in the university.

S4 - It needs training. Training is one of the main needs to manage URs efficiently. Secondly, there needs to be a new strategy, because our strategy may be old and needs to be renewed. By studying all the possible risks, precisely what may happen and how to prevent it, and have a plan based on what to do before, during and after disasters. Tools to use in preparation for UR, we could use these programs to prepare for risks, for example during Hajj, we The General Administration for Safety face many problems and UR that effect the country and its reputation

globally. In addition, we miss coordination between government departments regarding managing UR, they all work when the disaster happens, for example, the incident of stepping and congestion in Mina Saudi Arabia, during the problem everyone started to work, and this is a problem

S5- Currently no, because it requires concentration of senior leadership and support in safety procedures. Support such as financial and administrative support, and they need to make plans in order to prepare for an upcoming disaster. For example, during pilgrimage season in Mecca, whether it needs updating or not, and if it turns out that it does … safety is the priority.

S6 - Our organization is the King Saud University is administered by specialists or distinct cadres and thus it has the expertise and knowledge in many areas, at times we can be little late. However, all quarters that specialise and are existing in all of the capital, all those are in cooperation with us. Therefore, we have committees meet in an emergency situation. Yes, the decision-makers make the decision and the resources are available as well as ready to use thankfully. Furthermore, the university is as you know the first and the largest university in the state, it also has an exceptional budget from the State, there is a strong support and therefore we are able to face unexpected risks well.

S7 – The company is a Saudi American company and it is 150 years old, so there were original risk management processes but we shaped it so it is suitable for our environment. The partner in the organisation has a role in the existence of these programs. There are two strategies that execute risks; First, emergency plan, which deals with Industrial problems such as disaster, fire in building, leaks of any kind, accidents and employees related health problems, so there is plan to manage these types of accidents. Secondly, Crisis plan when it occurs, which deals with industrial crisis, such as fire that cause the death of many, and brought a lot of negative media coverage, also it could be an article about our company that talks negatively which causes problems to the company. Moreover, there are programmes for risk management, crisis management and the administration of accidents. Therefore, if god is willing we face any future accidents we are ready for it.

S8 - No, of course. Firstly, because I think it needs financial investment, and require significant amount of human resource, as well as the requirement of training, unfortunately till now we

have not reached that point. In case of any accident, it will eventually first and foremost affect the organization, also affect the efforts of its officials, for example, when a huge umbrella fell in one of the girls' public high school, it has shadowed all the efforts and work done by the Ministry. Secondly, I contemplate half of the problem is in the quality and firmness of the buildings. Moreover, making sure of the design size, equipment needed and being specific about it. All of these issues I believe that we still need to look at it more.

S9 - Yes, there are a specialised organisation work on the sensing the risks there is throughout the year, in such assumptions; for example, certain assumptions for the occurrence of particular accident, where the general arranging of all human and material resources and attempting to simulate reality before it happens, and then how to handle the situation on serious grounds. After that, when finishing this assumption now is the time for correction or have the benefits on what have been established; For example, accomplishing the duty in record time. We do have unexpected scenarios, for example flooding or earthquake or volcanoes on particular places, what are the possibilities of the resources that must be provided. There are some places that could observe earthquakes and volcanoes, based on the sensing of it before occurring, then the prior awareness, awareness of the surrounded areas, Take the necessary precautions with local and governmental organizations in the same location, making arrangements on the basis of being ready if this incident occurs. So, each participant and each organization know their role and duties, that placed responsibilities on the frame and overall coordination with the organization to which it belongs.

S10 - There were many arrangements that was done by the organization I am in, and of course one of the arrangements is the creation of a management that deals with risk management called enterprise risk management; this unit was set up three or four years ago, the administration was available before but it was only a unit under the corporate finance department. Moreover, there was a department concerned with risk but it was not under the name of risk management, it was something like security and safety management. Security and safety departments only managed the safety of the facilities and factories, part of it was to also take care of the environment and the risk that may face the factories. Moreover, it operates on the subject of policies and procedures, guide lines and regulations, the management was available it just was not under the

name of enterprise risk management or risk management.

For strategies that was applied by our organization to deal with risk. Firstly, lets take strategies in general, the structure or instruction, but off course there is now a management on board level of the committee called risk management. Moreover, there is members from SABIC or the members of the board committee of SABIC, beneath derives the management of risk management and enterprise risk management under this organization comes more than one department; departments regarding risk evaluation as well as a department regarding emergency plans that named business continuity management in case of an emergency (god forbid) how to deal with it. In addition, there is a department that administers highly unexpected changes such as climate change and its consequences. In all business units, strategies and strategic business unit that has vocal point which regards to risk management is a main structure. Furthermore, there are two types of risks in an organization; first, the risks within the company, second, the risks of the company's environment. There is the law of complains, and this law is a way of giving an awareness to employees and trainees, so that it mitigates or minimize the chances of risks. So, in order to mitigate the risk, we created the law of complains, there is also the code of ethics on the basis to making sure the staff is not causing any risk to the organization, internally. Furthermore, risk rating, every year we work with different organization and we make assessments of what are the potential risks your sector may face; These risks are recognize on three levels, on the level of head sector of the organization or the executive vice president IFB, then on a level 2 and there are risk that are less than level 2 such as what manger define as the risks, after such it is the navigational action, which is what can be done in order to keep risks a way. In addition, we have web system in the company such as the “shield system” this is a progress update so that you are able to follow up at every, it will be seen when there is a risk and we use risk matrix which is a matter that contains two-dimension map; first is the chance of risk happening. Secondly the consequence impact and impact we have is high, see which one is high and which one is low quarterly on the matrix. Moreover, when we recognize there is risk we take action and put a deadline and knowing how to end it and its named full obstacle which is a general strategy. In addition, we use three thousand of the audit from risk management when you implement it you will see positive results.

S11 - Yes, after the tragedy that have happened in Jeddah, the officials of corporations and

organisations have sensed the size of danger that have occurred, so the risk of general management have been created with in the ministry as well as municipalities, and then we took a step toward the right path, we have made the disaster or risk something important and we are required to prevent and mitigate the danger from it. We have started to operate like corporations when facing risks. Previously, the we operate in traditional way on facing or mitigating the disasters/risk.

First of all, the system of the administration, there should be systematic administrative specialized for disasters and the mitigation from it.

Second step, there should be human cadres, a ready team within the head office, in the ministry and its branches; there should be a human cadres and the capabilities of technical and financial on confronting any danger might occur in the future, and dingoes all the dangers the might be expected to happen within the region, and prioritization of risks for each region, because in every region have its special disaster which is different from other regions, limiting the risks in each region and featuring the disaster in every region and putting weights for this risks, and prioritizing the risks because every systematic excites within all the regions should have the capabilities and preparations of human and technical suitable with the type of risk that might happen in that region.

We give the risk its weight; with clarity, if the topic is regards the west region, we give all the highest weight for the technical disasters, for example, oil leak, chemical leak, biological resources, or the industrial explosions in oil factories, or chemical factories, or petrochemical factories, these risks have the highest weight from other dangers. The other risks, could have a bigger weight in a different region; for example, natural disaster. So, we start to do risk analysis and risk simulation within all the kingdom region, and we study the specific disaster for every region and we try to consists the equipment for human and technical ready for mitigating any risk might happen in every region.

S12- Yes of course, and usually it is prepared from the lessons of previous disasters, and what services prepare is implementing future plans for future disasters. There are not any indicators of anything that may occur but there should be should a plan ready. for example, Hajj

preparations of the occurrence of something unexpected.

S13 - Mainly creating emergency plans, and through these plans we can control and adaptation the plans depending on the situation or the type of event, so there could be a high flexibility within the plan, and having alternative plans to cope with any change depending on the disaster/risk.

Q - Does your organization have the ability to cope with or manage URs? If Yes, how? If not, why?

S1 - For current time and hopefully now when public strategies subject to disasters it depends on modern strategies, many things now seemed to address the topic of disasters. Why doesn't the boarder have a disaster management? Because the culture of our community depends on god. The religion noted tie your camel and have the trust in Allah? But thank god we do our duty, look we always must believe on god on everything, even with the American progression, and West still finds disasters coming and destroying, however any progression or process we take cannot protect us from what god have written for us. We need early detection and initial estimates in expectation that you need to have an early warning and monitoring devices as well as units of measurements of expectations before the crisis occurs anywhere, the percentage of accuracy might be successful, but next time we must reduce the harmful effect of the disaster.

S2 - To a certain extent, we have plans and scenarios ready, yet there isn't much depth in researches, even the scenarios that are used for accidents is weak in implementing. Moreover, there is still weakness in how to manage UR. Also, the drills and ideas to manage UR when practiced it still does not clear the gaps to fill.

S3 - This depends on a lot of things, you need to make sure that all organisation with the help form civil defence have created plans, so this is a planning concept. Planning needs resources, which is s basic elements to activate the plan, and financial support. In addition, individuals in the organisation need to be well trained in terms of culture, awareness wither it is someone that deals directly with the risk or an individual that is part of the organisation. By training and spreading awareness if you pay attention to American companies they have a guide for each operation steps and a process clearly to be understood as well as train individuals on them.

British companies are the opposite, they try to gather leaders and people and tell them the different type of plans and process, then starts to focus on the most risky action to reduce its negatives.

S4- At the moment I believe it is not capable. Because there isn't coordination between government departments, it is as if there is a cloud between us, however there is internal coordination. We completely are missing UR drills it is available but as a picture to the outside, and if we do implement it, it takes time and preparation which results in most of the employees knowing and that losses the value of the drill, if I were to do it I would make it a complete surprise

S5 - Not at the moment no. Because the shortage of the cadres, or the findings, or the insufficient of the resources. I believe that these are the major reasons.

S6 - Yes, my organization has the capability. It is the availability of material and human resources, and the presence of interest in the planning and development process. The Supreme adopted a policy for risk management at the University of Iemam in the importance of employees and visitors' protection, as well as protect its reputation. Furthermore, it has adapted a new strategic plan (KSU 2030) and the Strategic Plan requirements is the existence of a policy and a plan to cope with risks, therefore the university I'm in went beyond and formed a management that administrative approved plans. Yes, there is a public risk management at the university as well as linked to the senior management at the university.

S7 - Yes, its prepared because it has made programs available to bodice risks, because we have a drill repeatedly, it is not less than 4 drill attempts to see if our organisation and those that are involved is prepared to face risks. Every time we do a drill it results in finding a problem that needs to be addressed. We also prepare on how to manage the public and media coverage.

S8- I think part of it takes into account the desires of the public, this is one. The second reason, sometimes there is an external strength that have a stronger influence then the organization itself. Thirdly, it is essentially the organizations administrative and its timeline and I strongly believe that it's all a motive for an organization to have some kind of flexibility in creating legislation and regulations on this matter. No I believe that eventually the organization is trying

to first provide the service to the recipient, whoever it could be, whether a regular or an engineer or a parent of a student, so on the basis that I do care to provide service, it does not prevent me or an organization to be more flexible in reviewing my procedures that is aimed at the common good in favor of the beneficiary.

S9 - I expect that the organization that I belong to have it, because we have a special management in risk analysis, within the management we have a special expertise on a high level. Firstly, working on studies and explorations risk hidden places, and trying to discover the risk before occurring; for example, locating the places of risks, finding the exact time as possible (of course cannot determine a specified time or specified type of risk), but might find the estimated time for the possibility of this risk. There are a large troop of the materials and human capabilities and capacities to deal with the risk, but not to the desired level, not to the level that the person hope for, the person wishes for 100 percent, but it will need a big effort, but at the moment it does the job, and there is a future aspect into expansion in this area.

S10 - I just stated some examples on what we should aim to do, such as risk assessment on what threats may face the company. Of course, I will give you a brief on how our assessment work; you have the leader or the vocal point which is risk management; risk management cannot operate one its own they call for a workshop that gathers particular people, for example, I arrange to meet and listen from different departments such as the employees of the businesses, factory managers, specialists in Finance, and hear from them what risks may face the organisation. Risk management is in a way process fillister but to know the risk is by meeting those in charge of different departments to know what each may face, even those in supply chain management department that deal with ships using the logistic. When we want to evaluate disasters, or risks we call upon all those in charge for a workshop to recognize the risks and prioritize on the percentage of risk occurrence, the impact faced we exercise extensively on. We only use the tools for matrix that is available. In beginning stage, we only hire PhD in the field. Saudis and foreigner employees. As I said because the concept is new it needs specialists in the field, it is not a deficiency to young Saudis but "No matter how much of knowledge you have it is only a little" (85) You just bring experience try to gain it and then you will gain independence.

S11- In 1421 there is a committee has been formed with high officials to study on constructing a ministry of disaster; also, the plan has been studied for the last 10 years ago from 1420 to 1430, and when they done the study, the have established that in each and every organization has its own risk/disaster department, "that has been created from the presidential committee?" The Ministerial Committee or the Committee that has formed from a well-known people to study the concern of establishing a great committee for disaster management within the high committee for systematic management. Released in 1422 results of recommendations raised to the officials, officials have supported the committee's recommendations. Officials have looked and decided, instead of creating a high ministry or a high department for disasters, so they decided to create disaster management within each and every organization, within the organization of Civil Defense Council, this department of disaster management should be the arm meaning offering the support such as: helping, coordinating, contributing, communicating with the main organization that is Civil Defense Council, rather than creating a one high management or ministry. The high ministry of disaster is the Civil Defense Council but different names.

In 1422 The decision was to maintain the Civil Defense Council and exercises its functions and responsibilities, as well as create disaster initiatives in every government agency. In answer to your question, you mentioned why not established specialized departments. "you reminded me of 1431" In 1431 they restudy the topic of risk management and came up with creating a forum for mitigating the risk and disasters, so they sum up with civil defense council to do its duty nicely but it needs to be more develop and activate and strengthen the possibility of the council as well as the general municipality committee and the general committee council, that what have been in the decision (116) issued by the Council of Ministers in 1432, and it gave more authorities, tasks, and responsibilities than before in risk and disaster management and the mitigating of its causes, Council of Ministers have made resolution (406) in 1436, this decision has given the committee of civil defense more power and extended control/terms of reference on managing the risks and disasters in the Kingdom of Saudi Arabia. Civil Defense Council headed by: His Highness Sir Crown Prince, the general committees, the General Secretariat of the Council, the committees of the Civil Defense and headed by the prince of regions; and every one of them have his/their duties and responsibilities. Then the sequence as follows; when it gets dangerous on the city level, the governor proceeds the danger, if he cannot, the Prince of

the region participate with all the officials they meet, with participant of Civil Defense Committees in the region, and try to manage risk/disaster; if they could not intervene the danger or the danger is beyond the capacity of the entire region capabilities; than the General Civil Defense headed by His Highness Sir Crown Prince, take a place on managing this disaster.

S12- I am speaking with full transparency, regarding our organization on an administrational level yes, there are things that are planed out and in our thoughts as well as made future plans regarding which will be supported either from the insurance company or even from the Ministry in the area of our preparedness work. The preparation and plans for risks are available, we are in contact with officers in hospitals, and now are following operations activation plans. This is quite normal, since you are a hospitals Manager you always need to be ready yes. Contingency plans are setting mechanism by hospitals forever, afterwards, we train people to process and activate contingency plans in case it is needed later. In certain hospitals where, for example, have a fire drill for confirmation of activation, of course in any plan things go wrong we are not angels but as I said these drills we make use of them for future purposes, there are things we benefited from and other where we try to prevent. Moreover, there are hitches that may put the plan itself at risk such as financial support. Also, some things may be the panic of patients is one of the main reasons not to activate contingency plans as well as we plan. We take the administration and use of certain consultants, we had easy-time consultant from the Department of King Saud University, we also have an advisers form King Abdul-Aziz University.

S13 - Yes, we had put preparations on both terms logistic and manpower, and we prepared equipment and machinery as well as plans, ready for any risks even the unexpected once.

Q - From your perspective, what does an Organization needs to face UR with efficiency? Why? How?

S1 - The first thing is to create a special department/management team in risk management, it must be created in each and every organization, and then every organization specialize on their business, for example; if the organization is financed than they need a financial risk management with distinct management, If the technical department or functional systems they need a strong technical risk management within the department and that's what we focus on, security and safety management is not concerned with risk and disaster management, we don't

say the disasters and its managements or risks with its managements but we it should be as an independent department and it has its own leverage, as well as having a clear programs and the understanding of the risks in their field.

S2 – Having said we have plans to manage UR doesn't mean we are satisfied with what we have, there are three process an organisation needs to manage UR and the people to understand:

- The process before the disaster.
- How to manage during the disaster.
- The recovery process.

This process every organisation should understand well, I found it missing while I was looking at our general strategies in our organisation. All we have plan for is how to handle the risk when it happens not the before, during and after process. Being ready financially resource wise and equipment is necessary to prepare for UR.

S3 - It is necessary for risk analysis, analysis what will happen if the event occurs, it is necessary to build concepts to the expectations of the event, and the expectations of this event may result from simple event or chronically large event, therefore we need to look at these things and create rules for it. I assume if we organized the analysis process, how to hazard identification and how the process of the organization itself to understand organizations. Unfortunately, we have some people that does not know how the decomposition the form of the organization, the organization components and assumes the organization is only equipment and materials, yet it is procedures, factors and a culture of people in this organization. These are all a concept to determine the risks. The more these concepts add up, it reduces the possibility of risks.

The first need is basic construction. Basic construction which is when employs and mangers when they are introduced to their organisation departments to manage risks, they will recognize the institution Organization, recognize the internal components significantly, recognize organizations capabilities, including analyses and controls which eases to locate risks. Moreover, it generally means system description or system definition, it describes the system components and their functions and then identify the desired goals as possible objectives it could be big or a small goal, also it is possible to be linked to a very small area or be a

component of facility from a whole division. Furthermore, divide goals into sections and determine where is the risk in each, this is a first and a necessary step to make. This is an understanding that was derived from people within the organisation.

S4 - It needs training. Training is one of the main needs to manage URs efficiently. Secondly, there needs to be a new strategy, because our strategy may be old and needs to be renewed. By studying all the possible risks, precisely what may happen and how to prevent it, and have a plan based on what to do before, during and after disasters. Tools to use in preparation for UR, we could use these programs to prepare for risks, for example during Hajj, we The General Administration for Safety face many problems and UR that effect the country and its reputation globally. In addition, we miss coordination between government departments regarding managing UR, they all work when the disaster happens, for example, the incident of stepping and congestion in Mina Saudi Arabia, during the problem everyone started to work, and this is a problem.

S5 – Organisation need to create higher body for safety, like, government, a high commission for safety and reduction of risk is needed. It is important to question people that uphold experience from their work in companies and on land and sites who not only have educational background but practice in the field. Yes, the person must have senses and a link and knows the situation and the danger behind it, not anyone could understand unless the work on the field, even the academic lecturer won't have the understanding unless they work on the field.

S6 - First, the attention of senior management and their belief in the existence of risk management professionally. Secondly, the organization should have risk analysis in quantitative terms, this could be in general or particular; professionals who administrate in risk management department by their professionalism is what will reduce some of unexpected risks. Furthermore, they will have a sense of the dangers in general. As to what we always say in the University of King Saud "risk classification in general has to be (if the threat occurred it goes under a certain branch of the main risks) therefore this reduces the danger of unexpected risks, now based on the example I gave you, we call it the beginning of the crisis, because it stops the process of education or some of the important services, this is considered crisis. In addition, with the presence of the available resources, thankfully it's expected to be dealt with crisis

straightforwardly.

S7-

A. To be prepared to face UR there needs to be risk evaluation (risk assessment), do an evaluation on all the risk that may face the company as well as prioritising the risk.
B. Have a risk solution, we should not wait till the problem occurs and find a solution therefore solutions ought to be available and ready to implement.
C. Continues training, you can not only find the problem and solution and stop here because risks are repeatedly renewable, therefore there should be a frequent scheduled training, every 1 year make new plans for newer types of risks so that we are always prepared.

S8- I think the first thing is, creating an administration and configuration, administrative organizations in the system. Secondly, is creating two type of teams it could be either regular or voluntary. Further, you must also plant the idea of volunteering and helping in the work of relief and rescue. Thirdly, you must train people on clear foundation, I mean let it not be the subject of jurisprudence, the work is regulated, especially since that the Kingdom goes through seasons, so we should benefit from that we make use of these seasons. As an example, the rainy season or hajj season are supposed to be a reason for observing and practicing, they are training opportunities, whether we take groups or volunteers from schools like the one we have in Mecca and Almandine City, or the areas that Pilgrims and Umrah performers go through. I believe these are situations that are calculated on how we should deal with such matters, it could differ from managing the crowds, handling Department gatherings, these are all cases that could be looked at. Last but not least, I estimate that logistical cases, support and provide all the possibilities that is need from cars, machines and appliances then it needs a legislation, I think it revolves around these issues. What I also think is important is founding a Supreme court that manages all these issues on a State level as well as organized under one umbrella. First, they unite the activities and efforts at the same time sectors benefit from each other and there will not be overlapping and there is contrast, because when a disaster occurs (God forbid), everyone wants to intervene that is the norm of our people, so it gets more complicated. No, there is not unfortunately.

S9 - First, you need to believe senior management, senior management must belief on the

importance of risk management. Secondly, there should a special independent department for studying and identifying the risks. Also, there must be people who are specialists within the department who are aware and familiar with methods and modern ways on sensing the risk, and the knowhow of handling the risk. After that, must provide the resources and the workforce that required facing this danger to mitigate its consequences.

S10 - What the organization needs first is awareness, our problem in many local organisations is the lack of awareness of what risk actually means. There are organisations that believes it's a waste to invest in risk management, thus if any accident occur it will damage the organisation heavily, I mean what happened in the 2008 crisis, I have seen the impact on factories, companies and Banks, if only these organisations had an effective and well managed risk management department as well as understand the value of it, it could have navigated the risk in order to minimize it or prevent it. The law and regulation of risk management in the company should be taken on a serious matter. Further, a written document of the law of risk should be documented on the system. Awareness is necessary in these matters and always do a follow up and improvement to every aspect of the organisation. Moreover, the matters of the company ought to be as large as the company meaning that accompany of 40,000 employees cannot be compared with a company in which has 60 or 70 employees. In addition, it is necessary we provide lessens on how to deal with risks to have a prevention mentality you don't go to a doctor as they say "when you are almost finished" you should do a check-up yearly. Also, you ought to have a conscious management with a clear system and an interested mangers in the its implementation.

S11- The system of administrative in Saudi Arabia is excellent system, but needs to increase the level of coordination, communication and cooperation and partnership between all sectors. The work process should be part of shared operations room, everyone contributes to mitigate risks, there should be a direct and fast communication between all sectors and all organizations within the public system of Saudi Arabia. Because Saudi Arabia is a state of institutions, each institution has its tasks and responsibilities, but the danger and disaster, do not recognize administrative borders and no geographical boundaries, and does not recognize the tasks and responsibilities in the organization, danger or disaster comes and sweeps across the borders and places. when the danger occurs, the surprising element plays a role, as well as conflicting

responsibilities and tasks it needs to have a maestro that guides the whole parties, the systematic is Saudi Arabia authorize these duties on many organizations such as: Committee of Civil Defense, the General Council's for Committee of Civil Defense, Council's General Committee, the General Secretariat of Civil Defense Council, and the General Directorate of Civil Defense. The maestro who leads all the authorities and organizations in Saudi Arabia in risks/disaster management. However, the management needs, disaster management to participation and collaboration of everyone and everyone's contribution. Also, everyone should be under one-man management so they could have all threats and negatives phases falls as quickly as possible.

S12- This question is beautiful; the questions answer could be very broad. Firstly, is consciousness, awareness, for all organization, there should be an awareness of that risks exist, both on a personal level, risks at the corporate level and at a State level. There are points that it should be aware of;

1. A challenge is to raise awareness amongst people.
2. Training, installation and Setup. What I mean about training is if you are expecting a risk that may occur or may not occur, make sure to train people and specialists in this field, whether it is administrative or practical or medical to face expected or unexpected danger.

I will give you an example, some diseases may be unexpected worldwide, and not have a plane for it, therefore, you must have people trained in the process, some may specialize in biological safety, how to maintain themselves and keep others safe.

3. What will help in upgrading of the Organization to face risks is financial support. Financial support is very important because any shortcomings you need in a particular area needs financial support.
4. Administrative support, I mean based on the Government that support the management of the organization that manages the Organization as an administrative management.
5. In addition, it is very important to provide infrastructure, devices, equipment that can help in the process of risk. Furthermore, computers, medical equipment, the needs of the trainer and trainee, there presence is essential.

S13 - There must be alternative plans such as plan B, and it should be flexible enough to absorb

to a high capacity of the danger, the plan might not be serving or mitigating the danger, but the plan helps to reduce and mitigate as much as possible of wasting people and resource.

The plan formed on scenario that possible of occurring according to the risk profile, or to the disasters have occurred. We put out the possible scenarios, we work on (drills: which is hypothesis exercises), to face different types of risks as well as the unexpected risks. Hence, the plan was flexible enough to accommodate and confrontation the unexpected risks.

Q What are the successful key factors required by the Organization to mitigate the consequences of unexpected risks/disasters?

S1 - The quickness/speed at stopping the risk. You must stop the cause, means when you find the disaster you have to stop it. Causes of disaster, so when we looking for a disease cause in our region, we must restrict and siege then we start to recover it and start the process of healing. But the hemorrhage must be stopped, and must have instant responding at stopping causes. Knowing the causes of the problem. The case sometimes kingdom of Saudi Arabia does not have some of accurate diagnostic devices to depend on and this is glitch. So how do I create and be able to diagnose the disease quickly, and stopping it, then return to the process recovery and healing from the disaster.

S2 - If you already have a plan of the UR, the possible size of the risk, as well as financial support

S3 - The increasing number of student, because at any point they could rebel. Also, make a safety plans for factories. We don't want to be face with a problem that may change the direction we are going in therefore make preparation in case of an accident.

S4 - Beforehand Planning and having solutions laid out, for example, how many beds are available, amount and types of blood needed, there should not be a case of when an ambulance arrives to a hospital they say "oh it full" that panicking situation I do not want, the ambulance should now from the accident spot where to go. So it is, more effective coordination and increasing the availability of information.

S5- Of course it depends between a company to another. Yes in general it relies on having the

required preparation. For example, you are in an event of a fire, you must have, for example, our fire management only has employees! We couldn't carry out the clearing process correctly, when I first started working here in 2012 we correctly carried out the clearing at our main building on manfuha. Because we had a problem in safety points we placed them on foreign Street which weren't right.

S6- Presence of risk management organisations? Multi possibilities management. The existence of professional plans.

You will find some organizations that have plans ready. However, these plans in case of an accident or disaster and does not apply it becomes a problem, plans have to go through scenarios or real tests to know how to manage it better. Further, some plans are inflexible, it can be possible to use them now but in five years it may be unrealistic. Therefore, the existence of flexible plans that are well tested will eases the process in facing danger.

S7 - Founding a risk management and finding the right cadres for the job so that they will be available when needed and we won't need to bring outside expertise. Moreover, the availability of resources, the implementation of plans won't be successful if there is a lack of resources, it also could be lack of machinery, technology or human. Recovery plan is a part for crisis management, and when the crisis starts this plan guides to how to handle the situation. Engagement between all these evolved from the organisation in the process of recovery

S8 - The existence of a Legislation, laws and regulations. For example, lets use of Aramco's experience. Saudi Aramco safety is considered a red line, Legislation and regulations made employees committed. Furthermore, an employee at Aramco is affected by the number of traffic violations, once that he has a traffic violation it shows on his record causing an influence in him getting promotion, so in this case it links safety to commitment and this is the main criteria for all employees of Saudi Aramco.

When there is a system let take the Ministry of education as an example, if there is file for every teacher and each teachers file tied with department of traffic, the teacher let's say has six, seven, eight, ten, how is he suited for such a job if he can't respect traffic laws and know road ethics when himself has road irregularities, such issues, I think it's important. When you have

legislation, laws and regulations that applicable to everyone, I think it is what will give the Organization prestige and value as well as deportment.

S9 - First, there should be like I stated, a facility called risk management that is specialized on a high degree of specialization, there should be specialized human cadres in the process of analyzing risks, there must be financial and human potential to implement these plans, and there must be plans and strategies to encounter these plans, to apply through financial and human potential, and there must be coordination between all the organizations and civil bodies, and there should be an organization that is connected in one direction, that coordinates all efforts.

S10 - There are two parts of the cycle; First part is before the danger occurs, secondly, for the cycle to complete you have to be ready face danger, the plan should be ready, do not wait till last minute. The company I work in has an understanding of the concept business continuity management BMS, almost every four years they do an update, it is an old concept but they have recently worked on it. One of the risks we are carefully working on is Enterprise resource planning which is the system of SAB or the LORCA, large companies without these systems are a disaster, especially when we are talking globally, our organisation is a unit of business continuity management, If one day the program of BRB or SAB and LORAC shuts down how do we manage properly?, We worked on the concept of Business continuity management off course its available in the market and dependent on to give an accreditation, and we asked to be given any of the key processes existing, what were the most important three or four process, for example, we chose order to cash or plan to produce, and you have procure to pay, these are three important processes. Also, core process for SAP were to be disrupted the whole process will fail. Therefore, we order all different type of departments to make a manual steps that explain the processes and models so that if God forbid anything crashes we start working manually, we put a great effort from the beginning on the procedure and the manual instruction including the data base for customers or the communication protocol. Moreover, you need to know how to manage how to communicate with people how to use the telephone and fax all these things are included in the manual that is available in case of an emergency. In addition, we did not settle with the plan and asked how long will we survive without SAB, will it be normal stage, dangerous or a critical one, so we decided on dividing it, the first five days, the first day will be like this and the second like this and etc. This is a preventable action you did what is

called risks identifying and detected the process then placed a manual procedure on how to manage risk when it occurs.

S11- The organisation must deal with the danger in professional way not in traditional way, even with small and easy danger. The organisation must have solid infrastructure of communication and consultancy facilities for the early awareness by using the right tool and the technical possibilities as well as the human cadres that is qualified and well trained. From the previous plans, from the models of simulations or from the scenarios for each risk and conduct responsive and hypothesis with other organizations so it could be ready in facing any risks in present time or in future, with the availably of: tools, workforce, technical component, and technology, which if all the elements work fine together it could help the organisation as well as put the organisation in a stage of helping others.

S12 - Financial support is an artery and nerve for any management, especially after any disaster or any risk of an event a financial support is considered important. Another point that is also very important, is the coordination between the parties or organization in each specializing field, when there is a harmony on a state level in managing risks it will ease the recoveries.

S13 - The organisation should have risk profile in details, and knowing from it the type of risks and the level of threats to the organisation. There must be awareness of the risks; Hence, the organisation can be prepared for facing it. First thing, the plans should have put in to action and have mitigated the risks before occurring. The plans should have been tried and traced the risks when happening and it might have been into actions previously. For example, the flooding, taking off the sand walls in the farms that might change the direction of the running water, and these steps are proactive/beforehand and I have done it before it occurs. Hence, when the event occurring the accident will not be hard it will pass by ease.

Effectiveness of Risk Management strategies

- Robustness /Resilience

Q – What are the requirements for risk management to be effective in dealing with UR? Why?

S1 - We figure it on somethings, the right developments are where all aspects been evaluated, for example; adoption schemes, the necessity besides accommodations must be on your mind of avoiding all the risks. Sustainable development will rely on the correct awareness and education. Also, the third thing is the existence of the regulatory department, the system, and regulations; either encouragements or corporate governance for disasters. These things must be concluded so we could recover before the disaster take a place, we need 3 activities: Awareness, governance, regulations, and the machine.

S2 - In order for an organisation to be proactive is to higher the right specialists for the right job that have the knowledge and experience for the required field in management. The higher management should support Risk management, and there should also be a future plan to change the understanding or culture of the people, it will require time to see the benefits of the idea.

S3 - Planning to be proactive, with demanding equipment in order to reach what is planned for. Further, the leadership must be positive and the necessities to implement the plans available. I will give you an example, for me to implement the plan or to accomplish what I strive for the organisation, the leaders should and need to be understanding to the importance of the work to protect the organisation and its production, it will not succeed otherwise. Leaders should provide financial assurance, economics required for the plan, materials and facilities. Another example, if you want to do risk analysis for cars and you are trying to find the level of safety in the car, if you provide the training and operation requirements which are expenses, it will reach the highest of safety, here you are doing an optimization between the economical expenses to prevent risks and expenses of risk itself.

S4 - Having a strategy ready in managing the situation that is not tied to every other governmental department nor a department that is related to managing the accident. Moreover, communication is one of the most important tool that we need, training is also one of the tools that I need to raise the knowledge level, the general tools that I need to manage a department, with that I create a program to tie all governmental departments to their necessities and this will be clear by the constitution or the rules that I've placed to manage UR. the absence of not training for the action, and lack of the communication between government departments. Moreover, during the action everyone wants to be a hero, for example, during an accident Civil

Defence and public security counteractive, each department doesn't know what the other departments exactly do even though it's on paper what to do, sometimes, during an accident the leader does not have a clue on what to do, so he tries to solve it logically when it is already on paper what to do.

S5- Just like Aramco they call it hazard prevention management. Just like I told you the resource and corps are needed, at the same time comprehensive awareness process and a culture of complete organization need to be in place, and for every employee from the basic means of entry to the company to be fully aware in something called safety, safety first.

S6 - The most important is human potential. Well qualified employee and has sufficient experience to implement policies and procedures ready in case of danger. It needs risk management, qualified human cadres, capable in supervising risk management in a professional manner. Further, being able to identifying and characterizing the risks present in the organization as well as develop strategies to face danger.

S7 - Solutions of possible risks are made during the beginning of the creation of the organisation. We should not wait till the risk is near to plan, possible risks should be looked at precisely and find a solution to prevent them. Training on what was planned, it should be a mandatory requirement.

S8 - I of course think, first of all, is good planning. Secondly, it dose not prevent you from offering experiences and scenarios for managing an unexpected crisis. Thirdly, linking the current President with the first President of the Organization these are important issues. Fourthly, is working with transparency and clarity with the media on the basis of assuring the outside community in case of a disaster, God forbid. Yes, I am. For example, my department is connected directly to the Minister, in everything we deal with. We work as General Manager, mainly associated with the Minister, in a way the Ministers related departments, the first man.

There is a Kingdom-wide Central Commission for education, I lead this Committee, the Emergency Committee, as well as educational area, there is a Committee which is chaired by the Director of education, so here is where the coordinates of Subcommittee with the Central Committee to face any difficulty. Of course, this Committee also coordinates the subscription to

the Sub with the administrator in the region, meaning the Princes in their areas.

S9 - First of all, they should have a risk management within the organization. I talking about a risk management inside the organisation, they should have specialists on a high level of expertise in the field of to determine the type of risks, because of you have a risk management but the employers don't have the abilities to diagnosis or expect and sensing the risk, it's like you did not do anything, So mainly we have to have a specialised department, where having qualified people to do special studies on identify risks. The other thing, there should be a funding/support from your own organisation as well as the existence of other organisations within the work environment. The other thing, you must have the tools and techniques that requires to discover the danger you're looking for. The risk can be defined in many ways such as: financial, industrial, and natural disasters, you must have the special tools and technology of sensing threats/disasters before they occur. So, when you sense and discover the risks, then you take all necessary preparations to prevent the risks before they occur.

S10 - The first need is to have clear guide lines, a clear procedure available in place with a manual instruction for safety. The second thing is having code of ethics from the foundation because some employees may over step the boundaries. The third thing is to be in action on a continuous form in the auditing of procedures for random business samples and work on them so that you make sure what is written in the guide lines or written in the procedure are being followed. Furthermore, educating employees it is not problematic for me to quarterly do supervision or a subject regarding risk management, forgot to say that employees are afraid of speaking to the compliances office, if they witness what may cause risk they will think "oh no this may affect my college or its not of my business" and this is not right; all of this is under organization's culture. You need to break the obstacle, you need to break that fear amongst employees, led by example, its necessary that the leader becomes a role model in this matter. The second thing is Statistics, you have to show employees what has occurred and what has been dissolved, if the employees are not aware of these statistics regarding compliance and the risk management they will not care and keep staying as they say "under the table". As I said, the most important thing is communicating with employees, you cannot work isolated in your office, you need to reach people that way you will be risk assessing. After risk assessment appears plantation action, you have to get in with the people, gain their honesty. Further, you

need to know how to plant action is by making an assessment and editing on the action and deciding if it is a smart action, logical, can it be measurable and does it have a time frame? There needs to be a line for open action, this is what happens when you identify risk. Moreover, keep people updated in your organisation, introduce them to risk owner and action owner, it is required that risk owner is different from action owner; The risk is where there could be a group of owners, the advantage of having action owner is it makes it an official for risk action owner. In risk Management, you are the facilitator in managing risks, you ought to not understand their business, therefore when the risk owner qualifies your risk plan, that is good your research is done. So, you have made communication between people and engage employees. The second important point is to have the right tools specially in very large companies, this is very important.

Tools means solution, an IT solution for example when you do a report on 40 employees 23 companies and 10 Management is exhausting, when it is Manuel it may put a risk on the quality of the report. Also, the communication will not be good therefore it is necessary to have IT Solution which is reporting tool in a work flow and follow-up on each period, these researches and updates truly give value to risk management. Above all the commitment the management, if you come to my company and design on national board a committee regarding risk management to manage disasters as well as general manger level reporting, which is third level in the organization that has CEO or IFB executive vice president and general manger. Moreover, there is Executive Vice president and beneath it a total of Executives, so when you come and place me in the third year of the organization in the risk management here it indicates that the company gives great attention to the subject risks and risk management.

S11- The bureaucracy, administrative procedures, the financial support to the executive that proceed and face the danger, this is one of the barriers that we must manage the disasters and deal with it professionally not traditionally, traditional management should not be in the risk or disaster management, it must be professionally on managing the risks and deal with awareness systems. Also, you should have all the tools and equipment's to encounter the danger and you should have a solid foundation.

S12 - Most importantly locating the organizations weakness.

For example, if you find out where the imbalance or weakness in your organization, lets measure on risks you expected, or about other things you did not expect, if a department locates its weakness in that if the threat came unexpectedly you will be able to know what is the problem and prevent it from triggering any future risk. Hampered by the unexpected, you if you solved this problem you will encounter unexpected risks. Therefore, you should find and locate the problems that are easily influenced from disasters and on its shadow, make solutions that way it will raise the barriers in facing a disaster and not being able to recover. If you implement what I said and in addition these three points this will prepare you well:

- Risk assessment
- Achieved the readiness and preparedness
- Understanding the expected things that it may be.

S13 - In order to prevent the surrounding risks that might be expected of occurring, the level of awareness must increase/grow. the preparations and training and qualifying people for this disaster

Q What do you think the most important factors for establishing resilience and robustness of the Saudi organizations against unforeseen risks?

S1 - We build a solid structure, hiring expertise globally to build a new and strong device/agency, modern and strong legislation. Solid and compulsory legislation, and because it's a disaster never leniency the disaster. Also, evaluated the strategies after a period of time so it could be flexible at finding a solution.

S2 - To have a robustness there needs to be a ready system and specialist as employees in order to be ready to face any UR. If there is intensive training and improvement in the knowledge of people, it could be even added in school studies, as well as training programs to face floods and explosions, a well-studied plan, if all these were available the consequences of the risk will be less.

S3 - By creating an understanding foundation, supportive to the needs of the organisation. Get rid of bureaucracy, shorten the proceedings, becoming flexible with different type of people. Our concern in our university is the student and their comfort, so this is our one and only

concern when risk is the subject.

S4 - Doing the actual work, following the rules and law. Also, every employee and manger should understand the law of the country clearly this is what makes it flexible. For robustness, the Law system. The Hierarchy of the event, who is the leader and such. Hold accountable and provide a punishment for any one that did not act upon the rules

S5 - To have a supreme body for safety that returns to the country and is interested, that watch over all productions and all companies that must have of course regulation (actual) not coming from of Russia and have become known worldwide and has a censorship on all companies in Saudi Arabia. Must be a contagious plan, is required to have a plan in the event of trouble should have a plan of course depend for the same domain means, for example, if there was a problem to do with chemical oil storage, by having a contagious plan on the bases of taking control of the place and how you deal with it, for example in its national waters, for example, how to deal with the situation if someone but a toxic chemical in one of the filling cabinet, you must have a plan for every situation.

S6- In my opinion, having a professional management department is essential. The presence of a professional management that outlines responsibilities and provides qualifications exercised. Organization Management that is professionally managed, on its ray employees' responsibilities can be defined accurately. Also within the responsibilities of employees are risk management of daily operations process which is very important. Professional management, it is inventing plans than can be well tested and can make scenarios (Simulation) on these plans continuously and we should have many plans not only one, for example: plan (A, B, C) plan there is a problem in plan (A) we can use plan (B) or the other, we should be flexible, so that there is the continuity of work. We have examples which turned well on our level and at the level of different organization. Further, some organizations because of the good use of risk management it has adopted a certain topic they transferred it to another; therefore, they have flexible business continuity. There are many examples and we have been through it all (thankfully) due to the available resource, the great potential of our organization, also the huge land source and the huge potential in our courts has made us flexible that will not be affected. These plans have been passed on to a corporate level and a State level, and passed by many crises and many wars,

thus not affected significantly.

S7- In the industrial field it is diversity. The diversity of an organization protects it, if for example if one of our products was declined duo to any reason, we have another, therefore its flexible. There are organizations that only produce one product and when it fails to sell, it will result in bankruptcy for the company. The organization and the shareholder have an understanding of the possibility of risk occurrence. The sufficient of financial, human and media availability.

S8 - Talking about how to minimize the effects, I think as I said earlier, prediction, predicting for an upcoming disaster and preparing for it. Moreover, train and educate people on how to handle it and ways in confronting it will ease the effects. For example, we had a subject on cases of panics, students that have a panic attack, now we have to train our school three, four, five times on the evacuation plans, these cases of panic attack have deteriorated. Further, we deal mainly with schools, therefore it is not a dangerous place, it's not like a factory, yes it is a lot pf people in classes, there is no danger around them. Places that may put students at danger are for example, school laboratories, that may cause harm to student like chemicals or similar equipment's, having said that the laboratory teachers are fully equipped and ready on how to handle situations. What sometimes may surprise us is Climate changes, intensity of rainfall and winds that may break down something (God forbid). therefore, we always deal with the issue by suspensions of schools, all in hope of protecting people's souls, while it should be study time.

S9- In every organization, first there has to be a belief at the level of senior management, the strong belief that sensing and studying the risk will be feasible economically, but in the future, it will be profitable and it will pay back; So, the senior administration should have the belief and the certainty on the importance of the risk management. The other thing, risk management must be at high level of specialization on sensing danger before it happens, and they should have the scientific methods that's is familiar global environment, and the latest methods of sensing the risk, then you must put plans and strategies to address and face the threat whether it's: natural or industrial disasters. there should be monitoring devices and take advantage of all possibilities within the organization or in the other surrounding area, the organizations nearby should take advantage using all of the forces, and if the organization get dependent to itself it will fail, but if

the when depending on the group on the same domain it will be stronger and more solid.

There are two important points, the first point, there should be alternative plans, because you may come during the disaster with one plan and cannot penetrate or approaching the danger, so you have to have plans (a, b, c, and d), to deal with the disaster. The second point, you should have the flexibility of rules and regulations that the organization operate at, there should not be a specific rule of working and time of the duty. There should be a way back, therefore if the rules and regulations didn't. We must have the flexibility and fast respond on editing the internal regulations, and created and implementing laws and regulations, the organization can change the way it operates during the event and can reduce or mitigate the implications. In reality it could have organizations somewhat, but I expect that in developed countries, I mean third world countries do not exist in the way that developed countries or other States with its a scientific environment, purely industrial, understanding of the conditions, and they have risk studies as well as coordination, they have a special harmony which assists the pupil and the organization to become independently strong and powerful.

S10 - Create a culture, educate people. In addition, set up a guide line policy with a follow up implementation, you cannot place something practical and not accomplish it, led by example meaning the leader himself respectful risk management. There is an assessment called risk appetite which means tolerance for risks, we mention some things like ABDI Air before interest, Task, depreciation and differentiation is earnings before taxes and Zakat. Also, who much of profit do I need to achieve to keep the continuing of the organization? So, I ask for tolerance or differentiation in certain areas to a certain number (xyz), can this number be dealt with? If not, you have to make exit. Therefore, if the organisation is originally flexible it would not only have a single target, let's say that I have a factory and say" I have 50 employees without the 50 the factory cannot work" this is not right, it is necessary for the organisation to have flexibility, you should place 45 to 55 workers and my profit is 65 to 75 so you always calculate things so the basis of your organization become flexible there is a rating you work upon.

Now you have planned the system, and it does not work for your company, with respect for all companies, when you compare a company in which it has only 500 employees by a company of

40,000 and try to follow the same tools, the originality of the plan is shared. The System, and the clear politics in the management of some risks, what I mean about some risks is when for example I'm an employee in a small company and have to manage 10 to 16 people depending on the company, Moreover, there has to be a stakeholder, someone that is concerned with risks, to keep a follow up it could be a full-time job or a part time job. If there is the right management and someone that keeps an eye on risks this is what builds the system, there has to be sense of certainty among the board and shareholders as well as keep track of problems and hold people responsible for the way they deal with risks. If you provide a knowledge and the rules with the process and capabilities, you have this will create flexibility to the company on how to deal with risk management.

S11- The most important factor is the collaboration and concerted participation of all in the face of danger within the Organization and outside the organization. The legislation, there should be legislation organs of the organization they cooperate and help and contribute to each other, engaged each other in the event of risks, there should be regulation and legislation of departments within the organization between each other, this exists in Saudi Arabia put Civil Defense Council, the functions and responsibilities of patients for all sides before danger during danger and some danger is not required from every hand played. This question must be tested, when you give an organization functions before danger and risk the danger after twelve must test this organization, is committed to implementing its tasks and responsibilities entrusted to the fullest, and a dozen of danger or if danger is the Organization ready to address readiness has risk, it must be tested this hypothesis test tasks and responsibilities with scenarios and emulation disasters and training. To our problems, we have to be professionals in dealing with risk, and not be the reaction and action is established, the problem of the human race does not care how the danger if it fell, the danger is not seen as important but if there are tasks and responsibilities of patients should do a risk. To establish procedures and preventive work, could be eligible cost his institution or organization there are currently aolo'iat his Crown of preventive programs or projects to reduce risk, putting it off because maybe didn't Intuit threat if it fell, but when danger senses the size of preventive actions will supposedly work this may be one reason, so we always expect danger while we must react on the preventive aspect/protective side and Seine is very weak; Comes from the vacuum must have awareness of notice to individuals at risk if size could

Bethe impact and losses in life and property, to be sensitized and educated, you must view the scenario when the level of threat is how this will activate the side protective and preventive walthoti for risk prevention and risk management in organizations supporting them and doing those departments, doing training and by material and moral support and technical and administrative, and research studies and work projects that reduce business risk when it happened.

As always when there is a solid foundation, and I mean not only infrastructure/projects but everything; it includes the infrastructure, humans, equipment, tools, connection devices, training, rehabilitation, gaining and transferring expertise; all these should come under the infrastructure of the organisation, and when you have the strong infrastructure and solid foundation so you could rely on the human cadres and the technical possibilities of the expertise when experiencing what other countries have done and bringing it into the country when the risk/danger occur it will pass with the minimalist wastes.

S12 - Confessing to the damages inside the organization, recognize the existence of the flaws is internal power, on its ray you could adapt flexibility. Let's not forget the first square which is the awareness and training I think these are main factors. Factors to create flexibility is undoubtedly finance support. And support reinterpretations people to the level one, not to scratch. Solidarity is very important, also the influence, there can't be one where he says I am the best in a way to show off, sharing can influence another.

S13 - The existence of the awareness of decision makers about this topic. The existence of the enough qualifies and training within the organisation. The existence of the preventive preparations on confrontation risks. The existence of effective and realistic plans, not virtual, the plans that been built up by previous lessons. These will make the organisation more solid at facing any event.

The existence of alternative or operational plans when the problem/disaster occurs, when having alternative operational plans when the risk happen it will ensure the continuous of the organisation.

Q - What do you think the most important factors that can hinder Saudi organizations from

creating risk management for URs?

S1 - The first thing is the expertise; the expertise is not available and if there is they would be a minority. The shortage of having the expertise that specialized in the field of disasters, and the second thing is the weakness of the administrator in understanding the disasters, with the clarity administrators didn't give the field of disasters its value and the supreme importance behind it in the series of the strategies and thought within the creation of the organizations. Now within the intention of creating any of government agency, should have its own risk management department, the meaning of the risk is not only on fir or any of that, risks are not fulfilling your duty unless you have a consideration of the unexpected risks.

S2 - Firstly, the culture and understanding of the importance of risk management from the Higher management. Secondly, financial support, because some directors may only look at the main ideas that are already supported and continue it while rejecting any newer ideas.

S3 - In the kingdom of Saudi Arabia some people considered doing risk management organizations that is separated from safety management, also some managements tried to do a safety management that is separate from security management. The security managements relationship with safety is linked to the safety risks to reach welfare, because if unforeseen risks are observed they could inaugurate plans for these risks. Risk management has now become really important for building plans and strategies for safety, because there will not be plans for safety without meeting or having knowledge on risks.

S4 - The understanding and culture that is available in foreign countries. Regarding safety or risk assessment it requires cost, some organisation say "well I may face a risk or may not, therefore I don't need to pay money on something that is not certain", in foreign countries they invest in risk management no matter how minimal the possibility may be. Risk management is very important it may be the start or break point for an organisation it may lose so much if there isn't risk management. There are risk management and risk evaluation department I am not denying that however those departments are not given as much importance as there should be.

S5 - What hinders Saudi organizations is mentality and considering health and safety as a source of wasting money. Yes, the process of spending, for example the company spends 10% on

safety, some people may prefer having the 10% rather than spending it on safety. There must be a full awareness process imposed for this kind of mentality. Recruiting qualified people whose specialized from abroad will be helpful.

S6 - In my perspective the most important factors are;

3. Its the philosophy of Senior management, their culture and faith. In general, senior management, either at a regular level, limited people, management committee or the culture of the senior management is important in the belief of the existence of risk management. This is an important point which many examples.

4. The second constraint is state central authorities, if linking organizations set up in the existence of risk management, it becomes mandatory.

Yes, an organization by the state that should be centralized, to provide permits and require within their requirements quality, we lack of such thing. Some might say I don't have the knowledge and not required to do it let along pay for it, especially since the human resources in risk management cost high to maintain. Further, when you hire someone that has experience, knowledge in the field and qualified for the job he/she will not settle for a salary that's normal or a customary level among the Saudis. These are for me, the most important obstacles.

- When governance in some companies are required, for example: Some companies now are signed with insurance companies, So the insurance companies require the organization to apply the safety requirements in a particular sector, therefore there will be a commitment from the organization to implement safety requirements.

- Accountability process is very important in my view for the owners or top management decision-makers or officials.

S7- There are two elements to hinder the management of RM; First, the lack of awareness from the organisation towards risk management, the company has to be aware of the possibility of the occurrence of accidents such as financial, economic, industrial crisis at any time, even how the market feels about your products therefore prepare for it. Second, the shortened of cadres, when you do not employ the right person for the job it becomes very difficult to manage the

organisation properly, so you will have to bring outside guidance and this becomes a difficulty the organisation will face.

S8 - Sometimes administrative bureaucracy dose not response to change rapidly, in the sense that you are now in this Ministry and it wants to be flexible, but this for example is linked to civil service, however civil service does not have the convictions to change. Sometimes this regulation issued on all these government agencies and does not keep an account of the nature of the functions. These functions may vary from one department to another. Therefore, each department should be viewed as an independent. Moreover, sometimes a plan may require financial support and in this case, it will be disabled by the Finance Ministry.

S9 - A number of factors, but the first and main factor, the senior administration is not serious and does not have the responsibility of the organisation; the lack of interest on the importance of risk as well as lack of awareness. Because if they didn't recognise, or care about, or sense that risk management is essential, it will not support and will not request of creating the department (risk management) within the organisation. The other thing, would be the environment as a general, Saudi organisation is not as the organisations in the West or America; meaning scientific environment, an environment that helps you share information and find specialists in educational environment, that are in your environment to help you in the process of creating and developing risk management, with clarity you can operate properly.

S10 - Lack of awareness. Cost, people that operate in the risk management department are not any kind of people, particular in the beginning, it is necessary to hire qualified people, and those that have the know how in risk management. To are more aware of the difficulty of this subject, it is an advance subject that it is not even available in university bachelorette nor Masters. Therefore, it is not problematic to impose someone to introduce this subject or type of culture and create the system from scratch. The cost to creating risk management is expensive thus it is very implacable. There is no future vision amongst people, I mean most companies aim on what they say “quick one” not a sustainable business. A one should have a sustainable business with an aim of the next 20-40 years. If that emption is not available, then there is no aim. Resources

S11 - I don’t think there is barriers that hinder Saudi Arabia, certainly the Kingdom of Saudi Arabia is proactive in risk management, and the decision was made on the creating of the

Committee of Civil Defence before 40 years, exactly on 1387, we are now in 1437 proximately 40 years, and after that the system of Civil Defence have been created in 1406, and the system of the work of the committee and the general council in the committee, as well as the general municipality for the committee, and gave every organisation within Saudi Arabia tasks and responsibilities..

The Kingdom one of the oldest countries that have sensed the knowledge of risk management and disaster management, but there must be tasks or responsibilities within the governmental organisations to activate. There should be tasks and responsibilities that must be done and examined by the head department, it testes the system of the preparation of government agencies and the organisations that excites under the shadow of the committee of civil defence, and try to examine the preparation for the unexpected risks.

S12- Constraints, the first thing you may be neglecting, it could be neglecting to anticipate a problem or a future event or lack of interest, negligence occurs not only when you just don't care It may also when not expected. It might be that it wasn't part of the plan or have no clue to be discussed in the first place. let me give you an example, like now we had the disaster of flooding in the country. Saudi Arabia is dry country and you would not assume particular "flood" will happen in Jeddah unexpectedly, and when there is a lack of interest to the disaster in Jeddah and this is the main reason of the cause of this tragedy, because of the lack of interest from people that were responsible and those that were in charge of it. Yes, the topic to its procedures in legal rights. Also, the lack of awareness this is very important, lack of financial support, also the level of promotions, if we took the opposite it can be the factors the hinder the procedures.

S13 - Maybe the disasters/risks do not occur frequently, or opinion leaders in these organisations to a kind of dependence, because there are no recurrent disasters. Hence, there shouldn't create or specialise manpower or entity or administrative unit within these organisations because they want to reduce the financial expenditure of their organisation. In addition, the awareness level never reached the officials in these organisations, to develop or take interest in the topic of **risk.** Even in such a simple matter such as **safety**, the organisations tend to avoid spending on safety and not making sure of how well it within the organisation.

APPENDIX C: Interview and Focus Group Guide and Questions

Table 1: Semi-structured interview questions

Date:	Started: Ended:	Location:
Demographics	Name:	
	Position:	
	Type of organization:	
	Industry: Education	
	Name of organization:	
	Years of experience	
	Contact:	
	e-mail:	
	Permission for recording:	

1) Has your organisation experienced URs before? If yes, please, give an example?

2) Has your organisation considered URs before and done anything about them? If yes, what strategies or approach did your organisation use for dealing with URs? If not, why?

3) What do you think are the most important factors that can hinder organisations in SA from establishing risk management for the URs?
   1) Why is UR department not available in most organisations?

4) From your perspective, what the organization needs to face the unexpected danger efficiently? How?
   1) How?

5) You said a moment ago what organisations need to manage an UR, so, can you tell me please, does your organisation have the ability to manage the UR? If yes, how? If not, why?
   2) How?

6) What do you think are the main issues or factors that can hinder organisations in SA from managing UR?

7) What does risk management need/require to be proactive against an UR? Why?
   3) What do you mean about a positive relationship?

8) What does an organisation need to be preventive against an UR?

9) What do you think are the most important factors to cope with unexpected risks in your organization?

10) What are the key success factors required by the organization to reduce the consequences of UR?

11) What do you think are the most important factors in establishing robustness in organisations?

12) What do you think are the most important factors in establishing Resilience in organisations?

13) Is there anything you would like to add that was not addressed?