Factors Affecting Implementation of Enterprise Risk Management (ERM): An Exploratory Study Among Saudi Organizations

By

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ABSTRACT

Enterprise risk management (ERM) has received significant attention in recent years in order to establish a comprehensive approach for managing different types of events (risks and opportunities) relevant to organizations' strategic objectives. Although the number of ERM implementations among Saudi organizations has grown significantly, there is a lack of knowledge of key factors to be considered when implementing ERM. Therefore, the purpose of this study is to empirically determine the factors affecting ERM implementation based on how the 44 ERM dimensions, derived from the Committee of Sponsoring Organizations ERM Integrated Framework, were actually implemented in a sample of Saudi organizations.

The exploratory factor analysis method is used to analyze a sample of 103 responses received through an online survey questionnaire. The results of the exploratory analysis support the retention of three factors that require specific considerations when implementing ERM, namely, (1) the ERM structure and standards, (2) the enterprise's portfolio of risks and opportunities and (3) risk oversight and corporate governance.

This study differs from previous research because it is the first to explore ERM implementation among Saudi organizations and because its findings provide a foundational understanding of the key factors affecting ERM implementation. This study also suggests an ERM implementation framework that addresses identified factors and guides organizations on how to enhance ERM implementation. Reflecting this suggested framework in practice helped the researcher's organization to identify gaps in its ERM program and develop actions to improve ERM implementation. The actionable knowledge generated focuses more on developing integrated ERM and strategic planning processes to have a better view of the enterprise's key risks and opportunities relevant to the strategic objectives and defining responsibilities of the leadership team to establish clear accountability for risk oversight.

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Lastly, I would like to extend my gratitude to all organizations and employees who participated in completing the research survey for this study and to those who helped to review and organize the survey.

DECLARATION

I, Yousef Aleisa, hereby declare that the contents included in this Doctor of Business Administration (DBA) thesis are entirely my own work, have been developed specifically for this research, and have not been previously submitted for any other qualification.

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CHAPTER ONE
INTRODUCTION

1.1 Motivations

The global financial crisis of 2008, the corporate collapses and the highly publicized accounting scandals were main drivers for abandoning traditional risk management (silo approach) and implementing an enterprise risk management (ERM) approach that is more integrated and comprehensive for managing different types of events (risks and opportunities). There is a clear demand from shareholders and regulators to implement enhanced ERM practices in order to capture the maximum value for organizations (Mikes and Kaplan, 2014). The New York Stock Exchange (NYSE) rules released in 2004 incorporated new corporate governance requirements that mandate audit committees of listed companies to be more involved in risk oversight, including risks beyond financial reporting (NYSE, 2004). The U.S. Securities and Exchange Commission (SEC) released in 2009 also incorporated new requirements mandating risk oversight by company's board of directors. These requirements represent an increased pressure on companies to enhance risk oversight and improve risk management processes to holistically manage risks.

Similar to regulatory requirements issued worldwide, the Capital Market Authority (CMA) in Saudi Arabia released in 2006 Corporate Governance Regulations (CGR) to establish rules and standards that govern the management of joint stock companies listed on TADAWUL, the Saudi stock exchange market. The purpose of these regulations is to ensure compliance with governance requirements that would ultimately protect shareholders' rights as well as the rights of stakeholders. More specifically, these regulations also set the requirements related to risk management for Saudi publicly listed companies. According to CGR, the boards of directors of Saudi listed companies are seen to hold the primary responsibility for establishing, reviewing and updating policies and work plans related to

risk management. In addition, among the main functions of boards of directors is setting rules for the internal control system, in order to ensure that there are adequate and effective control procedures for risk management to forecast the potential risks facing a company and disclose these risks with transparency (CMA, 2006).

In addition to regulatory mandates issued to improve risk management practices, several risk management frameworks emerged to guide organizations on how to implement ERM, such as the Committee of Sponsoring Organizations (COSO) ERM integrated framework and the International Organization for Standardization (ISO) risk management principles and guidelines. These frameworks and others provide guidelines and specific component structures for implementing ERM. However, some organizations attempt to use one or several frameworks to guide their implementation of ERM, whereas others attempt to develop their own framework. Differences in ERM implementation precipitated many researchers to investigate and explore ERM in several industries and sometimes in specific countries to understand how organizations attempt to implement ERM.

As explained earlier, it is evident that there is an increased demand for establishing and maintaining a robust ERM system. This thesis is motivated by the belief that understanding the key factors affecting ERM implementation is essential in order to design and implement ERM in an organization. Currently, we have little understanding of what affects ERM implementation, which leads to difficulty in focusing on key areas that require specific attention and improvement. Additionally, no prior study has yet been conducted investigating ERM implementation in Saudi organizations. Therefore, it was very motivating to conduct a study that contributes to the emerging research on ERM and the risk management literature.

1.2 Introduction to ERM

Risk management is a known profession in a number of areas, including finance, insurance, clinical work, project management, safety, health and the environment, and it can be viewed from different technical disciplines. Traditionally, organizations tend to manage different types of risks individually using the silo-based approach. For example, risks related to insurance, credit, foreign exchange, commodities and operations are managed individually by their relevant functions in an organization. However, traditional risk management, which is recognized as a silo-based approach, appears to be lacking in terms of total integration and has proven to be inadequate for managing risks effectively across an organization (Lam, 2000; Davenport and Bradley, 2001). As a result of these shortcomings, the holistic approach known as ERM has emerged as a strategic management tool to improve risk management practices at the corporate level and to help organizations manage different events (risks and opportunities) on an enterprise-wide basis. Rochette (2009) asserts that the main goal of ERM is to complement organizational strategic management processes by allowing organizations to have a consolidated and forward-looking view of risks and opportunities related to their strategic objectives.

The ERM concept has broadened the definition of risk management to embrace all types of risks that can potentially impact an organization's achievement of its strategic objectives in order to collectively manage the impacts of these risks (Beasley, Branson and Hancock, 2009). However, instead of attempting to focus on managing the negative consequences of a risk event, ERM helps organizations to view risk positively. It also increases the ability of senior management and the board of directors to oversee key risks and opportunities at the corporate level (Beasley, Clune and Hermanson, 2005). The understanding of the ERM concept and its applications in practice has been evolving due to the increasing variety, number, and interactions of different risks facing organizations.

Yeoh (2009) indicates that the 2008 financial crisis is the greatest global economic crisis after the Great Depression of 1929-1933, which was caused by several factors, such as the incorrect pricing of risk, poor governance practices and over-leveraging. As a result, international regulatory agencies, such as the NYSE and SEC, required specific improvements in risk management programs to avoid a similar crisis. ERM helps to complement existing traditional risk management processes by creating a holistic view of the internal, external and emerging risks affecting the achievement of strategic objectives in order to consolidate all similar exposures throughout the organization and manage them collectively. ERM is also intended to improve governance and accountability for managing the negative impacts of identified risks and exploiting the strategic opportunities from these risks. Most people are risk averse and therefore, attempt to focus on the negative aspects of a risk event and forget the positive aspects, which can be exploited by having a well-established risk management program. Incurring losses due to a risk event is not bad if these potential losses were properly anticipated and actions were put in place to manage consequences of these potential losses (Rochette, 2009).

Despite significant efforts in several organizations to develop an ERM framework and related processes in order to identify and manage different types of events (risks and opportunities), management systems do fail when an economic downturn takes place. Kaplan (2009) relates such failures to the lack of an effective approach to account for risks when formulating business strategies. He further indicates that management focuses more on strategies with the objectives of shareholder value creation and revenue growth. However, few managers explicitly incorporate risks in their activities, especially when formulating strategies. He further asserts that a risk management program must be incorporated and embedded into the routine activities of management and senior executives. Kirkpatrick (2009) indicates that organizations face difficulty in identifying specific deficiencies in

implementing risk management activities and that the lack of effective integration and communication of risk management activities has been identified as the key issue in implementing risk management programs. Additionally, Beasley, Clune and Hermanson (2005) assert that as the size of an organization increases, the scope of the risks it faces is likely to increase, taking into consideration nature, timing and the extent of different types of events threatening the organization.

1.3 Statement of the Problem and Research Question

The researcher's inspiration for this study developed while he was working as a Senior ERM Specialist in a global Saudi petrochemical company. The ERM function was established in 2009 with the objective to develop and implement a comprehensive ERM program. Despite continuous efforts to implement ERM, the practice-based problem facing the researcher's organization is the lack of knowledge about the key factors to be considered in implementing ERM. Therefore, the research question for this study is as follows. What factors do organizations need to consider when implementing ERM?

The need for this research is not only a personal matter to the researcher. In fact, the practice-based problem and research question prompted the researcher to conduct an exploratory study to understand the factors that affect ERM implementation among Saudi organizations and to develop actionable knowledge that reflects his learnings and research outcomes in practice in order to improve ERM implementation in his organization.

1.4 Research Aim and Objectives

The overall aim of this study is to inform the researcher's organization on how to improve its ERM implementation. The key objectives of this research in order to achieve the aim of the study are:

- To identify the specific dimensions needed to explore ERM implementation in Saudi organizations.
- To explore the factors that affect ERM implementation.
- To suggest a framework that addresses the identified factors and guides the researcher's organization on how to improve its ERM implementation.

1.5 Research Methods Overview

This study uses quantitative methods, mainly surveys and exploratory factor analysis, to achieve its aim and objectives. The ERM dimensions used to develop the survey instrument and conduct quantitative analysis were built on the work of Lundqvist (2014). The original dimensions used in her study were modified and improved to focus on only 44 dimensions covering five main areas. Two of these areas, namely, the internal environment of an organization and control activities, were used to explore areas that are prerequisite for ERM implementation. The other three areas, namely, specific risk management activities, the organizational structure of risk management and specific types of events, were used to explore the actual implementation of the core areas related to ERM. A Likert scale that consists of four ratings is used to explore the implementation level of each dimension. The researcher developed a conceptual model to guide the study, in which the actual implementation of the 44 ERM dimensions among Saudi organizations will be explored in order to identify key factors affecting ERM implementation (see Figure 1.1).

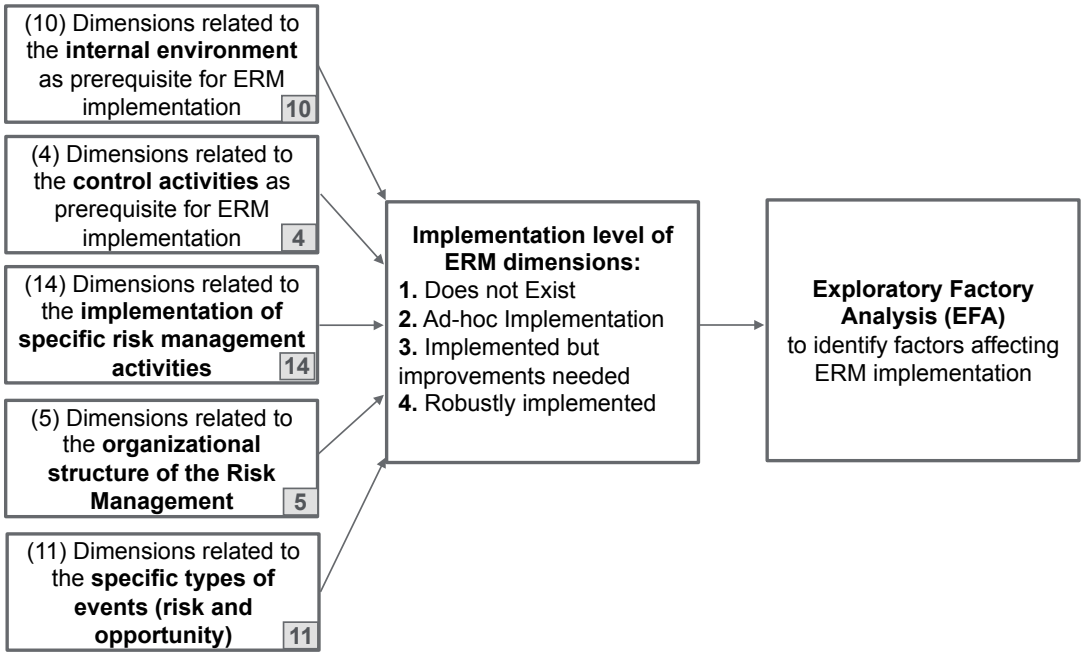

Figure 1.1: RESEARCH CONCEPTUAL MODEL

The researcher's decision and rationale for selecting quantitative inquiry is based on the nature of the research problem, the research methods used in prior research studies, the accessibility of required data, and his skills and capabilities to collect and analyze data. In addition, this is the first study that explores ERM implementation in Saudi organizations where exploratory methods were more relevant than other methods. These methods can also help to achieve the objectives of this research and produce locally relevant and actionable knowledge to improve ERM implementation.

This study uses only primary data collected through survey questionnaires from a sample of executives and professionals working in the fields of risk management, finance and internal auditing in Saudi organizations. An online survey tool was used to collect responses from participants to explore the implementation levels of the 44 ERM dimensions used in the study. LinkedIn was the primary method used to distribute the research questionnaire to participants. Survey questionnaires were also emailed to a sample of participants from the Institute of Internal Audit, Saudi Chapter.

Exploratory factor analysis (EFA), which is available in the Statistical Package for Social Sciences (IBM SPSS 23), was used to determine the number of factors affecting ERM implementation. The main reasons for using EFA are the uncertainty in the literature around the number of factors affecting ERM implementation among Saudi organizations and the high correlation among the research variables used in this study. Prior to conducting EFA, the data were inspected to review and analyze missing data, identify multicollinearity, and test the adequacy of the sample size for conducting the analysis. After that, three test runs were conducted to explore different factor structure models in order to identify the optimal number of factors to extract that are relevant, interpretable and represent a good fit for the data. Of the different factor extraction techniques available in SPSS, the maximum likelihood (ML) technique with promax rotation was used. Additionally, three strategies, namely, Kaiser's criterion of eigenvalues greater than one, a scree plot test and parallel analysis were used to confirm the number of factors to extract in each test run.

1.6 Main Research Findings

This is the first empirical study undertaken for Saudi organizations to investigate ERM implementation. The results of this study contribute to the emerging ERM and risk management literature by providing a foundational understanding of the key factors affecting ERM implementation. The major findings from this study are as follows. Three factors affect ERM implementation among Saudi organizations, namely, (1) the ERM structure and standards, (2) the enterprise's portfolio of risks and opportunities, and (3) risk oversight and corporate governance, which in turn are operationalized by 37 ERM dimensions.

1.7 Limitations of this Study

The researcher acknowledges the following limitations concerning the study, which impact his ability to draw accurate conclusions, leading to limitations achieving generalized knowledge:

1) The assessment of the level of implementation of the 44 ERM dimensions distributed to participants through the online survey instrument was self-reported by each participant. Therefore, the researcher acknowledges the possibility that participants may respond to the survey questionnaire in a manner that does not accurately represent the actual level of implementation of each dimension in their organizations.

2) The EFA method used for the data analysis was criticized in the literature for being subjective and somewhat based on the researcher's decision in terms of the selection of factor extraction and rotation methods. This issue might also have an impact on the final factor structure model.

1.8 Thesis Structure

This thesis contains five chapters and is structured as follows. The next chapter offers an overview of ERM frameworks, theoretical foundations, and prior empirical studies. Chapter Three contains the research design and methodology. Data analysis, research findings and discussions are presented in Chapter Four. Chapter Five provides suggestions on how to improve ERM implementation and presents reflections to practice. It also summarizes the actionable knowledge generated from this study and suggested areas for future research.

1.9 Conclusions

This chapter starts with the key motivations for the study and provides an introduction to ERM concepts and principles. It also states the practice-based problem and research questions investigated in this study. An overview of the research methods employed, research findings, and limitations is also presented.

CHAPTER TWO

LITERATURE REVIEW

The focus of the literature review is ERM with the objective of providing an overview of the main frameworks available for ERM implementation and discussing the existing empirical evidence on ERM's ability to create value and the determinants of adoption. The literature review focuses mainly on existing methods researchers have attempted to use to identify ERM implementers and explore levels of implementation. A review of previous research studies on ERM dimensions is also presented to demonstrate how research approaches evolve to improve existing flaws and inconsistencies in exploring levels of ERM implementation.

2.1 Definition of Key Terms

The Oxford English Dictionary defines the term "risk" as "the possibility of loss, injury, or other adverse or unwelcome circumstance." This definition reflects the traditional meaning of risk used by traditional risk management, which considers only the negative outcomes of a risk event. The COSO framework also defines events with negative impacts as risks, which can prevent value creation or erode existing value. The definition of the term "risk" has evolved so that several contemporary risk management texts and international standards include the positive and negative attributes of an outcome in the definition of risk. For example, the ISO risk management principles and guidelines (2009:1) define "risk" as the "effect of uncertainty on objectives," where an effect can be a positive or negative deviation from the expected. The ISO risk management principles and guidelines are recognized in the literature as the standard that incorporates best practices from leading international risk management standards, such as COSO, Project Management Institute, the Australian and New Zealand standard. Moreover, Hampton (2009) indicates that risk is commonly represented using two dimensions: frequency and severity. Frequency is the

likelihood of loss, damage or a missed opportunity, and severity is the intensity or magnitude of loss or damage.

Dickinson (2001:361) defines enterprise risk as "the extent to which the outcomes from the corporate strategy of a company may differ from those specified in its corporate objectives." The researcher further asserts that the corporate strategy put in place to achieve strategic objectives always embodies a risk profile from a range of external and internal factors that might have a significant impact on the resources, activities, and processes selected to implement corporate strategy. External factors are related to changes in the external environment, like economical, political, legal and technological conditions that are beyond management control, whereas internal factors arise from within the company and are mostly operational.

Hampton (2009:6) defines enterprise risk as "the likelihood that actual results will not match expected results." He asserts that enterprise risk is the aggregate risk from three key elements, namely, business risk, financial risk and hazard risk. The business risk is related to the possibility that the organization will not operate and compete successfully, whereas the financial risk component is related to the possibility that the organization will not meet financial obligations. However, the hazard risk component is defined as loss exposures without the possibility of gain (e.g., physical damage to assets, injuries to employees or lawsuits). These risks are known as insurable exposures with no upside. In fact, there are several factors that have an impact in defining enterprise risk such as nature of the entity, political factors and economic factors. Therefore, a common feature in the above definitions of enterprise risks is that such risk is aggregated from various risk categories that increase the uncertainty of achieving strategic objectives (Dickinson, 2001; Hampton, 2009).

Smallman (1996:14) is one of the first researchers to introduce the concept of holistic risk management, defining it as "a systematic, statistically based, and holistic process that builds a formal risk assessment and management, and addresses the set four sources of failure within a hierarchical multi-objective framework: (1) hardware failure, (2) software failure, (3) organizational failure (4) human failure." In addition, the author posits that a sound risk management approach should include three aspects, namely, continuous risk analysis, different techniques for risk analysis (e.g., quantitative and qualitative) and a supportive risk culture to monitor risks and learn from past errors.

The concept of holistic risk management evolves over time, and instead of focusing on the specific types of failures illustrated in Smallman's definition, other researchers, like Meulbroek (2002), attempt to provide a broader definition of the concept. Meulbroek (2002:2) introduces the concept of integrated risk management and defines it as "the identification and assessment of the collective risks that affect firm value, and the implementation of a firm-wide strategy to manage those risks." Using integrated tools and techniques across an organization is the key to aggregating all types of risks in order to mitigate their impacts and communicate them to relevant levels across the organization. Meulbroek (2002) refers to integration as a combination of (1) modifying the organization's operations, (2) adjusting its capital structure and (3) employing specific financial instruments. Meulbroek asserts that integrated risk management helps organizations to shape their risk profiles in order to make informed decisions in shedding some risks while retaining others.

In addition to the initial attempts to define the concept of a holistic and integrated risk management approach, the COSO framework provides a comprehensive definition of ERM. The framework defines ERM as "a process, effected by an entity's Board of Directors, management and other personnel, applied in strategy setting and across the enterprise,

designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives" (COSO, 2004:4). This definition adopts the holistic view of enterprise risks in order to integrate risks for the whole organization by considering people, processes, and systems.

In general, the ERM concept helps to integrate key strands of traditional risk management practices. These practices are used to focus on managing operational/hazard risks through insurance, whereas financial risks are managed through financial derivatives, such as futures, options and swaps. According to Meulbroek (2002), financial derivatives used to magnify rather than reduce risks represent only a small part of the holistic risk management approach. Thus, the ERM concept helps organizations to consider a broader approach to the management of insurable and financial risks in order to make informed decisions on how much of the risks should be retained and how much should be financed or offset by external arrangements (Dickinson, 2001). In the literature, ERM is synonymous with enterprise-wide risk management, strategic risk management, integrated risk management and holistic risk management (Meulbroek, 2002; Liebenberg and Hoyt, 2003; Kleffner et al., 2003; and Hoyt and Liebenberg, 2011). For consistency, the term "ERM" is used throughout this document.

2.2 ERM Frameworks

With the increased attention on ERM starting from the early 2000s, there have been great efforts to encourage organizations to adopt and implement ERM. Therefore, several frameworks have emerged in order to guide organizations to implement the concept of ERM such as COSO ERM integrated framework, ISO risk management principles and guidelines, Basel II, the joint Australia/New Zealand 4360-2004 standards and the Turnbull Guidance. These frameworks are conceptually similar, but they have different structural representations

and components that vary in number and definition (Lundqvist, 2014). However, many researchers assert that the COSO framework is the most cited and debated framework (Beasley, Branson and Hancock, 2010). This framework focuses on the role of the board of directors, management, and other personnel to effectively execute the ERM activities. It promotes the concept of interaction and the total influence of the four key risk categories, namely, strategic, reporting, operation, and compliance on the whole organization. The framework consists of the following eight interrelated components of ERM.

1) ***Internal environment*** represents the tone at the top of an organization including the risk management philosophy and risk appetite. It also encompasses the governance, structure and culture of the organization's risk management.
2) ***Objective setting*** highlights the importance of having specific organizational strategic objectives. ERM provides the processes that support management in setting objectives that are aligned with the organization's vision and increasing the probability of achieving them.
3) ***Event identification*** focuses on identifying significant events (i.e., negative and positive events) relevant to internal and external factors that affect the likelihood of achieving the organizational strategic objectives.
4) ***Risk assessment*** involves risk analysis to understand the likelihood and impact of the identified events.
5) ***Risk response*** covers risk management strategies and actions, which include sharing, avoiding, accepting and reducing risks, to remain within the organization's risk appetite and tolerance.
6) ***Control activities*** include policies and procedures that help management implement risk responses.

7) ***Information and communication*** provide assurance that risk information is identified and communicated within a defined time frame.

8) ***Monitoring*** is relevant to the ongoing management to ensure that the entire ERM is effective.

These eight components represent what is needed for an organization to achieve its strategic objectives. A study by Lundqvist (2014) of 151 firms in the Nordic countries reveals that 24% of the surveyed firms confirm that they are implementing the COSO framework solely or in combination with other frameworks. However, Beasley, Branson and Hancock (2010) argue that the nature of the COSO framework is ambiguous and overly theoretical and that frequent changes in the business environment make the actual steps to align risk management with the organizational objectives a challenging task to achieve.

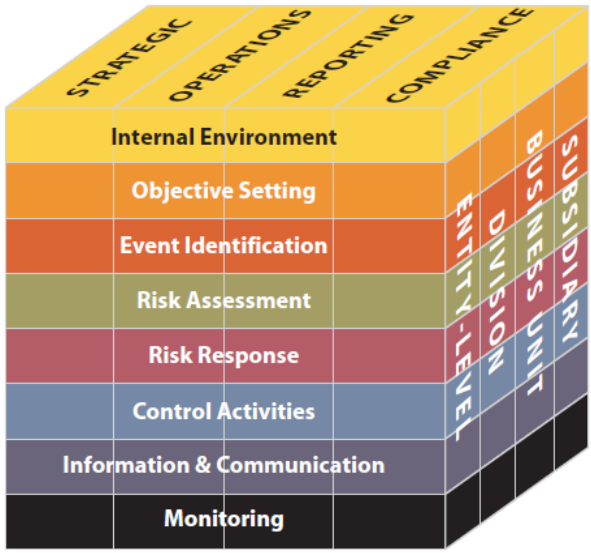

Figure 2.1: COSO ERM integrated framework cube

The COSO framework also coincides with the implementation of the Sarbanes-Oxley Act of 2002 (SOX), which focuses on financial reporting requirements. Section 404 of the SOX Act requires a top-down risk assessment in order to provide assurance on the identification of material risks to financial reporting (McShane, Nair and Rustambekov,

2011). In addition, the Basel Committee on Banking Supervision published the Basel II regulatory requirements in 2004. These requirements focus more on capital adequacy determinations and the related credit and market risks for financial institutions in order to align regulatory capital with the risks that banks face and increase leadership oversight of the operational risks facing financial institutions.

In 2009, the International Organization for Standardization issued ISO risk management principles and guidelines to define principles, a framework, and a process for managing risks. Frigo and Anderson (2011) indicate that the ISO framework provides comprehensive risk management guidelines that can be applied to organizations from different industries. In addition, the COSO has issued, in the same year, a thought paper titled "Strengthening ERM for Strategic Advantage" with the objective of reinforcing the strategic approach of the ERM process. This paper provides more emphasise on the benefits of ERM and its significant contribution to delivering an organization's strategic goals. It basically recommends four practices regarding the interaction between management and the board of directors in order to establish risk management processes that are robust and have the capability to provide timely information related to risks emerging across the organization. It also recommends establishing key risk indicators to identify emerging risks that have a potential impact on achieving strategic objectives (COSO, 2009).

Although there are several ERM frameworks with their own specific component structures and implementation processes, organizations tend to create their own internal frameworks guided by one or several of the international standards to implement the concept of ERM. According to a survey conducted for 151 firms in the Nordic countries (Sweden, Norway, Finland, and Denmark), 41% of the sample firms are using internally developed frameworks solely or in combination with other frameworks instead of using a specific framework. Mikes and Kaplan (2014) argue that the current guidance and tools on how to

implement a company-wide risk management framework and processes are immature and still emerging.

2.3 Theoretical Foundation and Prior Empirical Research Studies on ERM

In general, the literature on ERM comprises of two main research streams. The first explores the determinants of ERM adoption, and the second stream investigates the ability of ERM to create value. However, a literature review reveals that no prior studies have investigated the determinants of ERM adoption or its ability to create value for Saudi organizations. Only two research studies in the literature explore ERM practices in Middle Eastern countries. Therefore, it is very interesting and motivating for this researcher to explore the application of Western literature to Saudi organizations and to answer specific research questions to improve ERM practices in his organization.

This section of the literature review first presents and discuses the portfolio and contingency theories in order to illuminate the theoretical foundation of ERM. In addition, prior empirical evidence on ERM with more focus on the key indicators and measures used to explore the degree of ERM implementation are also reviewed and discussed. An investigation into risk maturity models in practices is also presented in order to highlight and critique how practitioners attempt to evaluate the level of ERM implementation.

2.3.1 Theoretical Foundation of ERM

ERM research studies are evolving, and the theoretical foundations have yet to be fully established. The literature review reveals that there are a few theories that lend themselves to ERM, such as portfolio theory and contingency theory. For example, Alviniussen and Jankensgard (2009) argue that the ERM concept originates from portfolio theory. Portfolio theory was introduced by Markowitz (1952) in order to provide a framework for thinking about the collective risk of a portfolio of securities and to help investors manage risks

through diversification and asset allocation. Nocco and Stultz (2006) also posit that managing risks on a portfolio basis creates value for organizations, as it allows management to make informed decisions through the concurrent consideration of the various risks facing an organization.

The ERM concept is an extension of portfolio theory and is built on the basis that risks should be measured and managed on a portfolio basis in order to balance them against potential rewards. Therefore, ERM helps to address and manage all types of risks, including financial and non-financial risks, facing an organization. This collective approach of combining and consolidating various types of risks minimizes the effects of individual risks compared to overall risks, which results in increased profitability and productivity through cost savings (Alviniussen and Jankensgard, 2009). Nocco and Stultz (2006) also posit that managing risks on a portfolio basis helps to maintain a consolidated view of the various types of risks and creates value for an organization, as it allows management to make informed decisions through the concurrent consideration of the various risks facing the organization.

Other theories, like contingency theory, are also referenced in a few ERM studies to explain how contextual variables are related to ERM implementation. The basic foundation of contingency theory is that there are no universally accepted principles applicable to all situations, but, instead, selected attributes or characteristics are dependent upon another. The theory is broad and applicable to various disciplines and helps researchers to study various aspects of the environment in order to develop related processes that fit the environment (Hanisch and Wald, 2012).

Several ERM researchers argue that factors affecting the level of ERM implementation seem to follow contingency theory. For example, Mikes and Kaplan (2014)

and Gordon, Loeb and Tseng (2009) contend that successful implementation of ERM in practice is contingent upon specific factors. Mikes and Kaplan (2014) indicate that organizational effectiveness is dependent on establishing an adequate fit between the ERM mix (e.g., risk identification processes, frequency of risk meetings, risk tools and defined roles for the risk function) and contingent variables. However, Gordon, Loeb and Tseng (2009) argue that the positive relationship between ERM and firm performance is contingent upon an appropriate match between a firm's ERM system and five specific factors, namely, the board of directors' monitoring, firm complexity, firm size, environmental uncertainty and industry competition. In relation to above discussion and under the premises of contingency theory, this study was conducted from an organizational contingency model perspective in order to explore the factors that influence the design and implementation of ERM.

2.3.2 Empirical Research Studies on the Determinants of ERM Adoption

In the first stream of ERM studies, researchers explore a specific firm's contextual variables or determinants driving ERM adoption and tend to search publicly available information to identify signals of ERM implementation, such as the appointments of a chief risk officer (CRO). Because organizations disclose limited information on their ERM practices, researchers assert that CRO hires are a simple proxy for ERM implementation in a company (Liebenberg and Hoyt, 2003; Pagach and Warr, 2011). Kleffner, Lee and McGannon (2003) also posit that the existence or hiring of an individual such as a CRO who is charged with the responsibility to implement and coordinate ERM activities demonstrates an organization's intention to adopt and implement ERM.

Liebenberg and Hoyt (2003) and Pagach and Warr (2011) investigate the determinants of ERM adoption using publicly available information to search for firms that have made CRO hiring announcements in order to identify ERM implementers. Whereas Liebenberg

and Hoyt (2003) use a sample of 26 firms to identify those who have announced the hiring of a CRO, Pagach and Warr (2011) use a larger sample of firms (n=138) and a wider range of determinants relevant to financial, market, asset and managerial characteristics. Research findings from both studies reveal that firms that are larger in size as well as those with more volatile operating cash flows and stock are more likely to appoint a CRO and adopt ERM.

Although Beasley, Clune and Hermanson (2005) use a survey approach instead of searching public information to explore the determinants of ERM adoption for a sample of US and international organizations, their research results also reveal that the entity size is one of the key determinants of ERM adoption. They argue that as the size of an organization increases, it is assumed that the scope of the risks it faces is more likely to increase, taking into consideration the nature, timing and extent of different types of events threatening the organization. In contrast to the studies on the determinants of ERM adoption by Liebenberg and Hoyt (2003) and Pagach and Warr (2011), where only CRO appointments were used to identify ERM implementers, Beasley, Clune and Hermanson (2005) use a scale with values ranging from one to five to rate the stage of ERM implementation. These stages included in the scale are: (1) no plans exist to implement ERM, (2) investigating ERM but no decision made yet, (3) planning to implement ERM, (4) partial ERM is in place and (5) complete ERM is in place. The study finds that the presence of a CRO increases the organization's stage in ERM implementation.

Researchers investigating the determinants of ERM adoption tend to agree that entity size is one of main factors driving ERM implementation but they also identify additional factors for ERM adoption. For example, Beasley, Clune and Hermanson (2005) conclude that board independence, senior management (e.g., chief executive officer and chief financial officer support for ERM) and auditor type are key determinants of ERM adoption. However, this researcher would argue that studies of the determinants of ERM adoption lack

a comprehensive approach to explore how ERM is actually implemented in practice. For example, Liebenberg and Hoyt (2003) and Pagach and Warr (2011) use simple proxies (i.e., appointments of a CRO) to identify ERM implementers. However, this approach is too superficial to explore the level of ERM implementation because a CRO appointment provides limited information about the quality and depth of an organization's risk management processes (Lundqvist, 2014). The existence of the CRO does not clarify the level of support and leadership from the chief executive officer (CEO) and the board of directors in terms of risk information production and dissemination across the organization nor does it clarify how resources are dedicated to mitigate and control the principal risks (Mikes and Kaplan, 2014). In addition, some organizations might have good ERM practices but have not appointed a CRO. In this case, these organizations will be judged as not having implemented ERM when in actual fact they have. Whereas Beasley, Clune and Hermanson (2005) explore the level of ERM implementation based on the stage of its deployment, this approach is also subjective and binary in nature because it assumes that an ERM is either in place or not.

2.3.3 Empirical Research Studies on the Ability of ERM to Create Value

Most literature on risk management explores the value adding ability of risk management based on how organizations manage their financial risks using examples of financial instruments, such as derivatives, to hedge. However, there is very little empirical evidence on the value adding ability of ERM that considers the effects of both financial and non-financial risk management practices on organizations. A strong theoretical basis emerges from the literature on the ability of ERM to create value and improve organizational performance. Lam (2003) and Stulz (2003) argue that ERM implementation adds value by reducing potential losses, earnings and stock price volatility as well as improving the return on capital. These arguments drive scholarly interest in ERM in order to

investigate whether ERM can contribute to better firm performance and has the ability to create value. However, the results of the empirical tests conducted to-date exploring the relationship between ERM implementation and firm performance are controversial, and the research outcomes vary from one study to another (Mikes and Kaplan, 2014). There are no definitive or general statements about the financial benefits related to ERM implementation (Beasley, Pagach and Warr, 2008). Kleffner, Lee and McGannon (2003) also posit that uncertainty on how ERM creates value for an organization is the main reason for its poor adoption rate.

Researchers investigating the ability of ERM to create value tend to apply different approaches to identify ERM implementers and explore the level of implementation. For example, Beasley, Pagach and Warr, (2008), Pagach and Warr (2010) and Hoyt and Liebenberg (2011) use CRO appointments as a proxy for ERM implementation in order to investigate the ability of ERM to create value. However, these research studies report mixed results. For example, Beasley, Pagach and Warr (2008) explore the market reaction to a sample of 120 CRO appointments from different industries (i.e., financial services, insurance and energy) in the US and observe a positive stock market reaction to the appointment of a CRO among non-financial companies. Hoyt and Liebenberg (2011) also find a positive relationship between ERM implementation and company value for a sample of 117 US publicly traded insurers, where company value is measured using Tobin's Q. However, Pagach and Warr (2010) examine the effect of ERM implementation on firm performance for a sample of 106 US publicly traded financial and utility firms and find no significant changes in firm performance variables, leading them to conclude that ERM did not add observable value.

The variations in the results of the above studies could occur for two main reasons. First, all studies use the appointment of a CRO as a proxy for ERM implementation, which

is criticized as inadequate to identify true ERM implementers. Because this proxy is superficial and is too oversimplified to identify true ERM implementers and capture to what extent the ERM framework and processes are actually implemented in an organization (Lundqvist, 2014). Second, the effect of ERM implementation is assessed against different measures of organizational performance. Whereas Beasley, Pagach and Warr (2008) use market reactions represented by stock prices as a measure of firm performance, Hoyt and Liebenberg (2011) measure firm value using Tobin's Q, which is the book value of liabilities plus the market value of equity divided by the book value of assets. Additionally, Pagach and Warr (2010) measure firm performance using specific financial variables, namely, earnings volatility, stock price volatility, leverage, return on equity, opacity and growth options. Therefore, using inconsistent measures of organizational performance creates difficulty in arriving at convincing results regarding ERM's ability to create value.

Instead of using CRO appointments as a proxy for ERM implementation, readily available criteria by rating agencies, such as Standard & Poor's (S&P) ERM rating, are also used as a proxy for ERM implementation. The ERM rating is newly added to the eight components that S&P uses to rate the financial strength of insurers. For each insurer, S&P determines an ERM rating based on the following aspects: strategic risk management, emerging risks, risk controls, risk models and risk management culture. The S&P ERM rating uses five categories to capture the implementation level of an ERM program for each insurer, namely, excellent, strong, adequate with a positive trend, adequate and weak. For example, McShane, Nair and Rustambekov (2011) and Baxter et al., (2013) use S&P ERM ratings as a measure of the level of ERM implementation and Tobin's Q as a measure of the firm value. However, the results on the relationship between ERM implementation and firm value are controversial. McShane, Nair and Rustambekov (2011) investigate the relationship between ERM implementation and firm value for a sample of 82 publicly traded US insurers

and find a positive relation between the S&P ERM rating and firm value. However, using similar measures (i.e., the S&P ERM rating and Tobin's Q) to investigate the association between ERM implementation and firm value for a sample of 165 banks and insurers, Baxter et al. (2013) conclude that ERM implementation does not lead to higher firm value.

The main reason for the differences in these research outcomes is related to the originality and reliability of the S&P ERM rating to measure the level of ERM implementation. Although S&P is an internationally recognized credit rating agency, the ERM rating criteria are not derived from one of the internationally recognized risk management frameworks, such as COSO or ISO. In addition, S&P uses its own definition of ERM, which may lead to different interpretations across researchers. Lundqvist (2014) argues that the S&P ERM rating is limited to insurance companies and has not been examined for its appropriateness for ERM studies. McShane, Nair, and Rustambekov (2011) indicate that the business relationships between financial rating agencies and clients might affect the objectivity of the rating results.

Due to the limitations and inaccuracies of the previously presented proxies for ERM implementation (i.e., CRO appointments and S&P ERM ratings), other researchers attempt to develop their own measures derived from the COSO framework to explore the level of ERM implementation. For example, Gates, Nicolas and Walker (2012) develop eight ERM components and test the relationship between these components and firm performance for a sample of 150 audit and risk management executives. Gordon, Loeb and Tseng (2009) develop another measure, called the ERM Index, to explore the effect of ERM implementation on firm performance based on one-year excess stock market returns for a sample of 112 US firms. The outcomes of both studies reveal that there is a positive relation between ERM implementation and firm performance. However, Gordon, Loeb and Tseng (2009) argue that this relationship is contingent upon the appropriate match between a firm's

ERM system and five specific factors, namely, board of directors' monitoring, firm complexity, firm size, environmental uncertainty and industry competition. Additionally, Gates, Nicolas and Walker (2012) conclude that ERM implementation enables executives to manage an organization better in terms of meeting strategic goals, increasing profitability, making informed decisions and reducing earnings volatility, which ultimately contribute to improvements in firm performance. They further suggest a model to implement ERM processes and achieve greater management consensus regarding the risks an organization encounters. The model includes key areas that require more focus, such as risk identification against organizational objectives, management reaction to identified risks, risk oversight and information and communication processes.

Although both measures (i.e., ERM components and the ERM Index) are derived from the COSO framework, the total number of indicators used in each measure is different. For example, the index measures ERM effectiveness based on its ability to support the achievement of organizational objectives relative to the COSO's four objectives, which are strategy, operation, reporting and compliance. A total of eight indicators (i.e., two indicators to measure the achievement of each objective) are used to measure the overall effectiveness of a firm's ERM system. Examples of these indicators are sales volume compared to competitors, the firm's ability to reduce its systematic risk, the number of employees, auditor fees, material weakness disclosures, and financial restatements (Gordon, Loeb and Tseng, 2009). However, Gates, Nicolas and Walker (2012) use eight ERM components, which include objective setting, risk identification, risk reaction, oversight, information and communication, internal environment, management, and performance. They use a total of 26 indicators to measure these ERM components. For example, three indicators, alignment between business risks and organizational objectives, defined levels of risk tolerance and communication of risk expectations, are used to measure the objective setting component of

an ERM program. All indicators are then utilized to develop a survey questionnaire for the study in which a five-point scale is used to measure each indicator.

2.3.4 Empirical Research Studies on the Implementation of ERM in Middle Eastern Countries

A literature review reveals that there are limited research studies on the determinants of ERM adoption and its ability to create value for organizations headquartered in Middle Eastern countries. In particular, no ERM studies have been conducted for organizations in Saudi Arabia. This section presents key results generated from prior empirical studies that investigate ERM implementation for organizations headquartered in Middle Eastern countries. However, other studies that report risk management practices under different labels are excluded from the literature review. For example, the empirical study by Alzharani and Aljaaidi (2015) that investigates the effectiveness of audit and risk management committees in Saudi Arabia or the exploratory study by Hain (2011) that investigates risk perception and risk management strategies of Western multinational enterprises in the Middle East are not included in the literature review. Therefore, the literature review reveals that only two research studies explore ERM implementation in organizations headquartered in Middle Eastern countries.

A study by Rao and Marie (2007) uses a survey questionnaire to explore ERM implementation in 100 business organizations in Dubai. The survey questionnaire covers five components of the COSO framework, namely, control environment, risk assessment, control activities, information and communication, and monitoring. The researchers explore the status of ERM implementation in terms of the tools and processes that companies in Dubai are using to identify and measure risks. The research results reveal that respondents are generally satisfied with the existing tools for assessing, measuring and mitigating financial risks, such as credit risks, interest rate risks and reinvestment risks. However, the

level of satisfaction in terms of managing operational risks (e.g., reputation, technology, intellectual capital, political and regulatory and catastrophe) is mixed. In addition, culture, time availability and cost are classified as key barriers to ERM implementation. Although the research results reveal that key aspects of risk management are adequately implemented, the researchers highlight the need for organizations in Dubai to implement integrated strategic ERM processes and to increase awareness about ERM. They also suggest five strategic steps to improve ERM implementation. However, the researchers indicate that these findings are limited to businesses in Dubai due to the limited study sample.

Another study by Muralidhar (2010), using six case studies, explores the status of ERM implementation for selected entities in the oil and gas industry in six countries. The researcher identifies key determinants of ERM adoption, explores challenges to ERM implementation and recommends an implementation plan to establish a robust ERM framework specific to entities in the Gulf region. He uses an inductive research approach based on semi-structured interviews by asking open-ended questions (who, why, what and how) to explore participants' answers to research objectives. The researcher uses the data collected to position organizations in the ERM maturity model according to their ERM implementation progress as under construction, partial or a complete ERM framework in place. The research findings reveal that ERM means different things to oil and gas companies in the Middle East, and the key emerging themes in ERM implementation are standardization, integration and centralization. In addition, the key determinants of ERM adoption are corporate governance, leadership of the chief executive, good business practice, initiative of the board of directors and internal audit recommendation (Muralidhar, 2010).

It is evident that the empirical evidence on ERM implementation for organizations that operate in Middle Eastern countries provides insights into the key determinants of ERM adoption and the challenges to implementing ERM (Muralidhar, 2010). This evidence also

sheds light on the importance of ERM for Dubai businesses, the types of risks critical for these businesses and the adequacy of tools and processes to manage business risks (Rao and Marie, 2007). However, the researchers neither apply a structured approach to identify organizations embracing ERM nor use specific measures to explore the degree of ERM implementation, similar to empirical studies conducted for Western organizations.

2.4 Dimensions of ERM for Measuring the Degree of Implementation

In addition to the two research streams presented in the previous sections, there is an emerging stream of ERM research studies that focuses on using a more comprehensive approach to capture and understand how ERM is implemented in organizations (Mikes and Kaplan, 2014).

Researchers embracing such an approach attempt to use multiple dimensions to compile sufficient evidence to assess and measure the degree of ERM implementation. Desender (2007) is one of the first researchers to attempt to construct an aggregate measure of ERM. The aggregate measure consists of 70 ERM dimensions derived from the COSO framework and a prior study by Knechel (2002) with the aim to test the degree of ERM implementation. In a study investigating the relationship between board composition and ERM practices, Desender (2007) searches publicly available information from 2004 annual reports to measure ERM implementation for 100 publicly listed organizations that operate in the pharmaceutical industry. Instead of using a single event, such as the appointments of a CRO, as a proxy for ERM implementation, an aggregate measure of ERM is used to explore to what extent the elements of the COSO framework are implemented. Each dimension in the ERM measure is given a score of one when the firm provides the information and zero otherwise.

The research results reveal that the average ERM score is 34%, meaning that firms provide information on 34% of the ERM dimensions. However, firms with a higher degree of ERM implementation provide information on 90% of the ERM dimensions. The results also reveal that firms that demonstrate the highest level of ERM implementation have an independent board of directors and separation between the CEO and the chairman. Although the author applies a comprehensive approach to measure the degree of ERM implementation, using publicly available information poses a limitation to the study because the available information does not reflect the true state of risk management practices. Liebenberg and Hoyt (2003) also confirm that organizations typically disclose in publicly available information their risk management practices related to specific risks and not whether they are managing risks in an integrated approach. In addition, the study focuses on the pharmaceutical industry, so the research findings may not be generalized for other industries. The author indicates that five senior auditors were asked to evaluate the aggregate measure of ERM and the relevance of the questions to the study. However, using experienced risk professionals and executives to review and evaluate the aggregate ERM measure may provide more insights to the relevance of the question in practice.

To overcome the limitations in Desender's research approach, Lundqvist (2014) uses a survey methodology to explore how firms actually implement specific ERM dimensions. Lundqvist reviews Desender's original list of ERM dimensions and develops a refined list. The refined list contains 59 ERM dimensions and is used in a comprehensive survey questionnaire over a sample of 151 Nordic firms to explore how these firms actually implement ERM. The questionnaire is comprehensive in that it focuses on identifying the practices that may advance ERM even when these practices occur outside of the ERM function. Some examples of these practices include formally defined responsibilities for executive management, a formal strategy to pursue the mission (vision/purpose) of the

organization and defined performance goals/targets to assess whether the organization is achieving its business objectives. EFA is used to identify underlying factor structures, whereas confirmatory factor analysis (CFA) is used to evaluate a priori ERM component models. Based on how sample firms implement the ERM dimensions, the research results reveal four essential components or pillars of ERM implementation. Two components are related to the general internal environment and general control activities, whereas the third component is related to identifying risk management activities and the fourth component to defining the attributes of ERM implementation. Lundqvist (2014) asserts that organizations should implement the four pillars or components in order to have a well-implemented ERM.

Although the majority of empirical studies attempt to explore and investigate ERM implementation using publicly available information or surveys, Mikes and Kaplan (2014) argue that ERM studies produce few significant results due to limited fieldwork assessments to investigate actual risk management practices. In order to produce a complete and adequate assessment of how ERM is used and implemented in practice, Mikes and Kaplan (2014) execute a ten-year fieldwork project using three case studies and conducting more than 250 interviews with senior and chief risk officers. The objective of the study is to provide comprehensive specifications for ERM that are more practical and to develop a foundation for a contingency theory of ERM that is based on specific design parameters.

Instead of recommending a universal risk management system or specific dimensions, the outcomes of the study by Mikes and Kaplan (2014) recommend a contingency framework for ERM. The contingency framework recommends establishing an adequate fit between ERM design parameters, known as the ERM mix, and contingent variables in order to achieve organizational effectiveness. The ERM mix includes risk identification processes, the frequency of risk meetings, risk tools and defined roles for the risk function, and the contingent variables are risk types (preventable, strategy and external) and other

organizational and industry variables. The ultimate objective is to encourage individual organizations to establish a clear organizational context and identify specific circumstances in order to select an appropriate and relevant risk management system for the organization.

Additionally, Mikes and Kaplan (2014) argue that using general statements such as "applicable to all organizations" and "all types of risks," as presented in international risk management guidelines like ISO framework would limit organizations to search and identify innovative approaches for risk management processes related to specific circumstances. ERM systems vary from one organization to another in terms of the types of risks facing the organization (e.g., financial and non-financial), the unit of analysis for risk management (e.g., project level or entire the organization) and the calculative culture (e.g., more or less focus on risk quantification and measurement).

2.5 Risk Management Maturity Models

In addition to the empirical evidence presented earlier on ERM dimensions and in order to provide a comprehensive view of how practitioners attempt to assess the level of ERM implementation, websites and trade publications of key consulting firms and risk management institutes are reviewed. For example, one of the well-known models to test the maturity level of ERM is the Risk and Insurance Management Society (RIMS) - Risk Maturity Model (RMM). The RMM is developed by RIMS, which is a global not-for-profit organization dedicated to advancing the practice of risk management, networking risk management professionals and providing educational opportunities to its members. The RMM consists of seven sections, including ERM process management, risk appetite management and uncovering risks. These seven sections are further broken down into 25 success factors and 68 competency drivers. The model uses five ratings, (1) ad-hoc, (2) initial, (3) repeatable, (4) managed and (5) leadership, to classify the organization's ERM maturity (RIMS, 2015). The RIMS model is based on the capability maturity model, which

was first developed by Carnegie Mellon University in the 1980s to assess engineering and management practices for software organizations (Zou, Chen and Chan, 2009).

The second example of a well-known model to test the maturity level of ERM is the AON - Risk Maturity Index (RMI). This index is developed by AON, which is a global risk consulting firm specialized in providing consulting services in different risk management disciplines. The index consists of ten risk maturity characteristics, including board commitment to risk management, risk communication and risk management stewardship. These ten characteristics are further broken down into 40 components to examine specific practices and structures related to ERM. The RMI is used to classify the ERM maturity level into five levels, namely, initial, basic, defined, operational and advanced (AON, 2015).

One of the key observations on the above risk maturity models (i.e., RIMS RMM and AON RMI) is that these models are not derived from one specific risk management framework. For example, the RIMS RMM makes a reference to several risk management frameworks from which the model is derived. Using different frameworks to derive risk maturity models might lead to inconsistent results because each framework has its own definition and key elements for managing risk. The other observation is that risk maturity models do not use consistent scales to evaluate the responses to assessment questions in the model. For example, AON RMI provides a different number of options/answers (3 to 4) for each question to evaluate the maturity level of each component of an ERM program. Not having a standard scale to combine the evaluation of each element might lead to difficulties in analyzing responses and providing an objective evaluation of the maturity level.

2.6 Limitations in Existing ERM Research Studies

The literature review on existing ERM research studies provides insights into different identification and measurement methods to investigate and explore ERM implementation.

Researchers face two main limitations when they conduct ERM research studies and theses limitations that have led to mixed and inconclusive results. These limitations are related to obtaining accurate ERM information and accurately identifying and measuring ERM implementation.

2.6.1 Limitations in Obtaining Accurate ERM Information

Gates, Nicolas and Walker (2012) indicate that ERM is difficult to study due to minimal details reported by organizations on their ERM engagements. The lack of mandatory requirements on the types of risk information and risk management practices that must be disclosed publicly is the main reason for underreporting among organizations. Although some organizations have motivation to share some ERM disclosures, the information provided lacks details on ERM components or the stage of implementation. Liebenberg and Hoyt (2003) assert that organizations do not normally disclose enough details on their approach for managing risks. Organizations typically disclose their risk management practices related to specific types of risks and not whether they are managing risks in an integrated way.

The underreporting of integrated activities in managing risks leads to difficulty identifying organizations engaging in ERM, which also creates inaccuracies in evaluating ERM implementation (Liebenberg and Hoyt, 2003). The absence of an explicit disclosure of ERM implementation creates a major obstacle for researchers identifying organizations that actually implement ERM. As a result of the limited data, researchers attempt to use different approaches to identify organizations that are indeed engaging in ERM, such as searching publicly available information to identify signals of ERM implementation, relying on survey data or conducting case studies. For example, Beasley, Clune and Hermanson (2005) and Gates, Nicolas and Walker (2012) attempt to use surveys in their ERM studies in order to overcome underreporting limitations related to public information searches. Thus, they

explore the level of ERM implementation based on organizations' own rating and views of their ERM implementation.

2.6.2 Limitations in the Accurate Identification and Measurement of ERM Implementation

It is evident in the literature that the measurement tools used to explore ERM implementation are subjective in nature and vary widely in terms of their components (Kimbrough and Componation, 2009). Researchers use different proxies to identify ERM firms and apply inconsistent measures of ERM implementation. This inconsistency leads to inconclusive results regarding the determinants of ERM adoption as well as the ability of ERM to create value and it also creates difficulties concluding what an ERM organization looks like and what the key pillars of ERM are (Lundqvist, 2014).

As discussed earlier, several ERM researchers attempt to use simplistic variables to explain the complex behavior related to ERM practices. For example, identifying an ERM implementer based on a binary indicator or single (0 or 1) dummy variable, such as the availability of a CRO in the organization, does not capture or reflect how ERM is actually implemented. Identifying ERM organizations based on announcements of CRO appointments creates significant limitations to generalizing research findings generated from ERM empirical research studies. Whereas Beasley, Pagach, and Warr (2008) and Hoyt and Liebenberg (2011) use the announcements of CRO appointments as a proxy for ERM implementation to explore the relationship between ERM and firm value, Gordon, Loeb, and Tseng (2009) use their own ERM index. However, their research findings are mixed and inconclusive. Whereas Hoyt and Liebenberg (2011) find a positive relationship between firm value and the announcements of CRO appointments among insurance organizations, Gordon, Loeb, and Tseng (2009) conclude that the positive relationship between ERM and firm performance is contingent upon an appropriate match between a firm's ERM system

and five specific factors, namely, board of directors' monitoring, firm complexity, firm size, environmental uncertainty and industry competition.

At least two research studies use the S&P ERM rating as a proxy for ERM implementation (McShane, Nair and Rustambekov, 2011; Baxter et al., 2013). However, researchers of theses studies attempt to assess the ERM implementation level differently. Whereas McShane, Nair and Rustambekov (2011) use five categories of the S&P ERM rating to capture the implementation level of the ERM program, Baxter et al. (2013) divide the original S&P ERM rating into six categories in order to measure the level of ERM quality. However, the research results are controversial. McShane, Nair and Rustambekov (2011) conclude in their study that there is a positive relationship between the S&P ERM rating and firm value but Baxter et al. (2013) contradict these conclusions and assert that better ERM quality does not lead to better firm performance. As McShane, Nair and Rustambekov (2011) and Baxter et al. (2013) use a more comprehensive measure such as the one used by S&P to rate ERM implementation, the S&P measure has not been examined for its appropriateness for ERM studies. It is also limited to insurance companies and the results depend on the S&P definition of ERM (Lundqvist, 2014).

Researchers who attempt to investigate ERM's ability to create value face some limitations in producing generalized research findings. For example, McShan, Nair and Rustambeko (2011) assert that the lack of a suitable proxy and consensus measure for the degree of ERM implementation creates a limitation for researchers to study the relationship between ERM and firm performance. This limitation leads to mixed findings on the value creation ability of ERM (McShan, Nair and Rustambeko, 2011). Whereas Hoyt and Liebenberg conclude that ERM enhances the value of the firm, Pagach and Warr (2010) find limited evidence that the adoption of ERM results in significant changes to key financial variables. However, one of the other issues for researchers studying the ERM's ability to

create value is addressing the time factor in terms of how long it takes after implementing ERM to gain the intended benefits or value.

2.7 Conclusions

This chapter critically analyzed different approaches applied in prior ERM studies to identify ERM implementers and assess the degree of implementation. The literature review reveals that researchers face difficulties in assessing the degree of ERM implementation due to the absence of reliable and universally accepted measures of what ERM is and what mature ERM looks like (Kimbrough and Componation, 2009). As a result, the findings from ERM studies are inconclusive due to inconsistencies among researchers on how they identify ERM implementation and assess the degree of ERM implementation (Lundqvist, 2014). To overcome these inconsistencies in measuring ERM implementation, an additional stream of ERM research studies emerges to capture and understand how ERM is implemented in an organization. Researchers embracing such an approach attempt to use multiple dimensions to compile sufficient evidence to assess and measure the degree of ERM implementation (Desender, 2007; Lundqvist, 2014; Mikes and Kaplan, 2014). Although each researcher attempts to use different types and numbers of ERM dimensions, the process of developing and constructing a comprehensive measure to assess the degree of ERM implementation is evolving. Table 2.1 shows a summary of the empirical studies' identification and measurement methods addressed in this section as well as the results of the studies.

The inconsistency in assessing the degree of ERM implementation is the key gap in the literature. This area requires further research in order to construct a comprehensive and more robust measure of ERM implementation. Doing so would also help to address the diverging view on ERM's ability to create value and to focus on determining the specific factors of ERM that influence value creation.

Table 2.1:

Summary of the Literature Review on Existing ERM Empirical Studies

Research Area	Authors	Source of Data	Key Findings
A. Determinants of ERM adoption	Liebenberg and Hoyt (2003)	Public information for 26 US firms. CRO was used to identify ERM implementers	The size of the company is a significant factor that explains ERM adoption. In addition, research results reveal that organizations with greater financial leverage are more likely to appoint a CRO.
	Pagach and Warr (2011)	Public information for 138 US financial firms and banks. CRO was used to identify ERM implementers	Firms that are larger in size as well as those with more volatile operating cash flows and greater institutional ownership are more likely to adopt ERM. Additionally, researchers conclude that the stock volatility is a key determinant for hiring a CRO
	Beasley, Clune and Hermanson (2005)	Survey from 123 US and international organizations in the banking, education and insurance industry. CRO and Key words were used to identify ERM implementers.	ERM adoption is related to the following factors: presence of a CRO, board independence, senior management (e.g., CEO and CFO support for ERM), auditor type and the entity size. Also international organizations have more-developed ERM processes compared to US organizations

Summary: The appointment or existence of a CRO is used in all the above studies by itself or in addition to ERM key word as a proxy to identify ERM implementers. Examples of the most commonly determinants of ERM adoption used in the studies are company size, financial leverage, earnings/cash volatility, stock price volatility, asset opacity, auditor type, institutional ownership.

Table 2.1: Continued

Research Area	Authors	Source of Data	Key Findings
B. Ability of ERM to create value	Beasley, Pagach and Warr (2008)	Public information for 120 US financial and non-financial firms. CRO was used to identify ERM implementers	Researchers use the impact of firm-specific characteristics namely: (firm's growth options, intangible assets, cash reserves, earnings volatility, leverage, and firm size) on the equity market response to the announcements of appointments of CROs. While market reactions to the announcements of CRO appointments within nonfinancial firms are positively correlated to firm size and volatility of earnings, they are negatively correlated to the leverage and the ratio of cash to liabilities.
	Pagach and Warr (2010)	Public information for 106 US publicly traded financial and utilities firms. CRO was used to identify ERM implementers	Researcher use specific financial variables to proxy firm value namely: earning volatility, stock price volatility, leverage, Return On Equity (ROE), Slack, Opacity and growth options. There is little evidence that the adoption of ERM results in significant changes on key financial variables before and after the appointment of the CRO. In addition, the adoption of ERM does not result in significant changes on key financial variables such as capital efficiency, leverage and profitability.
	Hoyt and Liebenberg (2011)	Public information for 117 US publicly traded insurers. CRO and key words were used to identify ERM implementers	Researchers use Tobin's Q to proxy firm value. The ERM enhances value of insurance companies where firms with ERM program show higher mean and median values of Tobin's Q values. ERM users are larger with lower return volatility, less opaque, less leveraged, less financial slack and higher levels of institutional ownership. The number of ERM implementation is increasing, but still there is a lack of a clear understanding of the association between ERM and firm value and financial performance.

Table 2.1: Continued

Research Area	Authors	Source of Data	Key Findings
B. Ability of ERM to create value	McShane, Nair, and Rustambekov (2011)	Public information for 82 US publicly traded insurers. S&P ERM rating was used to identify ERM implementers and degree of implementation	Researchers use Tobin's Q to proxy firm value. There is a positive relation between ERM rating of S&P and firm value for the lower three categories of the ERM rating (weak, adequate, and adequate with a positive trend), which is an indication of increased levels of Traditional Risk Management implementation.
	Baxter et al. (2013)	Public information for 165 US banks and insurers. S&P ERM rating was used to identify ERM implementers and degree of implementation.	Researchers use Tobin's Q to proxy firm value. The ERM quality did not lead to higher firm's performance before or during the 2008 market collapse.
	Gordon, Loeb, and Tseng (2009)	Public information for 112 US firms. Key words were used to identify ERM implementers.	Researcher use one-year excess stock market returns to proxy firm value and measure performance. There is a positive relationship between ERM and firm value but this relationship is dependent/contingent on the appropriate match between the firm's ERM and five firm-specific factors, namely monitoring of the board of directors, industry competition, environmental uncertainty, complexity and size.
	Gates, Nicolas and Walker (2012)	Survey from 150 US audit and risk management executives.	The ERM implementation creates value by enabling executives to manage the organization better in terms of meeting strategic goals, increasing profitability, better-informed decision making and reducing earnings volatility, which ultimately contribute to improvements in the organization's performance.

Summary: While the appointment or existence of a CRO by itself or in addition to ERM key word was used as a proxy to identify ERM implementers, only two studies used S&P ERM rating to identify ERM implementers and explore degree of implementation and one study uses the survey approach for audit and risk management executives. While three-research studies use Tobin's Q to proxy firm value, two research studies use specific financial variables and one study uses excess stock market returns. Finally, we can conclude that results on the ability of ERM to create value were controversial because different financial variables were used to measure firm's value / performance leading to the difficulty to confirm the ability of ERM to create value.

Table 2.1: Continued

Research Area	Authors	Source of Data	Key Findings
C. Dimensions of ERM for measuring degree of implementation	Desender (2007)	Public information for 100 US publicly listed organizations that operate in the pharmaceutical industry.	The researcher constructed an aggregate measure of ERM which contains 70 ERM dimensions derived from COSO (2004) framework. Research results reveal that the average ERM score is 34% meaning that firms provide information on 34% of the ERM dimensions. However, firms with the highest degree of ERM provide information on 90% of all ERM dimensions. Research results also reveal that firms that demonstrate the highest level of ERM are with independent board and there is a separation of CEO and chairman.
	Lundqvist (2014)	Survey from 151 Nordic firms.	The researcher constructed an aggregate measure of ERM which contains 59 ERM dimensions to explore how firms actually implement ERM. The researcher concludes that there are four essential components or pillars of ERM implementation. Two components are related to general internal environment and general control activities where the third component related to identifying risk management activities and the fourth component related to defining attributes of ERM implementation.
	Mikes and Kaplan (2014)	Three case studies and more than 250 interviews with senior and Chief Risk Officers.	The research study recommends a contingency framework of ERM in terms of establishing an adequate fit between ERM design parameters known as ERM mix and contingent variables. The ERM mix includes risk identification processes, frequency of risk meetings, risk tools and the roles of the risk function where the contingent variables are risk types (preventable, strategy and external) and other organizational and industry variables. The ultimate objective is to encourage individual organization to establish a clear organization's context and identify specific circumstances in order to select appropriate and relevant risk management system for the organization.

Summary: Researchers did not use CRO and ERM key words to identify ERM implementers. Instead, two research studies constructed an aggregate measure to explore degree of ERM implementation extracted from COSO 2004 ERM framework. In addition, one research study uses case studies and interviews to construct a contingency framework for better ERM implementation.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter explains the basis of the research design and presents the research methods selected for data collection, including the definition of the research population, the sampling strategy, the design of the survey instrument and the approach for data collection. Additionally, the methods and techniques of the factor analysis are presented and discussed.

3.1 Statement of the Problem and Research Question

The literature review helps to build a foundational understanding of ERM in terms of its concept, the existing theories and arguments among researchers. This understanding helps the researcher to formulate the research problem for this study. As the researcher is an ERM practitioner in one of the large Saudi petrochemical organizations, a practice-based problem facing the ERM function in his organization was selected for the following reasons:

1) To use proven research methods, with the support of independent supervision from the University of Liverpool, to investigate the practice-based problem in order to achieve relevant and rigorous research outcomes that can inform the researcher's organization on how to improve its ERM implementation.

2) To exploit the opportunity, while studying in the Doctorate of Business Administration program and conducting this study, to gain in depth knowledge about the practice of ERM from different industries and to reflect the learnings gained from this study in actionable knowledge, which can be applied to a practical organizational setting.

The researcher's organization has four strategic business units (SBUs), several manufacturing facilities and sales offices located across the globe. Some of the existing manufacturing facilities are in the form of joint ventures with well-known petrochemical producers. The organization is in continuous growth with an inspiring vision to become the

preferred producer of chemical products in the world. In order to achieve this vision and maintain a competitive advantage in the petrochemical industry, the organization is expanding its operations globally and is currently looking for new business opportunities.

Taking into consideration the size of the organization's operations and its ambitious vision, the board of directors and senior management demand a robust ERM framework and processes to support the leadership team to manage the increasing variety, number and interactions of different risks that can potentially impact the organization's achievement of its vision and strategic objectives. The ERM function was established in 2009 with the objective to develop and implement a comprehensive ERM program. However, gaps related to the design and implementation of the ERM framework and processes do increase as the volume and complexities of risks increase. Despite continuous efforts to implement ERM, the practice-based problem facing the researcher's organization is the **lack of knowledge about the key factors to be considered when implementing ERM**. Therefore, the research question for this study is as follows. **What factors do organizations need to consider when implementing ERM?**

Answering this research question and resolving this practice-based problem can make an an important contribution to the researcher's organization in terms of improving ERM implementation and exploiting the ultimate benefits stated in the literature in terms of creating value for the business and shareholders as well as supporting decision-making. Additionally, answering the research question will also make important contributions to emerging research on ERM implementation.

3.2 Basis of the Research Design and Selection of Research Methods

In the design stage of a study, researchers attempt to clarify their philosophical position, define methodological assumptions, and select relevant research methods in order

to provide solid answers to research questions (Gelo, Braakmann and Benetka, 2008). The philosophical positions of a researcher are drawn from ontological and epistemological assumptions, which further form the foundation for selecting appropriate methodologies for the research topic. Ontological assumptions are related to views about the nature of reality, whereas epistemological assumptions are related to views about most appropriate ways of enquiring into the nature of the world. Understanding these assumptions and the differences between different philosophical positions helps researchers make informed decisions about the research design in order to study a particular topic (e.g., what kind of evidence is needed or how to collect and interpret research evidence in order to find solid answers to research questions). Gaining adequate awareness of the existing philosophical positions and related assumptions contributes significantly to the quality of the research results (Easterby-Smith, Thorpe and Jackson, 2008; Gelo, Braakmann and Benetka, 2008).

Three main epistemological positions are identified in the literature, namely, positivist, relativist and social constructionist. Positivist methods focus on identifying true answers where the researcher starts with specific research hypotheses and selects relevant methods to confirm or disconfirm them. However, relativist methods focus on identifying regular patterns in organizational behavior by measuring and studying a number of variables related to a specific topic in order to identify and explain the relationships between them. Finally, social constructionist methods assume that there is no absolute truth or reality, and the researcher's role is to establish how the claims for reality are constructed. Different research methods are relevant to each position. Therefore, the researcher's decision to study a topic in a particular way requires clarity on the epistemological in order to select relevant methods (Easterby-Smith, Thorpe and Jackson, 2008; Gelo, Braakmann and Benetka, 2008).

Based on the researcher's philosophical and theoretical stances, either a quantitative or a qualitative approach is selected to conduct a study. Additionally, the goals of a study,

whether to generate universal theories, test theories or produce locally relevant knowledge, guide the researcher's choice on how to study a specific topic. Whether theory or data should come first is another factor driving the researcher's choice of research method (Easterby-Smith, Thorpe and Jackson, 2008). In order to make an informed decision on the appropriate philosophical position and research method for this study, the literature review was conducted first to gain insight into what is already known in terms of theories related to the practice of ERM, researchers' philosophical positions and research methods employed in prior ERM research studies. The literature review identifies two main research streams studying ERM, namely, one exploring the determinants of ERM adoption and one evaluating the ability of ERM to create value. Majority of ERM researchers tend to use quantitative methods in their studies. Researchers using quantitative methods either attempt to use surveys or search publicly available information to test a set of hypotheses.

Although this approach for testing research hypotheses is used in several ERM quantitative studies, this study employs factor analysis techniques to explore, from a set of dimensions, the underlying factors affecting ERM implementation among Saudi organizations. The researcher's decision and the rational for selecting quantitative inquiry is based on the nature of the research problem, the research methods used in prior studies, the accessibility of data, skills and the researcher's skills and ability to collect and analyze data. Additionally, this study is the first to explore ERM implementation in Saudi organizations where exploratory methods are more relevant to the study than other methods are. These methods can also help to achieve the objectives of this study and to identify solutions to the practice-based problem facing the researcher's organization.

3.3 Data Collection

In general, selecting the sources from which quantitative data will be collected requires an adequate understanding of the advantages and disadvantages of each source.

Researchers first need to decide whether they will attempt to obtain quantitative data by collecting their own primary data or by utilizing secondary data from external sources stored in archival databases. Although secondary data is readily available and less costly to obtain, it has been criticized for its quality and the potential uncertainty of meeting research objectives. In contrast, using primary data has several advantages, as it provides new insights relative to previous studies, control over the sampling structure, greater confidence in the probability of the collected data and more likelihood that the collected data matches the objectives of the study. However, Easterby-Smith, Thorpe and Jackson (2008) argue that using primary data costs more and takes longer to collect.

The review of the literature reveals that authors of ERM empirical studies apply different techniques for collecting quantitative data, such as searching publicly available information, using surveys or obtaining data from other sources, like credit rating agencies (e.g., S&P). However, the approach of collecting data on the practice of ERM from publicly available information is criticized for inaccuracies due to the limited details reported by organizations on their ERM engagements (Lundqvist, 2014; Gates, Nicolas and Walker, 2012). Because of the underreporting issues and the limited data disclosed on the practice of ERM from publicly available information, the researcher argue that using surveys to investigate ERM implementation helps to collect more reliable data compared to other techniques (Beasley, Clune and Hermanson, 2005; Gates, Nicolas and Walker, 2012; Lundqvist, 2014).

In this study, a survey questionnaire is used to collect responses directly from research participants. However, there are some challenges to collecting accurate responses from participants who have relevant knowledge in risk management. For example, some of the responses reported may not accurately reflect actual ERM practices in the organization. Some of the participants might be responsible for delivering risk management activities in

the organization but might lack knowledge of the principles of risk management to understand and answer some of the questions in the survey. To overcome these challenges and minimize limitations in using surveys for this study, LinkedIn was utilized in this study to review participants' profiles and identify those who have adequate experience in risk management and can provide accurate answers to the survey questions.

The design of the data collection process for this study is based on an online survey approach to explore how the 44 ERM dimensions are actually implemented among a sample of Saudi organizations. The data collection process is also designed in a way to obtain responses from participants with relevant experience in the fields of either risk management, finance or internal auditing who work in publicly and non-publicly traded Saudi organizations. LinkedIn was the main channel used to identify participants who meet the sampling criteria and to distribute surveys.

3.3.1 Defining the Research Population and Sample

Defining the research population, which includes the whole set of participants, and drawing a representative sample from the population are key steps for collecting relevant quantitative data for a study. In addition, defining the sampling unit (e.g., company or person) and the quantity of these units is essential to making informed statements and conclusions about the research population from which the sample is drawn. Obtaining a sample with characteristics that are similar to the population helps to avoid potential bias in the sampling process. Such a sample can be achieved by giving every member in the population a similar and equal chance of being included in the research sample (Easterby-Smith, Thorpe and Jackson, 2008).

In order to define the population for this study, a literature review was conducted to explore and identify a list of job titles of individuals used in prior ERM studies. For

example, a study of 151 Nordic firms by Lundqvist (2014) to determine the integral components of ERM targeted the CEOs and chief financial officers (CFOs) of the sampled organizations. The main reason for targeting individuals holding the CEO or CFO job title is because of the key role these individuals play in ERM implementation. Another example is the study of Alzharani and Aljaaidi (2015) conducted for 102 publicly listed Saudi organizations, in which the researchers assert that individuals with an internal audit background would have the relevant knowledge about risk management practices in Saudi organizations. The main reason for this conclusion is that the responsibilities of monitoring and controlling risk management activities are closer to the audit committee than to the board of directors or other committees in Saudi organizations. Additionally, Davenport and Bradley (2001) indicate that the leaders who are critical for an ERM initiative to succeed are often CFOs, risk managers or leaders from the internal audit. It is evident that some organizations might not appoint a CRO to lead ERM activities; instead leaders from other functions such as internal audit or finance, might take the initiative to lead ERM activities. Therefore, including participants with a leadership role in internal audit and finance helps to provide some level of objectivity in the responses given since these participants usually have a better understanding of ERM implementation in their organizations.

In addition, the literature review reveals that the participants in a risk management study should include individuals from organizations that are either publicly or non-publicly traded. For example, a study by Kleffner, Lee and McGannon (2003) that investigates ERM implementation within Canadian companies finds no significant differences between organizations that are listed on the Toronto Stock Exchange (TSE) and those that are not in terms of their tendency to implement ERM. Similarly and with this assumption in mind, the population in this study should include individuals from publicly and non-publicly traded

Saudi organizations in order to gain an insightful and comprehensive understanding of ERM practices among Saudi organizations.

In this study, risk management professionals and leaders working in publicly and non-publicly traded Saudi organizations were the ideal candidates for this study. However, participation in this study should not be limited to risk management professionals and leaders. The study should be expanded to include participants at managerial levels in other functions, such as finance and internal audit, taking into consideration the fact that responsibility for ERM may vary from one organization to another. Therefore, the population for this study includes all individuals holding a leadership role from the risk management, finance and internal audit functions. It is assumed that such individuals would possess the required knowledge to provide accurate answers to the survey questionnaire. The organizations' CEOs, CFOs and leaders from internal audit functions are targeted in addition to risk management professionals and leaders because they tend to have the required knowledge to respond to the survey questionnaire for three main reasons.

1) CEOs are eligible candidates because they play a key role in setting the tone at the top, which influences the internal environment and relevant ERM components (COSO, 2014).

2) Risk management is an evolving practice among Saudi organizations, where corporate finance traditionally has the responsibility of managing financial risks, such as hedging and insurance. Therefore, CFOs of Saudi organizations are also eligible candidates because they play a key role in setting the required policies and organizational structure to implement risk management activities.

3) Individuals with an internal audit background have the required knowledge about risk management practices and are considered eligible candidates because they are given the

responsibility of evaluating the adequacy of risk management programs and providing assurance on the implementation of risk mitigation plans.

Having defined the population for this study, which includes the entire set of participants eligible to answer the research questionnaire, the next step is to define how to draw a representative sample from the population. To achieve a representative sample, the social networking site LinkedIn was used as the main source to search for individuals with relevant job titles such as CEO, CFO, CRO and Chief Audit Executive (CAE). LinkedIn also helped to review the profile of each participant to ensure that the sampled participants have the required risk management knowledge to answer the survey questionnaire. When the above job titles were not available, the researcher attempted to search for less senior job titles with risk management responsibilities, such as Director of Risk Management, Senior Risk Manager or Risk Manager. In addition, the Institute of Internal Auditing – Saudi Chapter was also leveraged to identify participants with an internal auditing background.

In order to make sure that the LinkedIn membership is representative of the entire population, a list of all Saudi companies listed on TADAWUL, was obtained from the Saudi stock exchange market website, which includes 167 publicly traded Saudi companies, in order to confirm and crosscheck that at least one participant from each company has an active LinkedIn account. In addition, a specific question on the current title/position of participants was included at the beginning of the questionnaire to control questionnaire respondents and to ensure that responses are distributed to and received from participants with relevant knowledge on risk management activities. Doing so also helps to understand the demographics of participants.

3.3.2 Approach for Data Collection

This research was designed to collect primary data only. Distribution of the research questionnaire started after receiving feedback on a pilot survey questionnaire. The survey questionnaire was administered through an online web-based tool. However, using an online web-based approach for data collection has advantages and disadvantages. For example, Couper (2000) indicates that data collection using a web-based survey approach is more attractive compared to other approaches for many reasons, such as low cost, convenience, speed, and ability to access a large number of participants, which would increase the response rate. In addition, the process of setting up an online web-based questionnaire is easy and helps to make the questionnaire more accessible to many participants by sending a link to main channels, such as LinkedIn and emails. The other advantage of using a web-based survey for data collection is the efficiency in terms of retrieving and analyzing the collected data. Researchers receive up-to-date information on progress and the number of responses collected. They also can download data into different formats for further analysis.

Although using a web-based survey has many advantages, there are some limitations or challenges for using the online questionnaire in a study. As the main purpose of using the online questionnaire is to access a large number of participants, researchers might send the questionnaire to wrong participants. For example, Couper (2000) indicates that errors such as writing the wrong email address or selecting the wrong participants might lead to a mismatch between the framed population and the targeted participants. To avoid this, LinkedIn was leveraged to search for participants with relevant experience by reviewing their profiles and professional experience in order to collect responses from the right participants.

The other limitation or challenge in using an online survey questionnaire is providing adequate assurance to participants that the confidentiality of their responses will be

maintained. For example, some of the participants might have the perception that their inputs on the risk management practices within their organizations might be shared with other organizations or used for other purposes than academic research. To minimize the impact of this limitation, a clear explanation about the purpose of the research, credibility, anonymity and the handling of inputs from participants was provided before subjects could access the online questionnaire. In addition, the security measures related to data handling, such as the use of passwords for data recorded electronically (i.e., input to web-based survey), are clearly stated to provide adequate assurance that participants' identities will be protected. The online web-based tool was administered through SurveyMonkey and could be accessed via a link (https://www.surveymonkey.com/s/QW6VFP9).

The link to the survey questionnaire was sent to participants mainly via LinkedIn. In some cases, whenever the email address of the participant was available, the link to the questionnaire was sent via an email invitation. Invitations to participants to complete the questionnaire were first sent in May 2015. Three reminders were sent to participants to encourage participation. The questionnaire remained open until the end of November 2015. A total of 129 responses were collected from participants working in publicly and non-publicly traded organizations headquartered in Saudi Arabia and operating in different industries (financial and non-financial). These responses were filtered so that only 103 responses were used in the data analysis process.

In general, research activities place some degree of burden on participants by asking them to voluntarily allocate time to complete the questionnaire and to share their experience on the practice of risk management. In order to minimize the burden to participants, the questionnaire was sent using an online web-based tool for quick access and designed such that it would not require more than 15 minutes to be completed. In addition, the questions

could be answered based on the participant's past experience in the field of risk management in their organization and did not require a search for answers in company records.

3.3.3 Characteristics of the Collected Sample

The survey questionnaire was sent to 366 participants with different job titles working in Saudi organizations in different industries. As indicated earlier, two main channels (i.e., LinkedIn and email) were used to send the link of the survey questionnaire to research participants. The majority of participants 89% received the survey questionnaire via LinkedIn, whereas 11% of the participants received the survey questionnaire via email (see Table 3.1).

Table: 3.1

Number of Surveys Sent via LinkedIn and Email	**N**	**(%)**
Number of surveys sent via LinkedIn	324	89
Number of surveys sent via email	42	11
Total number of surveys sent	**366**	

A total of 366 survey questionnaires were sent to research participants, and only 129 participants submitted their responses during the collection period. Of the 129 participants who submitted their responses to the SurveyMonkey tool, 21 participants answered only a few questions and did not complete the questionnaire, so these participants were removed from the sample. Out of the remaining 108, four questionnaires were received from participants whose organizations are not headquartered in Saudi Arabia, so they were also removed from the sample. In addition, one response was received from a participant who rated his/her degree of knowledge about the organization's risk management as "Don't Know," so this participant was removed from the sample. In summary, the response rate for

this study was 28.1%, with a total of 103 responses, which is very low and is considered one of the limitations of this study (see Table 3.2).

Table: 3.2

Summary of Survey Participants	**N**
Survey sent to a total of	366
Total of survey responses received	129
Surveys with incomplete responses	(21)
Surveys from participants who their organization is not headquartered in Saudi Arabia	(4)
Surveys from participants who rated their degree of knowledge about the organization's risk management as "Don't Know"	(1)
Total surveys remaining in the sample	**103**
Response Rate	**28.1%**

Comparing the response rate of this study to other ERM research studies, the literature review reveals that response rates of ERM studies range from 10% - 27%. For example, the response rates for research studies by Beasley, Clune and Hermanson (2005), Lundqvist (2014) and Gates, Nicolas and Walker (2012) were 10.3%, 22.6% and 27%, respectively. Although the response rate of this study is low, it is within the range of the response rates for prior ERM research studies.

As stated earlier, the sample of participants in this study is limited to individuals from Saudi organizations. The sample for this study includes participants from different industries, including publicly and non-publicly traded Saudi organizations, in order to gain a comprehensive understanding of ERM maturity among Saudi organizations. Although the sample includes a wide variety of organizations that operate in different industries, the types of risks facing each organization might be different, which might lead to difficulty generating accurate findings. This is also one of the limitations of this study in that the

results are not specific to one industry. To gain more insights in the collected sample, participants were asked to specify the primary industry of their organization. Although the individuals who participated in this study are from a wide range of industry sectors, around 23% of them are from banking and insurance and 34% are from the oil, gas and petrochemical industry. It is not surprising that majority of the survey responses are from these organizations because these industries are more likely to implement ERM programs. In addition, around 40% of the participants are from organizations that have an annual revenue between 1 Billion – 10 Billion Saudi Riyal (SAR), where 1 USD equals 3.75 SAR.

With the objective to gain insights into how organizations attempt to implement their ERM programs, participants were asked to specify if the organization's ERM framework was developed according to one of the international risk management standards or if it was created internally. Of the 103 participants that completed the survey, 69 respondents (67%) indicate that their organization adopted a formalized risk management program according to one of the international risk management standards, such as COSO framework, ISO framework, the Turnbull guidance and Basel II. However, 17 respondents (16.5%) indicate that their organization created its own risk management framework (see Table 3.3). This result indicates fairly wide adoption of a formalized ERM among Saudi organizations.

Table: 3.3

Summary of Responses on the Approach Used to Develop Risk Management Framework	**N**	**(%)**
Risk management framework developed according to one or multiple international risk management standards	69	67
Internally created framework with no reference to a specific international risk management standards	17	16.5
Participants did not report which framework was implemented in their organization	17	16.5

Individual characteristics, such as position/job title and degree of familiarity with risk management structure and risk management activities at an organization, were also collected to confirm the relevance of each submitted survey. Of the total respondents, 29% hold roles within the risk management function as a CRO, vice president (VP), general manager (GM) or manager, 24% hold roles within the internal audit function as a CAE, director, manager or auditor, 9.7% hold roles within the finance function as a CFO, VP or director and 10.7% prefer not to indicate their functional assignment (see Table 3.4).

Table: 3.4

Summary of Individual Respondent Characteristics	**N**	**(%)**
CEO	9	8.7
Risk management (CRO, VP, GM and manager)	30	29.1
Internal audit (CAE, director, manager and auditors)	25	24.3
Finance (CFO, VP and director)	10	9.7
Others (managing directors, GM, project managers)	18	17.5
Not provided	11	10.7

3.3.4 Design of the Survey Instrument for Data Collection

As the design of this study requires collecting inputs from human participants, the researcher has to comply with University of Liverpool's (UoL) requirements related to research studies with human participants. UoL's DBA students are required to complete and submit four forms for review and approval by the DBA Research Ethics Committee prior to the initiation of a study. Forms for approval to conduct research with human participants were submitted to the committee on December 2014 and approved on April 2015.

As indicated earlier, Lundqvist's survey instrument was leveraged to investigate ERM implementation among Saudi organizations and to explore factors affecting implementation. Below are the main reasons for selecting Lundqvist's survey instrument for this study.

1) Lundqvist's survey instrument was originally applied to a narrow range of participants to explore ERM implementation in organizations from one region only (i.e., Nordic countries). Since the scope of this study is Saudi organizations, it was motivating to leverage the same survey instrument to explore ERM implementation.

2) Applying the measurement tool to one country helps to achieve robust research results and conclusions that are more relevant to Saudi organizations and, in particular, to address the issues facing the researcher's organization.

3) Lundqvist's survey instrument is designed so that participants cannot tell that the focus is on ERM only. This questionnaire design approach helps to gain a comprehensive understanding of the maturity level of risk management practices. The objective is to avoid influencing participants' responses by using the tem "ERM," which might cause them to think that the questionnaire is not applicable to them or to provide inaccurate responses.

4) Several independent participants were formally engaged in reviewing the survey questionnaire, including the chairman of COSO, a researcher with experience in survey design and three ERM consultants. Having external participants review and validate the measurement tools provides assurance about the quality of the ERM dimensions and the research questionnaire.

5) The ERM dimensions in the survey instrument were derived from only one framework. In addition, the dimensions were very comprehensive in terms of identifying practices that may advance ERM implementation even when they are performed outside the ERM function. These practices include elements related to the level of clarity on the vision/mission and the strategies of the organization.

6) The ERM dimensions are not industry specific and allow the researcher to capture levels of ERM implementation between the implementation and non-implementation.

Permission was obtained prior to using the Lundqvist survey instrument for this study (see Appendix C). Although the survey instrument is suitable for this study, it consists of a large number of questions, which may create difficulty in finding participants who can provide accurate and relevant responses to all of the questions. Therefore, the original questionnaire, which consists of 76 questions, was carefully reviewed to optimize the number of questions. The questionnaire was modified in a way that would not impact the original components of the ERM dimensions. The main modifications are as follows. All open-ended questions that are not linked to a specific ERM dimension were removed because of their limited contribution to the objective of this study in terms of exploring and identifying factors affecting ERM implementation. In addition, all questions related to ERM dimensions that are highly correlated in Lundqvist's original analysis were also removed to avoid repetitive findings. Few other questions were removed or modified (see Appendix A).

Lundqvist uses two dimensions (i.e., likelihood and potential impact) to assess the degree to which significant events are considered for each of the following risk events: financial, strategic, economic, compliance, technology and reputation. For example, two dimensions are used to assess the degree to which the organization considers financial events. These dimensions are "the likelihood that financial risks and/or opportunities will affect the organization's ability to achieve its objectives" and "the potential impact that financial risks and/or opportunities will have on the organization's ability to achieve its objectives." The COSO framework recommends using the likelihood and potential impact together to prioritize risk events. It is difficult for respondents to provide accurate answers when separating the likelihood and potential impact dimensions. Therefore, the two dimensions related to financial events were combined into one dimension "the likelihood

and impact that financial risks and/or opportunities will have on the organization's ability to achieve its objectives."

In addition to the above questions that were modified or removed from the original questionnaire, a careful literature review was conducted to confirm the quality of the questionnaire and to identify additional dimensions or questions, if needed. On that basis, two questions were added. The first question is related to the "formal training on the organization's risk management program." Fraser and Simkins (2010) indicate that risk management training is one of the key ERM implementation strategies. They further assert that ERM training should focus on essential components, such as an overview of the organization's ERM framework and processes as well as risk inventory.

The second question added to the survey instrument, is related to "considering significant events (risks and opportunities) prior to strategic decisions such as investment in new projects, products or new merger and acquisition." Several researchers assert that positioning ERM as a strategic function creates value. This positioning also includes integrating ERM processes within the enterprise strategic planning and strategy execution processes in order to assess risks related to strategic objectives and strategic decisions and also helps to focus the attention of senior management and the board of directors on the most significant events that might impact the whole organization (Frigo and Anderson, 2011). In addition, Fraser and Simkins (2010) indicate that the benefits of embedding ERM processes into strategic decisions are overlooked by many organizations. The authors argue that a board of directors should focus on strengthening ERM processes to increase their ability to identify and assess risks that have significant impacts on the organization's strategic direction.

The final version of this study's questionnaire consists of 52 questions, including ERM dimensions, individual data and organizational data (see Appendix D). Participants were asked to rate the degree of implementing each ERM dimension in their organization over the last three years instead of in a specific year. Before the questionnaire was sent to the research participants, it was sent to Prof. Robin Luo, the thesis supervisor for this study, for review and comments. Based on the thesis supervisor's feedback, some modifications were made to the demographic data, and one question was removed. In addition, an online pilot test was conducted with two lead auditors and two ERM practitioners in order to test and refine the survey questions. No further modifications were suggested by the reviewers. The survey questionnaire consists of seven sections, as follows.

1) ***Introduction***: This section includes welcoming notes to participants and defines the maximum amount of time needed to complete the survey. It provides background on the study, its aim and its key objectives. This section also includes instructions for participants on how to contact the research supervisor or the research government office if they are unhappy or if there is a problem in the completing the questionnaire. Prior to answering the survey questions, participants were asked to confirm that they had read the participant information sheet and agreed to take part in the study.

2) ***Demographic questions***: These sections were added at the end of the questionnaire to gain insight into the types of risk management standards used in the organization, and whether the organization is listed on TADAWUL, and if the organization has an assigned CRO.

3) ***Dimensions related to the internal environment***: This section consists of ten questions related to an organization's internal environment, such as formally defined responsibilities for executive management, a formal strategy to pursue the mission (vision/purpose) of the organization and defined performance goals/targets, to assess

whether the organization is achieving its strategic business objectives. The availability of such dimensions is essential to implement ERM requirements, but these dimensions do not directly evaluate the maturity of ERM.

4) ***Dimensions related to control activities***: This section consists of four questions on how the controls related to the internal environment are monitored and evaluated. These questions include elements such as verification procedures to ensure that policies and procedures are implemented, channels for reporting a breach of the organization's code of ethics processes to evaluate the effectiveness and efficiency of the control environment.

5) ***Dimensions related to the implementation of specific risk management activities***: This section consists of fourteen questions assessing the maturity level of implementing risk management processes in accordance with the COSO framework. The questions focus on areas such as having a defined risk management philosophy (policy), a defined risk appetite, formalized training on risk management, a defined frequency for risk reporting to the board of directors and effective risk response plans for the identified risks.

6) ***Dimensions related to organizational structure of risk management***: This section consists of five questions assessing the maturity level of risk governance in an organization. These dimensions includes the availability of a board level committee for risk management oversight, the availability of a CRO or risk manager, the availability of a centralized department dedicated to risk management and assigned risk owners with clear responsibilities and accountabilities to manage risks related to their functions in the organization.

7) ***Dimensions related to specific types of events (risks and opportunities)***: This section consists of eleven questions focusing on the types of risk events that organizations

consider in the risk assessment process and whether the likelihood and potential impact of each risk event is evaluated adequately and consistently. Five risk events, namely, financial, strategic, compliance, operational and reputational are included in the questionnaire.

3.4 Data Analysis: Methods and Statistical Techniques

The rationale for using quantitative methods for this study was presented and discussed in Section 3.2. For example, nature of the research problem, the prior research methods applied to previous ERM empirical research studies and the complexity of the data collected help the researcher to make an informed decision in selecting a relevant and reliable data analysis method and statistical techniques. In this study, factor analysis was used to explore the factors affecting ERM implementation. The following are the main reasons for selecting factor analysis.

1) This study was initiated to explore solutions to a practice-based problem facing the researcher's organization with the aim to inform the organization on how to improve ERM implementation. Therefore, no specific theory or set of hypotheses is being tested. Instead, the scope of this study is exploratory, and a specific set of ERM dimensions is utilized to explore the underlying factors affecting ERM implementation in order to suggest a framework to improve this implementation.

2) The literature review reveals that no prior studies have been conducted to explore ERM implementation in Saudi organizations in order to determine the factors affecting its implementation. The literature review reveals that researchers, like Lundqvist (2014) and Lai (2014), who were the first ones to explore ERM implementation in the Nordic countries and Malaysia, respectively, use specific ERM dimensions and apply factor analysis to explore the underlying factor structure related to ERM implementation. This

is the first study exploring ERM implementation in Saudi organizations, so exploratory methods are more appropriate for this study than are other methods.

3) In this study, a total of 44 variables or dimensions are used to explore ERM implementation. The correlation matrix for this study yields a substantial number of large correlations among the research variables. Tabachnick and Fidell (2001) assert that a correlation among research variables above 0.30 strongly indicates that factor analysis is an appropriate statistical methodology. In this study, the correlation among the research variables exceeds 0.30, which confirms the appropriateness of the factor analysis technique for this analysis (see Appendix B).

4) Thompson (2004) asserts that one of the key advantages of factor analysis is its ability to reduce variable complexity to greater simplicity. Factor analysis is the most relevant methodology to apply in order to investigate the extent to which the ERM dimensions are correlated with each other in order to group similar dimensions that address the same issue affecting ERM implementation within one factor.

3.4.1 Overview of Factor Analysis

Factor analysis is a broad term used widely in the literature, but it represents a variety of methods and statistical techniques (Matsunaga, 2010). It is a multivariate statistical procedure and cyclical process that uses matrix algebra for its calculations. The basic statistic used in factor analysis is the correlation coefficient, which helps to determines the interrelationships (correlations) among a large number of measured or observed variables in order to determine the possibility of summarizing these relationships in a smaller number of latent or unobserved constructs (Yong and Pearce, 2013; Thompson, 2004). Factor analysis helps to reveal latent variables, known as factors, that cause covariance between measured variables but once these factors are identified or extracted, there are no intercorrelations

between any pairs of variables because the factors themselves account for the intercorrelations (Yong and Pearce, 2013).

The mathematical procedure of factor analysis helps to simplify interrelated measures to discover patterns in the measured variables. One of the assumptions in determining factors in the analysis process is that a linear relationship exists between the identified factors and the measured variables when calculating correlations (Gorsuch, 1983). The mathematical model of factor analysis is represented in equation (1), which is based on the assumption that the underlying factor structure includes *m* factors, where each observed variable is a linear function of the identified factors along with a residual. To represent the mathematical model of the factor analysis, *p* denotes the number of variables (X_1, X_2, …, X_p) where *m* denotes the number of underlying factors (F_1, F_2, …, F_m) (Yong and Pearce, 2013).

$$X_j = a_{j1}F_1 + a_{j2}F_1 + \ldots\ldots + a_{jm}F_m + e_j \qquad (1)$$

where:

X_j is the variable represented in the latent factors where $j = 1, 2, \ldots\ldots, p$.

$aj1$, $aj1$, ……, ajm are the factor loading where $aj1$ is the factor loading of jth

ej is the specific or unique factor

Applying factor analysis has several advantages. For example, Matsunaga (2010) indicates that applying the factor analysis procedure helps researchers to extract latent constructs or factors underlying a battery of measured variables while still maintaining important information from the original data. Henson and Roberts (2006) also assert that one of the key advantages of factor analysis in determining a theoretical construct that can represent the original variables. This construct can be achieved by removing redundant

information and noise induced by measurement errors. In addition, factor analysis helps researchers to analyze a large number of variables that are highly correlated with a smaller number of factors, which ultimately helps to identify logical combinations of variables to better understand and interpret their relationships. However, the literature review reveals that the implementation of factor analysis and the utility of its results are contingent on the soundness of the design of the study in terms of measuring variables that are based on reasonable guidelines and having adequate cases or a sufficient sample size to run factor analysis. First of all, researchers need to particularly focus on choosing the measured variables to use in their studies (Fabrigar et al. 1999). To achieve an appropriate variable section, the measured variables or ERM dimensions selected for this study were drawn from prior ERM empirical studies, where these dimensions were tested and proven to be robust for measuring ERM implementation.

Although factor analysis supports researchers in making informed data analysis decisions, some limitations and statistical issues require particular attention when applying factor analysis. For example, in using other techniques, such as multivariate analysis of variance and logistic regression, the solution is assessed and evaluated by how well it predicts group membership. For instance, in regression analysis, the dependent variable is a criterion, and the correlation between observed and predicted dependent variable scores serve as a test of the solution. However, factor analysis does include readily available criteria against which to test the solution (Tabachnick & Fidell, 2007). Factor analysis does not help the researcher to make an informed decision in naming identified factors. Instead, naming identified factors depends on the researcher's own interpretation of the variables related to each factor. Therefore, the factor name may not represent the combination of the variables loading into a particular factor (Tabachnick & Fidell, 2007).

The other limitation within the process of conducting factor analysis and especially after factor extraction is that a large number of rotations account for the same amount of variance in the original data but have different factor structures. However, the steps in conducting factor analysis require the researcher to make several statistical decisions and choices in terms of factor extraction and rotation, and these decisions may differ from one researcher to another, leading to different factor structures. Therefore, results from the same data may not be replicated exactly if different choices are made in performing the analysis (Henson and Roberts, 2006; Fabrigar et al., 1999).

Additionally, one of the limitations in applying factor analysis is the requirement of a large sample size in order to ensure the reliability of data analysis and identified factors. One of the rules highlighted in the literature is that 100 cases or below can be rated as poor, 101 to 200 cases can be rated as fair, 201 to 300 cases can be rated as good and 301 cases or more can be rated as excellent. Although Comrey and Lee (1992) argue that the recommended sample size is at least 300 participants, the required sample size to conduct factor analysis is debated. For example, MacCallum et al., (1999) and Fabrigar et al. (1999) do not evaluate the adequacy of factor analysis based on the sample size alone but rather suggest more specific criteria, such as the ratio of participants or cases to the number of variables. However, other researchers, like Gorsuch (1983), argue that 100 cases and above is adequate for applying factor analysis.

To address the sample size requirement and to ensure the appropriateness of factor analysis for this study, the survey questionnaire was sent to 366 participants with an aim of collecting at least 300 responses to achieve excellent sample size rating. Despite continuous follow up with participants, only 103 valid responses were received and used in the analysis. This number of cases is very low for conducting factor analysis, and is rated as fair. The following are the main reasons for not collecting an adequate number of responses.

1) The current study was limited to participants from Saudi organizations and does not include participants from international organizations located in Saudi Arabia.

2) The survey questionnaire was not sent to a very wide group of participants within each Saudi organization, as only participants with the required risk management knowledge were selected and invited to participate in the survey. This identification of appropriate participants was achieved by leveraging LinkedIn to review the profile of each participant.

Although only 103 responses were used in the data analysis, the results of the tests to validate the adequacy of the collected data for factor analysis were very robust. For example, the Kaiser-Meyer-Olkin (KMO) value, Bartlett's test of sphericity and communalities were reviewed and validated. The KMO value, which is a measure of sampling adequacy, is 0.832, which is greater than 0.5 (Yong and Pearce, 2013). Bartlett's test of sphericity ($\chi 2$ = 2532, df 703, P <0.001) is significant (Field, 2009) indicating that there is sufficient correlation between dimensions to use factor analysis (see Table 4.3). The communality of a variable, which represents the variance accounted for by a factor, was also reviewed to confirm the adequacy of the sample size for factor analysis. The data for this study produces high communalities (ranging from 0.4 to 0.9), with a mean of 0.70 (see Table 4.2), indicating that the sample size is adequate and does not pose any limitations for applying factor analysis (MacCallum et al., 1999; Yong and Pearce, 2013). Although initial analysis suggests that factor analysis is appropriate, the low number of responses is acknowledged as one of the limitations to generalizing the study results.

3.4.2 Methods of Factor Analysis

Two methods of factor analysis, EFA and CFA through structural equation modelling (SEM), are available for researchers to explore and confirm the underlying factor structure

of a data set. Selecting either EFA, CFA or both depends on whether the objective of the study is to develop theoretical constructs, prove/disprove proposed theories, reduce the number of variables or explore the relationship between variables (Williams, Onsman and Brown, 2012). EFA is used when there is little theoretical or empirical basis for the number of factors and the variables these factors are likely to influence. On the other hand, CFA is driven by theoretical expectations of structure of the data and can be used to test a proposed theory or model (Fabrigar et al. 1999). Matsunaga (2010) asserts that the EFA is used primarily for theory building, whereas CFA is used for theory testing. Understanding the differences between the two methods is very essential to making an informed decision of whether to use both or one of the methods to achieve the objectives the study. In the data analysis step of this research, only EFA is used, for the following reasons.

1) EFA is a heuristic method in the sense that the researcher does not have prior specifications for the nature or number of factors and their loadings. It is a data-driven technique that helps researchers to explore and determine the number of factors and the pattern of factor loadings in absence of theory to drive the analysis (Fabrigar et al. 1999). As indicated earlier, the nature of this research is exploratory, and 44 ERM dimensions were used to explore ERM implementation among Saudi organizations. The researcher is interested in exploring which dimensions or variables are relevant to each one another (i.e., correlated) in order to group them within one factor. Hence, EFA was used only to analyze the data in order to reduce the large number of measured variables or dimensions to a smaller number of latent variables or factors.

2) CFA through SEM is normally used to verify assumptions related to the relationships between observed and latent variables. It is driven by theoretical expectations regarding the structure of data and is normally used to test a quantitatively defined theory or model. To begin CFA, researchers should start with a model specification that is a

hypothesized structure or set of alternative structures that they believe may underlie the data (Finch and West, 1997). Thompson (2004), refer to the hypothesized structure as an a priori model of the underlying structure. The a priori model or the hypothesized structure should include specific expectations, such as the number of factors to retain, which variables are associated with given factors and whether the factors in the structure are correlated. These expectations will aid the researcher in testing if an a priori model fits the data (Thompson, 2004). However, the scope of this research is exploratory, and there are no specific hypotheses or models to test that would require a confirmatory approach to factor analysis.

3) Fabrigar et al. (1999) assert that in the absence of a strong basis for identifying one or more plausible models that support using advanced statistical methods such as SEM, applying only EFA is advisable. Because this study is the first conducted in Saudi Arabia investigating ERM implementation, and due to the lack of theoretical and empirical evidence related to the factors affecting ERM implementation among Saudi organizations, the researcher does not have a sufficient basis to identify a priori models in order to test them using the SEM method. Therefore, only EFA and underlying statistical analysis techniques were selected for the data analysis in this study.

4) Given the uniqueness of the dataset in this study and the lack of prior studies utilizing specific dimensions to explore ERM implementation among Saudi organizations, EFA was determined to be the most appropriate method for this study. EFA is thought to identify the underlying factors affecting ERM implementation in order to help the researcher suggest an appropriate framework to improve ERM implementation in his organization.

3.5 Statistical Analysis Techniques for Conducting EFA

The process of conducting EFA requires several important statistical decisions in order to define the meaningful latent factors (Henson and Roberts, 2006). Fabrigar et al. (1999) assert that determining the factor structure model from the analysis is both a substantive and statistical issue, where researchers need to produce a model that is interpretable and theoretically sensible. Therefore, it is essential to make appropriate decisions in the EFA process that are based on relevant theory and previous research. In addition, the success of EFA in providing insights into data depends on both design of the study and researcher making sensible decisions during the analysis process.

Prior to applying EFA, the researcher needs to decide on which statistical software packages to use in order to perform the statistical analysis. Three main software packages can be used for factor analysis, namely, SPSS, Mplus and PSPP. Although SPSS is the most costly, it has all of the features needed for statistical analysis, and the output results can be handled more easily than with other software tools. Therefore, IBM SPSS 23 was used to conduct the statistical analysis for this study.

3.5.1 Factor Extraction

The purpose of the factor extraction or retention step in EFA is to determine the number of factors to extract in order to produce a factor structure that provides insights into the data. Factor extraction is a decision making process whereby the researcher attempts to explore a series of alternative factor structure models and make an informed decision on the most appropriate model to produce an optimal number of factors that to explain the data (Fabrigar et al. 1999). Several factor extraction techniques are available for researchers, such as principal components analysis (PCA), maximum likelihood (ML), image factoring, alpha factoring, un-weighted least squares and generalized (weighted) least squares factoring. However, few sources in the literature can help researchers understand in detail the strengths

and weaknesses of each technique. Therefore, it can be very difficult for a researcher to make an informed decision of which technique to use. For example, Costello and Osborne (2005) indicate that many researchers who have used factor analysis in their studies do not provide a detailed explanation for why one specific technique was chosen over others, which poses a limitation around understanding differences between available techniques.

The literature review of ERM empirical studies reveals that two studies conducted to date use factor analysis methods to explore ERM (Lundqvist, 2014; Lai, 2014). However, limited information was provided in these studies about the basis for selecting the statistical techniques related to factor analysis. For example, Lundqvist (2014) states that the weighted least squares estimation (WLSE) technique was used in the study for factor extraction, but no further details were provided to compare its strengths and weaknesses to those of other techniques. The author only indicates that the WLSE technique was used in the study because (1) it is the default estimator in the MPlus statistical package and (2) the ceiling effects evident in the negative skews of several variables suggest the use of WLSE (Lundqvist, 2014). Lai (2014) only states that EFA was conducted without providing more details on which statistical techniques were used for factor extraction and rotation. Costello and Osborne (2005) assert that the difficulty in understanding the differences between each technique related to factor analysis and the basis for applying a specific technique may be the main reason for the popularity of the PCA technique.

In this study, ML was selected for factor extraction because it produces the optimum results when conducting factor analysis due to its formal statistical foundation. This foundation provides the researcher with more capabilities in terms of statistical inference, including significance testing and determination of the confidence level (Fabrigar et al. 1999; Costello and Osborne, 2005). Although the researcher selected ML for factor

extraction, the PCA technique was used in the initial test run only to compare its results with those of ML to confirm its applicability for factor extraction.

After selecting the most appropriate technique for factor extraction, several rules, strategies or criteria are recommended in the literature for deciding the number of factors to extract or retain for factor rotation, such as the eigenvalue (EV) rule or Kaiser criterion, the scree plot and parallel analysis. It is recommended to use more than one strategy or rule to test and confirm the number of factors to extract. The EV rule is the most frequently used criteria for factor retention and is the default option in many statistical packages, including SPSS. Based on this rule, the decision-making strategy states that any factor with an EV above 1.0 should be extracted but with the condition that each factor should consist of more than variable (Costello & Osborne, 2005). Fabrigar et al. (1999) assert that one of the drawbacks of using the EV rule is that it leads to an overestimation of the number of factors to retain. To avoid this drawback, Fabrigar et al. (1999) suggest using other tests such as the scree plot or parallel analysis, in order to obtain a better estimate of the number of factors to retain.

Thus, another test to confirm the number of factors to retain is the scree plot, which provides a graphical representation of the EV. The graph helps to identify the break point in the data in terms of where the curve displayed in the graph flattens out. The number of factors to retain should be above the break point but should not be the point where the bend occurs. The researcher can face difficulty in identifying the exact number of factors from the scree plot especially when the data points are clustered together near the bend. In this case, it is recommended to run several factor analysis tests, manually specifying the number of factors to retain, in order to see how the curve behaves. For example, Costello and Osborne (2005) recommend seeing the variable loadings in each run in order to identify the best factor structure that has no cross loadings for each variable. In certain cases when it is

difficult for the researcher to interpret data or when the loading table looks messy, it is recommended to remove the problematic variables or dimensions and rerun the factor analysis.

Other researchers assert that parallel analysis (PA) is the most accurate procedure to determine the number of factors to retain (Henson and Roberts 2006). Although PA is a recommended test, it is not available in the most frequently used statistical packages, including SPSS, so it must be calculated using another software package. To apply the PA test, Fabrigar et al. (1999) recommend comparing the EV obtained from the original sample data to the EV obtained from random data based on the notion that the EV of factors from the original data should be greater than the EV obtained from random data. The researcher can crosscheck the EV of each factor until reaching the point where the EV of a factor from the random data is greater than that from the original data.

In the factor extraction step for this study, all three criteria, namely EV, a scree plot and PA were used. In the initial run of the data using PCA, the EV criterion reveals that seven components should be extracted, whereas scree plot reveals that four components should be extracted. The statistical issues associated with the results from PCA are presented and discussed in Chapter Four. These results imply that PCA does not produce results that are interpretable and theoretically sensible. In contrast, using the ML technique produces more robust results. Two test runs were conducted using ML, and the final results produce a three-factor structure model that shows an appropriate presentation of the data.

3.5.2 Factor Rotation

The purpose of the factor rotation step in EFA is to simplify and clarify the data structure to make the representation of measured variables more interpretable without changing its original mathematical properties. In order to achieve this aim, factor rotation

helps the researcher to determine which measured variables load adequately onto a specific factor based on defined criteria, such as the factor loading value, which will be discussed later. There are two methods for factor rotation: the orthogonal method, which is based on the assumption that the factors are uncorrelated, and the oblique method, which is based on the assumption that factors are correlated. Furthermore, several factor rotation techniques are available for each method, and the researcher needs to select the common method recommended in the literature. Varimax, quartimax, and equamax are the three techniques available for orthogonal factor rotation in statistical packages like SPSS. Varimax is the most commonly used technique and is the default option when selecting PCA for component extraction.

For oblique factor rotation, oblimin, quartimin, and promax are the three techniques available in statistical packages like SPSS. Matsunaga (2010) asserts that the promax is the most recommended technique when applying oblique factor rotation as it focuses on maximizing the opportunity to make the resultant factors more distinguishable. To summarize, varimax and promax are the recommended techniques for the orthogonal and oblique factor rotation methods, respectively. In this study, orthogonal factor rotation with the varimax technique was used for the initial run of data analysis using PCA, and oblique factor rotation with the promax technique was used for the remaining test run of EFA. The main reason for using oblique factor rotation is that it produces additional matrices, namely, structure and pattern matrixes, which depict unique relationships or loading between variables and each factor, whereas orthogonal factor rotation only produces a loading matrix that shows correlations between observed variables and factors (Tabachnick and Fidell, 2007).

In addition to the selection of the appropriate factor rotation technique, the researcher needs to set a minimum value based on which the variables that will be retained in the factor

structure. Although the default setting in SPSS for variable loading is 0.10, the minimum value for variable loading to the factor structure is controversial. Tabachnick and Fidell (2007) state that a value of 0.32 is a good rule to use for the minimum loading of an item or variable, whereas Matsunaga (2010) argue that a value of 0.40 is the lowest acceptable threshold. Additionally, Comrey and Lee (1992) provide more stringent guidelines for variable loadings, and they indicate that variable loading greater than 0.71 is excellent, 0.63 is very good, 0.55 is good, 0.45 is fair and 0.32 is poor. It can be concluded from the above discussion that there is no single rule in the literature for setting the minimum value for variable loading. In general, the greater the loading value is, the more the variable is a pure measure of the factor. Therefore, a researcher should retain variables that load strongly onto one factor.

In the factor rotation step for this study, the minimum variable loading was set to 0.50, and any variable with a value less than that was removed from the final results. However, factors should be reviewed because any factor with less than three variables loading is considered a weak and unstable factor (Tabachnick and Fidell, 2007). Because of this requirement, several runs of EFA were conducted in order to ensure that at least three variables were loading to each factor. For example, in the first run of EFA, only two variables loaded to factors four, five and six, and only one variable was loading to factor seven. Therefore, these factors were considered weak and another run of EFA was conducted. The final step in EFA was the interpretation and labeling of the variables to factors, in which the researcher assigns a name to each factor based on how the variables relevant to each factor are grouped together.

3.6 Conclusions

This study uses quantitative methods, factor analysis in particular, and utilizes online surveys for data collection. Lundqvist's survey instrument is leveraged in this study with minor modifications to investigate ERM implementation among Saudi organizations. The survey questionnaire was sent to 366 participants with different job titles from different industries via LinkedIn and email. Only 103 valid responses were collected, implying a response rate of 28.1%. The collected data were analyzed using the EFA method, ML was selected for factor extraction, and the oblique technique (i.e., promax) was selected for factor rotation and supported the retention of three factors affecting ERM implementation.

CHAPTER FOUR

RESEARCH RESULTS AND DISCUSSION

This chapter describes in detail how the data analysis was conducted including data preparation, validation and iterations of the factor extraction and rotation. It also provides details on the interpretation and discussion of the resulting three-factor structure including the naming of each factor, the prioritization of the factors and comparing the findings with the literature.

4.1 Data Analysis to Explore the Factors Affecting ERM Implementation

In this study, a total of 44 variables were used to explore the factors affecting ERM implementation among Saudi organizations (see Table 4.1). As indicated earlier, the factor analysis methodology was selected to analyze the data for two main reasons. The number of variables selected for this study is large, and the correlation between these variables is significant (see Appendix B). Tabachnick and Fidell (2001) assert that when the correlation among research variables exceeds 0.30, it is a strong indication that factor analysis is an appropriate statistical methodology to apply because it helps to group highly correlated variables that address similar issues under one factor. They further assert that factor analysis helps to reveal the latent variables that cause the measured variables to covary. Matsunaga (2010) indicates that factor analysis is a broad term that is used widely in the literature but that represents a variety of methods and statistical techniques. EFA and CFA are the two methods available for researchers to explore and confirm the underlying factor structure of a dataset. In this study, only EFA was selected to explore the factors affecting ERM implementation. The reasons for not using a CFA approach, such as SEM were presented in Chapter Three.

Table: 4.1

List of Research Variables

No.	Variables / Dimensions
D1	Code of conduct/ethics
D2	Training in ethical values for employees of all levels
D3	Performance targets for employees of all levels
D4	Formally defined responsibilities for executive management including authority and accountability
D5	Ongoing training, coaching, and educational programs available to employees of all levels
D6	Formally defined audit committee responsibilities
D7	Formally defined corporate governance requirements
D8	Formal strategy to pursue the mission (vision/purpose) of the organization
D9	Performance goals/targets set to assess whether the organization is achieving its business objectives/plans
D10	System to ensure that policies and procedures that are in place to manage the achievement of the organization's objectives/plans are functioning and effective.
D11	Authorization procedures in place to ensure appropriate individuals review the use of policies and procedures
D12	Independent verification process/procedures to ensure the use of policies and procedures
D13	Channels of communication to report suspected breaches of code of conduct/ethics, laws, regulations, and other improprieties
D14	Monitoring of the organization's internal environment, processes, and control activities
D15	Determined correlations and portfolio effects of combined risks
D16	Determined quantitative impacts risks may have on key performance indicators

Table: 4.1 - Continued

No.	Variables / Dimensions
D17	Formal report submitted to the board level at least annually on the current state of risk and effectiveness of risk management
D18	Key risk indicators or indicators aimed at emerging risks (not historical performance)
D19	Centralized technology-enabled process to obtain risk-related information
D20	Verification of the completeness, accuracy, and validity of risk-related information
D21	Formal policies/procedures about how risk should be managed
D22	Risk response plan for all of the significant events the organization has identified
D23	Communication to all stakeholders, internal and external, of the importance of risk management
D24	Formal training in the organization's risk management program
D25	Assessment of the organization's risk management function done by an independent/external party
D26	Frequent and structured updates of risk-related information
D27	Formal written risk management philosophy (policy)
D28	Formal written statement of the organization's risk appetite
D29	Board level committee with responsibility for risk management oversight
D30	A senior manager designated with the responsibility to oversee risks and risk management activities
D31	Centralized department or staff function dedicated to risk management
D32	Internal risk assessment group or internal audit function given the responsibility to evaluate the ongoing effectiveness of the organization's risk management

Table: 4.1 - Continued

No.	Variables / Dimensions
D33	Allocated risk owners who have primary responsibility and accountability for managing risk within their respective areas
D34	Consideration of financial risks and opportunities
D35	Consideration of the likelihood and potential impact of financial risks and opportunities affecting the achievement of strategic objectives
D36	Consideration of strategic risks and opportunities
D37	Consideration of the likelihood and potential impact of strategic risks and opportunities affecting the achievement of strategic objectives
D38	Consideration of compliance risks and/or opportunities
D39	Consideration of the likelihood and potential impact that compliance risks and/or opportunities will have on the organization's ability to achieve its objectives
D40	Consideration of operational risks and opportunities
D41	Consideration of the likelihood and potential impact that operational risks and/or opportunities will have on the organization's ability to achieve its objectives
D42	Consideration of the likelihood and potential impact that reputation risks and/or opportunities will have on the organization's ability to achieve its objectives
D43	Consideration of the likelihood and potential impact that reputation risks and/or opportunities will have on the organization's ability to achieve its objectives
D44	Consideration of different types of risk and opportunity events prior to strategic decisions

4.1.1 Validating the Adequacy of Data for Applying EFA Techniques

Prior to starting the data analysis process, the data were reviewed to prepare for EFA and to confirm that collected data were ready and suitable for conducting EFA. The following key steps were followed in order to prepare and confirm the adequacy of the data for EFA:

1) ***Categorizing responses*:** For each dimension in the original survey, participants were requested to rate the degree of implementation for each ERM dimension using a Likert scale. In preparing the data for analysis using IBM SPSS 23, the Likert scale in the original survey was converted to numerical values ranging from one to four. However, all questions rated as "Don't Know" are treated in the analysis as missing data, and no numerical value was provided.

2) ***Screening and testing variables for missing data***: Some questions in the survey were not answered. Participants may have marked these questions as "Don't Know" or may have missed answering some of the questions. The missing data for this sample was analyzed using SPSS's missing value analysis (MVA) function. The MVA function helps to validate if data is missing completely at random (MCAR), missing at random (MAR) or missing not at random (MNAR). If the analysis reveals that data is MCAR, then no imputation procedure is considered, but if data is MAR, then there are patterns of missingness between pairs of variables in the dataset, that are not related to the dependent variables in the study. Finally, MNAR suggests the missingness relates to the outcomes of interest and cannot be ignored (Tabachnick and Fidell, 2007). The analysis reveals that, for this study, the total number of missing data points (i.e., questions marked "Don't Know" or not answered) is 116, which is equivalent to 2.5% of data set. The analysis confirms that the missing data is non-significant ($\chi^2 = 1195.208$, $p = 0.24$) and that there is no identified trend. Therefore, questions with missing answers or those marked as "Don't Know" were dealt with as MCAR. The option selected for dealing with missing data in the subsequent factor analysis is the "listwise" option, which is the default option in IBM SPSS 23.

3) ***Testing the reliability of the survey instrument*:** The reliability of a survey instrument refers to its ability to measure consistently. Cronbach's alpha is a commonly used test to

determine the reliability and internal consistency of a survey. It helps to measure the correlations among items in a survey to determine if they are interrelated. For this study, Cronbach's alpha was used to measure the consistency of responses related to the degree of ERM implementation based on the COSO framework. The 44 ERM dimensions have a Cronbach's alpha of 0.976, which is greater than 0.70, the typical definition of acceptable reliability. According to Cicchetti and Sparrow (1990), a Cronbach's alpha value less than 0.7 is considered unacceptable.

4) ***Testing the correlation among research variables*:** As indicated earlier, a high correlation among research variables is a strong indication that factor analysis is an appropriate statistical methodology to apply in a study (Tabachnick and Fidell, 2001). The correlation matrix of all 44 variables yielded a substantial number of large correlations among the research variables, which validates the adequacy of using factor analysis in this study. However, Tabachnick and Fidell (2007) assert that extreme correlation between variables (correlation > 0.90) is a problem when conducting factor analysis. Therefore, before applying EFA, the data were analyzed in order to identify evidence of very extreme correlation among the ERM dimensions in order to eliminate redundant variables. The correlation matrix does not reveal variables with correlation above 0.9 (see Appendix B).

5) ***Examining data for skewness and kurtosis*:** According to Curran, West and Finch (1996), it is recommended to test the distribution of variables to ensure that the skewness is less than two and the kurtosis is less than seven in order to avoid severe non-normality. This test was conducted and revealed that the skewness and kurtosis values of the data are within the acceptable limits, which provides confirmation that EFA can be used for the data (see Table 4.2).

6) ***Testing the adequacy of the sample size for EFA*:** Yong and Pearce (2013) assert that the sample size should be tested in order to confirm its adequacy for conducting EFA. The KMO value, Bartlett's test of sphericity and communalities were reviewed and validated. The KMO value, which is a measure of sampling adequacy, shows a value of 0.832, which is greater than 0.5, indicating that the data is a homogeneous collection of variables that is suitable for EFA (Yong and Pearce, 2013). Bartlett's test of sphericity ($\chi 2$ = 2532, df 703, P <0.001) is significant (Field, 2009), indicating that the correlation between dimensions is sufficient to use EFA (see Table 4.3). The communality of a variable, which represents the variance accounted for by a factor, was also reviewed and validated to confirm the adequacy of the sample size for EFA. The data used in this study produces high communalities with a mean of 0.70 (see Table 4.2) indicating that the sample size is adequate and does not pose a limitation to applying EFA (MacCallum et al., 1999; Yong and Pearce, 2013).

Table: 4.3

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin (KMO) measures of sampling sdequacy		0.832
Bartlett's test of sphericity:	Approx. Chi-Square	2532
	df	703
	Sig.	0.0000

Table 4.2

Dimensions	Mean	Std. Deviation	Skewness	Kurtosis	Communalities
D1	3.25	0.79	-1.09	1.20	0.66
D2	2.84	1.05	-0.46	-0.99	0.69
D3	3.22	0.71	-0.69	0.43	0.52
D4	3.44	0.73	-1.23	1.15	0.71
D5	2.92	0.82	-0.39	-0.38	0.66
D6	3.60	0.67	-1.63	2.14	0.77
D7	3.42	0.79	-1.40	1.59	0.78
D8	3.36	0.78	-1.11	0.79	0.56
D9	3.35	0.76	-1.10	0.92	0.62
D10	3.20	0.76	-0.76	0.41	0.85
D11	3.23	0.79	-0.92	0.56	0.66
D12	3.20	0.77	-0.89	0.73	0.72
D13	3.11	0.95	-0.87	-0.14	0.89
D14	3.29	0.78	-0.94	0.50	0.73
D15	2.66	0.93	-0.34	-0.68	0.67
D16	2.64	0.94	-0.24	-0.80	0.71
D17	3.14	1.00	-0.98	-0.11	0.70
D18	2.69	1.00	-0.33	-0.90	0.70
D19	2.53	1.13	-0.21	-1.37	0.57
D20	2.80	0.95	-0.44	-0.67	0.76
D21	3.01	0.97	-0.77	-0.32	0.81
D22	2.94	0.98	-0.71	-0.41	0.80
D23	2.85	0.98	-0.40	-0.87	0.70
D24	2.61	0.99	-0.28	-0.94	0.73
D25	2.51	1.18	-0.11	-1.50	0.34
D26	2.82	0.98	-0.49	-0.71	0.83
D27	2.93	1.10	-0.72	-0.80	0.80
D28	2.59	1.17	-0.23	-1.43	0.67
D29	3.05	1.04	-0.82	-0.54	0.47
D30	3.18	1.05	-1.07	-0.13	0.62
D31	2.97	1.10	-0.79	-0.70	0.67
D32	3.18	0.98	-1.10	0.23	0.58
D33	3.03	1.03	-0.77	-0.55	0.70
D34	3.64	0.67	-2.24	5.48	0.78
D35	3.45	0.74	-1.40	1.86	0.82
D36	3.35	0.77	-0.97	0.27	0.74
D37	3.25	0.78	-0.86	0.33	0.67
D38	3.41	0.77	-1.13	0.59	0.68
D39	3.34	0.77	-1.08	0.87	0.59
D40	3.42	0.82	-1.37	1.24	0.89
D41	3.33	0.82	-1.13	0.75	0.89
D42	3.28	0.88	-0.84	-0.51	0.84
D43	3.20	0.87	-0.69	-0.60	0.87
D44	3.19	0.92	-0.90	-0.12	0.63
			Mean for Communalities		**0.70**

4.1.2 Testing Different Factor Structure Models

To explore and identify the best factor structure model that can provide an accurate representation of the data, different statistical analysis techniques, which were presented and discussed in the previous chapter, are available for factor extraction and rotation. Among these different analysis techniques, ML was selected for factor extraction, and the oblique technique (i.e., promax) was selected for factor rotation. However, before using the ML technique to run the data analysis, the PCA technique was initially used to compare its results with those of the ML technique. The main reason for using PCA initially is its popularity in the literature for conducting EFA. However, the popularity of PCA has been challenged. For example, Fabrigar et al. (1999) assert that the PCA is an approach for identifying components, not common factors. They argue that PCA is mistakenly used in research studies as a factor analysis procedure, but it is not that type of procedure. Whereas factor analysis supports researchers in explaining the correlations between variables in order to distinguish between shared and unique variances, the PCA method does not. Additionally, for this study, the minimum variable loading was set to 0.5 when conducting EFA. Tabachnick and Fidell (2001) assert that the greater the loading value is, the more the variable is a pure measure of the factor. Using a higher value for the variable loading helps to compensate for the limitations in the sample size.

Initial run of research data using PCA with varimax rotation: Respondents' inputs for the 44 dimensions in the survey instrument were used to run PCA. Based on the Kaiser criterion test with EV >1, the total variance table shows that the total number of components to retain is seven, explaining 75.28% of the total variance. A higher percentage of total variance explained indicates a strong relationship among a group of variables (see Table 4.4).

Table: 4.4

Total Variance Explained for Initial Run Using PCA

Components	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	22.14	50.33	50.33	22.14	50.33	50.33	10.52
2	3.79	8.61	58.93	3.79	8.61	58.93	5.97
3	2.04	4.63	63.57	2.04	4.63	63.57	4.54
4	1.59	3.60	67.17	1.59	3.60	67.17	4.07
5	1.33	3.03	70.20	1.33	3.03	70.20	3.07
6	1.19	2.70	72.90	1.19	2.70	72.90	2.63
7*	1.05	2.38	**75.28**	1.05	2.38	75.28	2.32
8	0.93	2.11	77.40				

* Only seven components will be extracted because at component seven (EV >1) and at component eight (EV<1)

The second criterion used in this run to identify the total number of factors to retain is the scree plot. The scree plot for this run shows that the break point occurs at factor four, at which point the curve flattens out. Normally, the number of factors to retain should be above the break point but should not be the point where the bend occurs. This test therefore indicates that the total number of factors to retain in this case is three (see Figure 4.1). In addition, the rotated component matrix shows the dimension loading for the seven factors (see Table 4.5). An analysis of the PCA results reveals the following issues:

1) The optimal number of factors to retain using the two test criteria is inconsistent. Whereas the Kaiser criterion test with EV >1 recommends retaining seven factors, the scree plot recommends retaining three factors.

2) Interpreting the variable loading for the extracted components as represented in the rotated component matrix is difficult for the following reasons:

a) In three cases, variables cross load to two components. Dimension D24 loads to factors one and five. In addition, dimensions D34 and D35 load to factors two and three. This cross loading issue creates difficulty in making an informed decision to relating dimensions D24, D34 and D35 to one specific component.

b) Factor seven is weak and unstable because only one dimension loads to it. Tabachnick and Fidell (2007) assert that a factor with less than three variables loading is considered a weak and unstable factor.

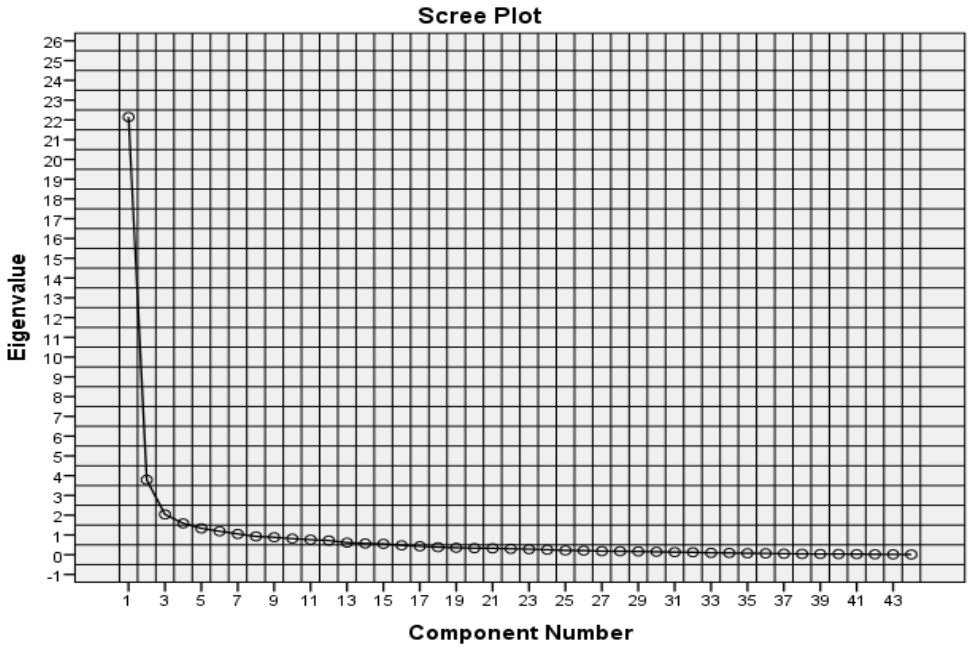

Figure 4.1: Scree plot for Principle Component Analysis

The above outputs and analysis indicate that PCA does not produce results that are interpretable and theoretically sensible. This limitation is highlighted in the literature. Thus, the ML technique for factor extraction with promax rotation is used in this study, and different factor structure models are tested using SPSS. The below test runs provide more details on the outputs of the EFA results.

Table: 4.5

PCA Rotated Component Matrix

Dimensions	Components						
	1	**2**	**3**	**4**	**5**	**6**	**7**
D1					0.62		
D2					0.68		
D3						0.51	
D4				0.73			
D5						0.54	
D6				0.83			
D7				0.69			
D8						0.72	
D9						0.54	
D10					0.51		
D13							0.52
D15	0.60						
D16	0.76						
D17	0.70						
D18	0.69						
D19	0.61						
D20	0.77						
D21	0.80						
D22	0.73						
D23	0.74						
D24	**0.69**				**0.51**		
D26	0.82						
D27	0.78						
D28	0.69						
D30	0.63						
D31	0.68						
D32	0.60						
D33	0.67						
D34		**0.54**	**0.52**				
D35		**0.63**	**0.57**				
D36			0.69				
D37			0.76				
D38		0.73					
D39		0.71					
D40		0.82					
D41		0.80					
D42			0.68				
D43			0.74				
D44		0.56					

***The first run of EFA using the ML approach with a promax rotation*:** A total of 44 dimensions are used in first run of EFA using the ML approach. Based on the Kaiser criterion test with EV >1, the total variance table shows that the total number of factors to retain is seven, where 75.28% of the total variance is explained (see Table 4.6). The total variance explained using the ML technique is almost similar to the results generated using PCA.

Table: 4.6

Total Variance Explained for First Run of EFA

Factors	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	22.14	50.33	50.33	21.73	49.39	49.39	17.64
2	3.79	8.61	58.93	3.57	8.11	57.50	15.38
3	2.04	4.63	63.57	1.79	4.06	61.56	11.03
4	1.59	3.60	67.17	1.18	2.69	64.25	4.34
5	1.33	3.03	70.20	0.97	2.20	66.45	12.93
6	1.19	2.70	72.90	1.01	2.29	68.74	7.06
7*	1.05	2.38	**75.28**	0.80	1.83	70.56	10.20
8	0.93	2.11	77.40				

* Only seven factors will be extracted because at factor seven (EV >1) and at factor eight (EV<1)

The second criterion used in this run is the scree plot. The scree plot for this run shows that the break point occurs at factor four where the curve flattens out. Normally, the number of factors to retain should be above the break point but should not include the point where the bend occurs. Thus, this criterion indicates that the total number of factors to retain in this run is three (see Figure 4.2).

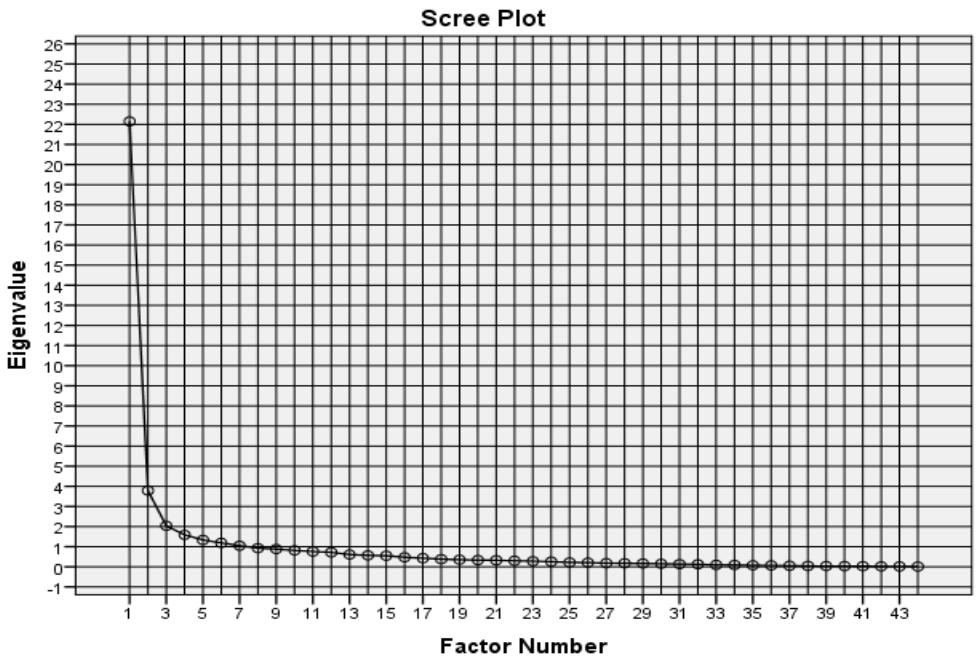

Figure 4.2: Scree plot for the first run of EFA

The other test recommended in the literature to confirm the number of factors to retain is PA. Henson and Roberts (2006) assert that PA is the most accurate procedure to determine the number of factors to retain. As PA is not available in IBM SPSS 23, the website (http://smishra.faculty.ku.edu/parallelengine.htm) was used to determine the number of factors to retain. When applying the PA procedure, the EV obtained from the original sample data is compared to the EV obtained from random data (using the above website). Fabrigar et al., (1999) indicate that the choice of the number of factors to retain is based on the notion that the EV of factors from the original data should be greater than the EV obtained from random data. The PA test was conducted for the 44 dimensions. The EV of factors obtained from the original data was compared with the EV of factors obtained from random data, and the results reveal that the number of factors to retain is three (see Table 4.7).

Table: 4.7

Parallel Analysis Test

Factors	Initial EV	Random EV	Comments
1	22.14	2.16	
2	3.79	1.91	
3	2.04	1.74	The number of factors to retain is three
4	1.59	1.63	At factor four, the EV from the random test is greater than EV from initial test. Therefore, factor four should not be included

After confirming the number of factors to extract, the pattern matrix table must be reviewed to interpret the variable loading of each factor. In this study, a promax oblique rotation was used with a delta of zero and kappa four, which are the default settings in IBM SPSS 23. Costello and Osborne (2005) state that there is no adequate explanation in the literature of when and why to change the delta and kappa settings. Therefore, the default settings in SPSS for delta and kappa were used. In addition, the minimum value for variable loading was set at 0.50, so that variables with a loading value of 0.50 or above were considered significant, and variables with a loading value less than 0.50 were dropped from the resulting factor structure (Tabachnick and Fidell, 2007). In conclusion, there is strong evidence that a seven-factor structure is weak and difficult to interpret for the following reasons:

1) The optimal number of factors to retain using the three test criteria, as illustrated above, is inconsistent. Although the EV test recommended retaining seven factors, the scree plot and the PA recommended retaining three factors.

2) Factors four, five, six and seven are weak and unstable because the pattern matrix table shows that only two dimensions load to factors four, five and six and only one dimension loads to factor seven (see Table 4.8). Tabachnick and Fidell (2007) assert that a factor with less than three variables loading is considered weak and unstable.

3) The majority of the dimensions (84%) load strongly to factors one, two and three, which is a clear indication that the first three factors have a strong contribution to ERM implementation compared to the remaining factors.

Based on the above results, a second run of EFA needs to be conducted to produce a stronger factor structure model that can be interpreted and is theoretically sensible. Because factors four, five and six have a low number of dimensions loading, as illustrated in the first run, they were removed in the second run, and the number of factors to retain was set at three. The reason for setting the number of factors to retain at three is that researchers like Costello and Osborne (2005) recommend removing the problematic factors and rerunning the factor analysis when it is difficult to interpret data or the loading table looks messy.

Table: 4.8

Pattern Matrix for the First Run of EFA

Dimensions	Factors						
	1	2	3	4*	5*	6*	7*
D1				0.51			
D2				0.55			
D4			0.73				
D5							0.69
D6			0.84				
D7			0.68				
D12					0.63		
D13					0.76		
D15	0.64						
D16	0.86						
D17	0.75						
D18	0.74						
D19	0.64						
D20	0.87						
D21	0.84						
D22	0.72						
D23	0.74						
D24	0.67						
D26	0.88						
D27	0.78						
D28	0.73						
D30	0.55						
D31	0.65						
D32	0.51						
D33	0.60						
D34		0.53					
D35		0.83					
D38		0.64					
D39		0.65					
D40		1.03					
D41		1.09					
D42						0.60	
D43						0.73	
D44		0.61					

* **Notes:** There were only two dimensions loading to factors four, five, and six and only one dimension was loading to factor seven. Therefore, these factors were considered weak and another test will be conducted and the number of factors to retain will be set in SPSS to three factors.

***The second run of EFA using the ML approach with a promax rotation and setting the number of factors to retain to three*:** The same 44 dimensions were used to rerun EFA with the number of factors to retain set to three. Therefore, the EV criterion was not used in this analysis. Only the scree plot, PA and the interpretation of the pattern matrix were reviewed to validate the adequacy of the resulting factor structure. The total variance table shows that 63.57% of the total variance is explained (see Table 4.9). Although the total variance explained is lower than the total variance explained in the first run, the total variance explained still exceeds the average of 52.03% reported by Henson and Roberts (2006) in their meta-analysis.

Table: 4.9

Total Variance Explained for the Second Run of EFA

Factors	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	22.14	50.33	50.33	21.68	49.27	49.27	18.12
2	3.79	8.61	58.93	3.43	7.80	57.07	16.26
3	2.04	4.63	**63.57**	1.58	3.59	60.66	16.77

In addition, the scree plot for this run shows that the break point occurs at factor four where the curve flattens out. Normally, the number of factors to retain should be above the break point but should not include the point where the bend occurs. This result indicates that the total number of factors to retain in this case is three (see Figure 4.3).

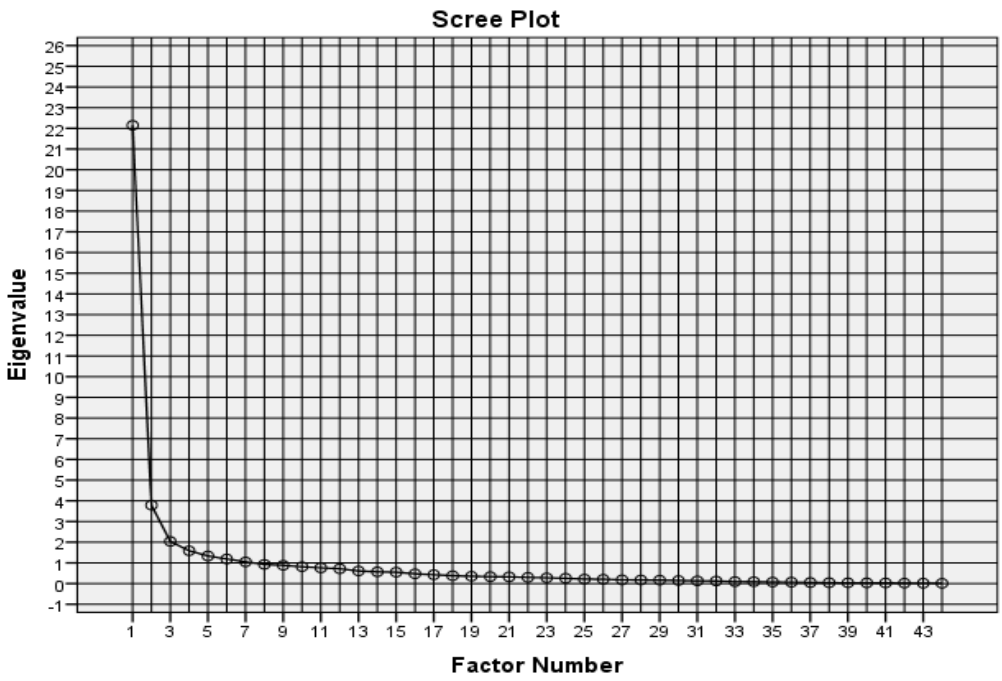

Figure 4.3: Scree plot for the second run of EFA

A review of the IBM SPSS 23 outputs for the second run of EFA provides strong evidence that the three-factor structure demonstrates a stronger representation of the ERM dimensions and is more interpretable and theoretically sensible compared to the seven-factor structure model produced in the first run of EFA. The following are the key observations on the results of the analysis:

1) The scree plot confirms that three factors should be retained. This result is consistent with the output from the first run. We can conclude that the scree plot always confirms that the data can be represented in a three-factor structure model.
2) PA also confirms that the data can be represented in a three-factor structure model (see Table 4.7).
3) All the dimensions resulting from the three-factor structure are loading strongly (with loading value > 0.50) to their respective factor (see Table 4.10).
4) No dimension cross loading is observed between factors, which also confirms the strength of the factor structure produced in the second run of EFA.

Table: 4.10

Pattern Matrix for Second Run of EFA

Dimensions	Factors		
	1	2	3
D2			0.52
D4			0.55
D6			0.68
D7			0.55
D10			0.55
D11			0.69
D12			0.85
D13			0.71
D14			0.58
D15	0.57		
D16	0.87		
D17	0.70		
D18	0.67		
D19	0.59		
D20	0.83		
D21	0.91		
D22	0.80		
D23	0.82		
D24	0.77		
D26	0.95		
D27	0.87		
D28	0.72		
D29			0.51
D30	0.59		
D31	0.68		
D32	0.52		
D33	0.65		
D34		0.74	
D35		0.93	
D36		0.60	
D37		0.64	
D38		0.63	
D39		0.70	
D40		0.98	
D41		1.02	
D43		0.53	
D44		0.68	

4.2 Interpretation and Discussion of the Resulting Three-Factor Structure

Fabrigar et al. (1999) assert that determining the factor structure model from EFA is both a substantive and statistical issue, where researchers need to produce a model that is interpretable and theoretically sensible. After considerable examination of several results of the factor structure models presented in the previous section, the three-factor model was deemed the best fitting model and superior to other models. The final model resulting from the EFA eliminated a total of seven ERM dimensions. This result means a total of 37 ERM dimensions loading to three factors are retained for further analysis. These dimensions were examined to determine the appropriate name of each factor, taking into consideration theory and research results currently available in the literature.

The first factor is named **"ERM structure and standards"** because the 17 ERM dimensions that loaded to the first factor contain important elements related to the ERM organization structure and standards, which appear to have a significant impact on ERM implementation. The following 17 dimensions are associated with the first factor (see Table 4.11).

Table: 4.11

Factor 1	No.	ERM Dimensions
ERM structure and standards	1	**D15.** Determined correlations and portfolio effects of combined risks
	2	**D16.** Determined quantitative impacts risks may have on key performance indicators
	3	**D17.** Formal report submitted to the board level at least annually on the current state of risk and effectiveness of risk management
	4	**D18.** Key risk indicators or indicators aimed at emerging risks (not historical performance)
	5	**D19.** Centralized technology-enabled process to obtain risk-related information
	6	**D20.** Verification of the completeness, accuracy, and validity of risk-related information
	7	**D21.** Formal policies and procedures about how risks should be managed
	8	**D22.** Risk response plans for all of the significant events the organization has identified
	9	**D23.** Communication to all stakeholders, internal and external, of the importance of risk management
	10	**D24.** Formal training about the organization's risk management program
	11	**D26.** Frequent and structured updates of risk-related information
	12	**D27.** Formal written risk management philosophy (policy)
	13	**D28.** Formal written statement of the organization's risk appetite
	14	**D30.** A senior manager designated with the responsibility to oversee risks and risk management activities
	15	**D31**. Centralized department or staff function dedicated to risk management
	16	**D32.** Internal risk assessment group or internal audit function given the responsibility to evaluate the on going effectiveness of the organization's risk management
	17	**D33.** Allocated risk owners who have primary responsibility and accountability for managing risks within their respective areas

Comparison of findings with the literature: The 17 dimensions related to factor one can be grouped into two main areas, namely, ERM structure and standards. The literature review confirms that these two elements play a key role in ERM implementation. For example, a study by Kleffner, Lee and McGannon (2003) conducted for a sample of Canadian companies confirms that organizational structure is one of the main factors affecting ERM implementation. In addition, the Economist Intelligence Unit (EIU) concludes from a study conducted in 2001 on a sample of companies in Asia, North America and Europe that one of the main factors affecting the practice of ERM is whether the organizational structure is conducive to ERM (EIU, 2005).

In terms of the importance of ERM standards, Mikes and Kaplan (2014) conclude from a ten-year field study that current guidance and tools on how to implement a company-wide risk management framework and processes are immature and still emerging. Researchers assert that the success of ERM implementation depends on an adequate fit between ERM design parameters known as the ERM mix and other contingent variables. They refer to the ERM mix as risk identification processes, risk tools and role of the risk function. Fraser and Simkins (2010) assert that defining common risk terminologies when designing ERM processes and related procedures and guidelines helps to promote consistent risk management practices.

The second factor is named **"enterprise's portfolio of risks and opportunities"** because this factor includes considerations of different types of events (risks and opportunities) affecting the achievement of strategic objectives. It includes ten ERM dimensions that represent the importance of having a comprehensive portfolio of different types of events (risks and opportunities) relevant to strategic objectives. These dimensions appear to have a significant impact on ERM implementation and consist of the following dimensions (see Table 4.12):

Table: 4.12

Factor 2	No.	ERM Dimensions
Enterprise' s portfolio of risks and opportunities	1	**D34.** Consideration of financial risks and opportunities
	2	**D35.** Consideration of the likelihood and potential impact of financial risks and opportunities affecting the achievement of strategic objectives
	3	**D36.** Consideration of strategic risks and opportunities
	4	**D37.** Consideration of the likelihood and potential impact of strategic risks and opportunities affecting the achievement of strategic objectives
	5	**D38.** Consideration of compliance risks and/or opportunities
	6	**D39.** Consideration of the likelihood and potential impact that compliance risks and/or opportunities will have on the organization's ability to achieve its objectives
	7	**D40.** Consideration of operational risks and opportunities
	8	**D41.** Consideration of the likelihood and potential impact that operational risks and/or opportunities will have on the organization's ability to achieve its objectives
	9	**D43.** Consideration of the likelihood and potential impact that reputation risks and/or opportunities will have on the organization's ability to achieve its objectives
	10	**D44.** Consideration of different types of risk and opportunity events prior to strategic decisions

Comparison of findings with the literature: Fraser and Simkins (2010) assert that one of the key objectives of ERM is increasing the likelihood of achieving strategic objectives and supporting the board of directors and senior management in making informed decisions. Thus, the objectives of ERM cannot be achieved without establishing a portfolio approach in which different types of events are collated and aggregated in order to have adequate awareness at the corporate level about key risk events facing the organization (Kleffner, Lee and McGannon, 2003). However, organizations differ in categorizing their risks. For example, whereas financial organizations use categories, like credit, market, liquidity and

interest rate to classify their risks (Cumming and Hirtle, 2001), others use different categories like strategic, reporting, operation and compliance, to align with COSO framework's four objectives (Gordon, Loeb and Tseng, 2009). The ultimate objective is streamlining risk identification and categorization processes in order to reflect the true picture to the board of directors and senior management in terms of the principal risks facing the organization. Nocco and Stulz (2006) assert that one of the important steps to operationalize ERM is to identify the risks to which the organization is exposed. Therefore, maintaining a comprehensive and active list of key events affecting strategic objectives is important for ERM implementation. The dimensions retrieved under this factor relate to considerations of financial, strategic, compliance, operational and reputational events.

The third factor is named "**enterprise risk oversight and corporate governance**" because the ten ERM dimensions that loaded to the third factor include dimensions related to the importance of having defined risk oversight responsibilities and corporate governance requirements. These dimensions consist of the following (see Table 4.13):

Table: 4.13

Factor 3	No.	ERM Dimensions
Enterprise risk oversight and corporate governance	1	**D2.** Training in ethical values for employees of all levels
	2	**D4.** Formally defined responsibilities for executive management including authority and accountability
	3	**D6.** Formally defined audit committee responsibilities
	4	**D7.** Formally defined corporate governance requirements
	5	**D10.** System to ensure that policies and procedures that are in place to manage the achievement of the organization's objectives/plans are functioning and effective
	6	**D11.** Authorization procedures in place to ensure appropriate individuals review the use of policies and procedures
	7	**D12.** Independent verification process/procedures to ensure the use of policies and procedures
	8	**D13.** Channels of communication to report suspected breaches of code of conduct/ethics, laws, regulations, and other improprieties
	9	**D14.** Monitoring of the organization's internal environment, processes, and control activities
	10	**D29.** Board level committee with responsibility for risk management oversight

Comparison of findings with the literature: Beasley, Branson and Hancock (2010) conduct a study of more than 400 leaders responsible for the ERM process and conclude that majority of leaders are dissatisfied with their risk oversight processes. For example, 42% of the respondents rate the level of their risk oversight as immature or minimally mature. In addition, Fraser and Simkins (2010) assert that many organizations attempt to assign risk oversight responsibilities to a committee of the full board of directors in order to oversee risk management activities in the organization. This finding is an indication that risk oversight is evolving and having a significant impact on the success of ERM

implementation. Furthermore, risk oversight responsibilities are not limited to the board of directors. Other functions in the organization contribute to risk oversight responsibilities, such as internal audit. For example, the NYSE introduced new requirements defining specific risk oversight obligations for the audit committees of companies listed on the NYSE.

The other key area in the third factor is corporate governance, which appears to encourage ERM implementation. The importance of corporate governance and its contribution to ERM implementation was highlighted in several research studies, especially after many large corporate failures. For example, Kleffner, Lee and McGannon (2003) assert that publicly traded companies in several countries attempted to set stricter corporate governance rules in the 1990s in response to these failures. At the same time, these corporate governance rules put greater emphasis on the benefits of ERM to strengthen the organizational approach for managing different types of risks. Furthermore, the conclusion on the effect of corporate governance on ERM implementation in this study is driven by the new corporate governance regulations issued in 2010 by the Saudi Capital Market Authority. The regulations require the board of directors of each publicly traded Saudi organization to establish a risk management policy at the corporate level, and the board of directors are seen as holding the primary responsibility for the establishment and implementation of the risk management policy.

4.3 Conclusions

Several steps, such as categorizing responses, testing variables for missing data and examining the data for skewness and kurtosis, were taken prior conducting factor analysis, which helped to confirm the adequacy of the collected data for conducting factor analysis. After that, two iterations of EFA were performed in order to produce a factor structure model that is more interpretable and theoretically sensible. The results of the data analysis reveal that a model with a three-factor structure was deemed the best fitting model and superior to other models. The resulting model includes 37 ERM dimensions distributed to three factors. The literature was examined in order to provide appropriate names for each factor, which are labeled as (1) ERM structure and standards, (2) enterprise's portfolio of risks and opportunities and (3) risk oversight and corporate governance.

CHAPTER FIVE

RESEARCH SUGGESTIONS AND REFLECTIONS TO PRACTICE

This chapter includes research suggestions on how to improve ERM implementation. It also provides full details on how the suggested ERM implementation framework was reflected in practice in order to identify gaps in the ERM program at the researcher's organization and develop an actionable knowledge plan for improvements. Key limitations to drawing accurate conclusions from the research findings were also discussed. Finally, this section provides suggestions for future research to bring more insights into results of this study.

5.1 Research Suggestions to Improve ERM Implementation

The central research question for this study is as follows. What factors do organizations need to consider when implementing ERM? Empirical evidence from this study reveals that there are three factors require specific considerations when implementing ERM, namely, (1) the ERM structure and standards, (2) the enterprise's portfolio of risks and opportunities and (3) risk oversight and corporate governance, which were in turn operationalized by 37 dimensions. Based on the empirical evidence, the researcher suggests an ERM implementation framework that addresses the identified factors and guides organizations on how to improve ERM implementation. The framework consists of three elements defined by their relevant dimensions, which require specific consideration when implementing ERM. The following are the three elements of the suggested framework with their relevant dimensions (see Table 5.1):

1) ***Establish a holistic ERM structure and define implementation standards***: This element of the framework suggests establishing a holistic structure for the ERM organization in order to build and maintain a robust ERM framework. It also suggests

defining specific ERM standards in order to clarify how ERM activities will be implemented across the organization. This element consists of 17 dimensions.

2) ***Establish the enterprise's portfolio of risk and opportunity events (i.e., financial, strategic, compliance, operational and reputational) affecting the achievement of strategic objectives***: Among the different categories of risks and opportunities available for classification, this element of the framework suggests that organizations establish and maintain an enterprise portfolio that focuses on five types of risk and opportunity events with defined likelihood and impact of each event relevant to strategic objectives. This element consists of ten dimensions.

3) ***Define risk oversight responsibilities and corporate governance requirements***: This element of the framework suggests defining clear responsibilities for the leadership team toward their accountability for risk oversight. It also suggests defining specific requirements for the corporate governance. This element consists of ten dimensions.

Table: 5.1 Research Suggestion: ERM Implementation Framework

Elements	No.	ERM Dimensions
Establish a holistic ERM structure and define implementation standards	1	D15. Determined correlations and portfolio effects of combined risks
	2	D16. Determined quantitative impacts risks may have on key performance indicators
	3	D17. Formal report submitted to the board level at least annually on the current state of risk and effectiveness of risk management
	4	D18. Key risk indicators or indicators aimed at emerging risks (not historical performance)
	5	D19. Centralized technology-enabled process to obtain risk-related information
	6	D20. Verification of the completeness, accuracy, and validity of risk-related information
	7	D21. Formal policies and procedures about how risks should be managed
	8	D22. Risk response plans for all of the significant events the organization has identified
	9	D23. Communication to all stakeholders, internal and external, of the importance of risk management
	10	D24. Formal training about the organization's risk management program
	11	D26. Frequent and structured updates of risk-related information
	12	D27. Formal written risk management philosophy (policy)
	13	D28. Formal written statement of the organization's risk appetite
	14	D30. A senior manager designated with the responsibility to oversee risks and risk management activities
	15	D31. Centralized department or staff function dedicated to risk management
	16	D32. Internal risk assessment group or internal audit function given the responsibility to evaluate the on going effectiveness of the organization's risk management
	17	D33. Allocated risk owners who have primary responsibility and accountability for managing risks within their respective areas
Establish the enterprise's portfolio of risk and opportunity events (i.e., financial, strategic, compliance, operational and reputational) affecting the achievement of strategic objectives	18	D34. Consideration of financial risks and opportunities
	19	D35. Consideration of the likelihood and potential impact of financial risks and opportunities affecting the achievement of strategic objectives
	20	D36. Consideration of strategic risks and opportunities
	21	D37. Consideration of the likelihood and potential impact of strategic risks and opportunities affecting the achievement of strategic objectives
	22	D38. Consideration of compliance risks and/or opportunities?
	23	D39. Consideration of the likelihood and potential impact that compliance risks and/or opportunities will have on the organization's ability to achieve its objectives
	24	D40. Consideration of operational risks and opportunities
	25	D41. Consideration of the likelihood and potential impact that operational risks and/or opportunities will have on the organization's ability to achieve its objectives
	26	D43. Consideration of the likelihood and potential impact that reputation risks and/or opportunities will have on the organization's ability to achieve its objectives
	27	D44. Consideration of different types of risk and opportunity events prior to strategic decisions
Define risk oversight responsibilities and corporate governance requirements	28	D2. Training in ethical values for employees of all levels
	29	D4. Formally defined responsibilities for executive management including authority and accountability
	30	D6. Formally defined audit committee responsibilities
	31	D7. Formally defined corporate governance requirements
	32	D10. System to ensure that policies and procedures that are in place to manage the achievement of the organization's objectives/plans are functioning and effective
	33	D11. Authorization procedures in place to ensure appropriate individuals review the use of policies and procedures
	34	D12. Independent verification process/procedures to ensure the use of policies and procedures
	35	D13. Channels of communication to report suspected breaches of code of conduct/ethics, laws, regulations, and other improprieties
	36	D14. Monitoring of the organization's internal environment, processes, and control activities
	37	D29. Board level committee with responsibility for risk management oversight

5.2 Reflection to Practice and Actionable Knowledge

In order to reflect the learnings and outcomes of this study to the researcher's organization and generate actionable knowledge on how to improve ERM implementation, the following steps were followed to proceed from research results to actions:

1) The results of this study and suggested implementation framework were presented to ERM management to ensure their agreement and commitment to reflecting the research results in practice.

2) The researcher requested ERM management to nominate team members to conduct a full review of the current ERM practices and to identify in detail the implementation gaps related to each dimension in the suggested ERM framework. The ERM management in the researcher's organization assigned a team of six senior members with relevant experience in strategic, financial and operational risks to participate in the project and to ensure a comprehensive assessment.

3) The researcher requested that ERM management and the assigned project team share their reflections on the research outcomes and the suggested ERM implementation framework for future improvements.

4) The ultimate output of this exercise is an actionable knowledge plan to improve ERM implementation, which also includes assigned action owners and due dates for the completion of each action.

5.2.1 ERM Management Reflection on the Research Outcomes

Following the discussion of the research outcomes with ERM management and prior to the gap analysis, several areas were suggested for future improvements (see Table 5.2). The suggested improvements can be summarized in three main areas, namely, factors, dimensions and the suggested ERM implementation framework. The ERM management

believes that the three factors resulting from the current research focus on the internal organization. They argue that the three factors do not address other important areas, such as potential changes in the external environment (e.g., new regulations and political issues) that are beyond management control but that might affect the achievement of strategic objectives. They also suggested adding additional dimensions to the resulting factor structure to provide more guidance on how to manage country risks and requirements from credit rating agencies such as S&P. Finally, the ERM management suggested adding an additional element to the ERM framework to provide guidance on how to integrate ERM into business processes as well as how to measure the performance of ERM implementation.

Table: 5.2

Summary of the Suggested Improvements Reflected by the Researcher's ERM management on the Research Outcomes

Area	Research outcomes	ERM management reflections
Factors	Research findings reveal that there are three factors affecting ERM implementation	ERM management argues that all factors focus on internal organization and do not address the effect of external organizational factors on ERM implementation. Therefore, they suggest adding additional factors that address potential changes in the external environment (e.g., new regulations and political issues) that are beyond management control and may affect the achievement of strategic objectives.
Dimensions	Research findings reveal that there are 37 dimensions that are important for ERM implementation	ERM management suggest adding additional dimensions on how to manage country risks and requirements from credit rating agency such as S&P.
		ERM management believes that some of the dimensions related to Factor-2 are repeated and should be combined to improve implementation.
Suggested ERM Framework	The study suggested ERM implementation framework which consists of three elements to improve ERM implementation	ERM management suggests adding two additional elements to the framework to guide the organization on (1) how to embed/integrate ERM to business processes and (2) how to measure performance of ERM implementation.

5.2.2 Detailed Gap Analysis against Suggested ERM Framework

After assigning the team members to conduct a full review of the ERM program, the team prepared a full plan of key project activities. Then, the team reviewed current ERM activities and practices to understand how each dimension is implemented in practice in

order to identify implementation gaps. The following section summarizes the key existing gaps and the proposed course of actions to address identified gaps related to each dimension.

Details of the gap analysis were removed by the researcher from this copy of the thesis.

5.2.3 Actionable Knowledge Plan to Improve ERM Implementation

The suggested ERM implementation framework provides a structured approach to conduct a comprehensive review of the ERM program with more focus on areas that are considered important for the successful implementation of ERM. Team engagement from different functions helped to build knowledge on various aspects of the ERM program and focus on actions that are important to improving ERM implementation. The results of the comprehensive review and the gap analysis reveal that there are good ERM practices and that these practices are evolving. However, other areas related to the suggested framework require specific enhancements to improve ERM implementation. In general, the review team concluded from the assessment that the majority of the gaps were related to Element 1 of the suggested framework (i.e., ERM structure and standards), where specific attention and enhancements were required. The reflection of the research outcomes to practice helped the researcher's organization to generate an actionable knowledge plan with more focus on the following areas in order to enhance ERM implementation (see Table 5.3).

Details of the actionable knowledge plan were removed by the researcher from this copy of the thesis.

Table 5.3: Actionable knowledge plan: including assigned owners and timeline for implementation

Actions		2016							2017								
		Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Ma	Jun	Aug	Sep	Oct
1	Update ERM Standards					ERM Team, Finance and Training Team											
2	Integrate ERM and strategic planning processes						ERM & Finance										
3	Defined risk oversight responsibilities							ERM, Finance and Audit									

5.3 Limitations to This Study

This section summarizes key limitations that impacted the researcher's ability to create generalized knowledge from this study. However, the research findings were very helpful to draw actionable knowledge that guides managerial actions in the researcher's organization.

5.3.1 Limitations in Identifying the Right Participants and Collecting an Adequate Number of Responses

The responses to the survey questions are self-reported from participants working in Saudi organizations from various industries. There is a possibility that some of the responses reported in this study do not accurately reflect the actual practice or maturity level of ERM in an organization. In addition, some of the participants who are currently practicing risk management might lack adequate knowledge of the principles of risk management because of the limited scope of their responsibilities in the field of risk management or because they may have been newly appointed to their positions. For example, some risk specialists or managers might have limited responsibilities focusing only on risk modelling, whereas others, such as risk officers, might be focusing on compliance risks only. Therefore, the inputs from certain individuals might not reflect the actual practice of risk management in

their organizations. To overcome these limitations, significant attention was assigned to the accurate identification of participants who could provide adequate responses to the research questionnaire. Instead of relying on the organizations themselves to distribute research questionnaires to participants within their organizations, LinkedIn was leveraged to search for participants with relevant experience by reviewing their profiles and professional experience in order to invite them to participate in the study. This approach helped to collect responses from the right participants.

The other limitation to the study is finding an adequate number of participants who have knowledge and experience related to ERM and are willing to complete the questionnaire and share their organization's experience after ERM implementation. Participants might have the perception that their inputs in terms of risk management practices within their organization might be shared with other organizations or used for other purposes other than academic research. This issue also explains the low response rate to the research questionnaire. To minimize the impact of this limitation, a clear explanation about the purpose of the research and how inputs from participants were being handled was provided before allowing participants to view the survey questions. In addition, security measures related to data handling, such as the use of passwords for data recorded electronically, are clearly defined to provide adequate assurance about protecting participants' identities.

5.3.2 Limitations in the Data Analysis

EFA was used for the data analysis. One of the main critiques and concerns highlighted in the literature is the utility of factor analysis for theory development because of its limitations in providing meaningful insights into data. However, this concern has been debated, and some researchers posit that the soundness of the factor analysis procedure and its utility for the development of a theory depends more on the manner in which it is

implemented (Fabrigar et al. 1999). For example, several researchers indicate that factor analysis techniques are sometimes misused due to inadequate understanding among researchers on how to implement them. In addition, factor analysis techniques require researchers to use a series of judgements that affect the results and interpretations (Matsunaga, 2010). Other researchers indicate that one of the limitations in using factor analysis is the subjectivity in the researcher's decision in terms of latent variables selection, factor reduction and construction techniques (Williams, Onsman and Brown, 2012).

In this study, the sample size was one of the main limitations in the data analysis process. Although the minimum number of cases needed to apply factor analysis in a study is debated in the literature, the general rule is that a larger sample size implies more stable is the factor loading that provides a precise population estimate. Other researchers have highlighted specific criteria related to the sample size when applying factor analysis, such as sample-to-variable and sample-to-factor ratios. For example, MacCallum et al. (1999) indicate that a sample-to-variable ratio of 3:1 and a sample-to-factor of 20:1 would yield a clear and stable factor structure. However, this sample-to-variable ratio was not achieved in this study, as only 103 cases were collected for a total of 44 variables. This creates a limitation in generalizing the research results to the whole population. In order to minimize the impact of this limitation on the research results, the researcher used a more accurate sampling approach (i.e., LinkedIn) to make sure that participants have adequate experience, which helps to increase the accuracy of the results. Furthermore, this is the first study on the practice of ERM among Saudi organizations and the results should be validated in another study as the maturity of ERM evolves with time.

Additionally, the sample for this study includes inputs from participants working in different industries such as banking, insurance, oil, gas and petrochemicals, that they tend to deal with different types of risks facing their organizations. Therefore, the research findings

are too generic and not specific for one industry. This limitation could have been avoided if the sample included inputs from participants representing one or two industries such as oil, gas and petrochemicals, because these industries tend to deal with the same types of risk factors. As suggested below, a similar study should be conducted with participants from one or two industries.

Several authors recommend using EFA and CFA in conjunction with one another, where the factor model generated from EFA provides a basis for applying CFA through SEM in order to test the a priori model. This process is iterative, and researchers sometimes attempt to modify the EFA model for a better fit, taking into consideration that any modifications should be interpretable and theoretically reasonable (Fabrigar et al. 1999). However, only applying EFA in this study poses a limitation to confirming that the factor structure and final conclusions can fit an a priori model. This study is the first to be conducted on the practice of ERM in Saudi Arabia, so it was difficult to consider an a priori model to conduct CFA in order to confirm the results generated from EFA. Therefore, through careful research design and based on the available theoretical background, the EFA model generated in this study is expected to provide the best fit determined by research data. Furthermore, it is recommended in the next section to test the factor structure generated from this study in another study.

5.4 Future research

This study contributes to the literature by providing a clear understanding of the factors affecting ERM implementation among Saudi organizations. The results of this study reveal three factors, with 37 underlying dimensions that affect ERM implementation. Conducting future research that explores the relationship between these factors and financial performance may yield valuable insights into ERM's capacity to increase the likelihood of achieving financial targets. The research questions may include elements such as whether

are organizations that adopt ERM and have the highest levels of risk oversight and corporate governance are associated with improved financial performance.

This is the first empirical study conducted in Saudi Arabia that investigates factors affecting ERM implementation. Therefore, additional research is needed to further validate these factors with participants from other countries in order to generalize the results of this study. In addition, more studies are needed to explore which one of the three factors is value creating for the organization in terms of achieving the ultimate goal of improving ERM's ability to create value for the organization. Future research may also include in depth analysis on the contribution of each factor to the value of the organization.

5.5 Conclusions

The results helped the researcher to suggest an ERM implementation framework to guide organizations on areas that require specific consideration for better ERM implementation. The framework consists of three elements and was applied in the researcher's organization in order to conduct a comprehensive gap analysis of the existing ERM program and identify areas for improvement. An actionable knowledge plan generated from the gap analysis focuses on developing integrated ERM and strategic planning processes to have a better view of the enterprise's key risks and opportunities relevant to strategic objectives and on defining the responsibilities of the leadership team to establish clear accountability for risk oversight.

References:

AON (2015) 'AON Risk Maturity Index Insight Report', www.aon.com/rmi.

Alviunessen, A. and Jankensgard, H. (2009) 'Enterprise Risk Budgeting: Bringing Risk Management Into the Financial Planning Process', Journal of Applied Finance, 19 (1&2), pp.178-190.

Alzharani, A. M. and Aljaaidi, K. S. (2015) 'An Empirical Investigation of Audit Committee Effectiveness and Risk Management: Evidence from Saudi Arabia', Accounting & Taxation, 7 (1), pp.39-49.

Baxter, R., Bedard, J.C., Hoitash, R. and Yezegel, A. (2013) 'Enterprise risk management program quality: Determinants, value relevance, and the financial crisis', Contemporary Accounting Research, 30 (4), pp.1264-1295.

Beasley, M.S., Clune, R. and Hermanson, D.R. (2005) 'Enterprise risk management: An empirical analysis of factors associated with the extent of implementation', Journal of Accounting and Public Policy, 24, pp.521-531.

Beasley, M., Branson, B. and Hancock, B. (2009) 'ERM: Opportunities for improvement', Journal of Accountancy, 208 (3), pp.28-32.

Beasley, M.S., Branson, B. and Hancock, B. (2010) 'COSO's 2010 report on enterprise risk management: Current state of enterprise risk oversight and market perceptions of COSO's ERM framework', New York, NY: Committee of Sponsoring Organizations of the Treadway Commission (COSO).

Beasley, M., Pagach, D. and Warr, R. (2008) 'Information conveyed in hiring announcements of senior executives overseeing enterprise-wide risk management processes', Journal of Accounting, Auditing & Finance, 23 (3), pp.311-332.

Browne, M.W. (2001) 'An overview of analytic rotation in exploratory factor analysis', Multivariate Behavioral Research, 36 (1), pp.111-150.

Cicchetti, D.V., Sparrow, S.S. (1990) 'Assessment of adaptive behaviour in young children', Developmental Assessment in Clinical Child Psychology: A Handbook, Pergamon Press, New York, pp. 173-196.

Comrey, A. L., and Lee, H. B. (1992) 'A first course in factor analysis', Hillsdale, NJ: Lawrence Erlbaum Associates.

Creswell, J. (2007) Qualitative inquiry and research design: choosing among five approaches. 2nd ed. London: Sage.

CMA (2006) 'Corporate Governance Regulations In The Kingdom Of Saudi Arabia', Capital Market Authority (CMA), www.cma.org.sa

COSO (2004) 'Enterprise Risk Management - Integrated Framework', Committee of Sponsoring Organizations of the Treadway Commission (COSO), www.coso.org

COSO (2009) 'Strengthening Enterprise Risk Management for Strategic Advantage', www.coso.org

Costello, A. B. and Osboren, J. W. (2005) 'Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis', Practical Assessment, Research & Evaluation, 10 (7), pp.1-9

Couper, M.P. (2000) 'Web surveys: A review of issues and approaches', The Public Opinion Quarterly, 64 (4), pp.464-494.

Cumming, C.M. and Hirtle, B.J. (2001) 'The Challenges of Risk Management in Diversified Financial Companies', Federal Reserve Bank of New York Economic Policy Review, 7 (1), pp.1-13.
Cummins, J. D., C. Lewis, and R. Wei, (2006) 'The Market Impact of Operational Risk Events for U.S. Banks and Insurers', Journal of Banking and Finance, 30, pp. 2605-2634.
Curran, P.J., West, S.G. and Finch, J.F. (1996) 'The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis', Psychological Methods, 1 (1), p.16-29
Davenport, E.W. and Bradley, L.M. (2000) 'Enterprise Risk Management: A Consultative Perspective', Casualty Actuarial Society Discussion Paper Program, available at: www.casact.com.
Dickinson, G. (2001) 'Enterprise risk management: Its origins and conceptual foundation', The Geneva Papers on Risk and Insurance, 26 (3), pp.360-366.
Desender, K. A. (2007) 'On the Determinants of Enterprise Risk Management Implementation', available at SSRN: 1025982.
Easterby-Smith, M., Thorpe, R. and Jackson, P. (2008) Management research. 3rd ed. London: Sage
Economist Intelligence Unit (2005) 'The evolving role of the CRO', The Economist Intelligence Unit, London/New York/Hong Kong.
Field, A. (2009) 'Discovering statistics using SPSS', Thousand Oaks, California: SAGE (3rd ed.)
Finch, J.F. and West, S.G. (1997) 'The investigation of personality structure: Statistical models', Journal of Research in Personality, 31, pp.439-485.
Fraser, J. and Simkins, B. (2010) 'Enterprise risk management: Today's leading research and best practices for tomorrow's executives', John Wiley & Sons.
Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999) 'Evaluating the use of exploratory factor analysis in psychological research', Psychological Methods, 4 (3), pp.272-299.
Frigo, M. L., and Anderson, R. J. (2011) 'Strategic risk management: a foundation for improving enterprise risk management and governance', Journal of Corporate Accounting & Finance, 22 (3), pp.81-88.
Gates, S., Nicolas, J. L. and Walker, P. L. (2012) 'Enterprise risk management: A process for enhanced management and improved performance', Management Accounting Quarterly, 13 (3), pp.28-38.
Gelo, O., Braakmann, D. and Benetka, G. (2008) 'Quantitative and qualitative research: Beyond the debate', Integrative Psychological & Behavioral Science, 42 (3), pp.266-290.
Gordon, L.A., Loeb, M.P. and Tseng, C.Y. (2009) 'Enterprise risk management and firm performance: A contingency perspective', Journal of Accounting and Public Policy, 28 (4), pp.301-327.
Gorsuch, R. L. (1983) 'Factor analysis', Hillsdale, NJ: Lawrence Erlbaum.
Hain, S. (2011) 'Risk perception and risk management in the Middle East market: theory and practice of multinational enterprises in Saudi Arabia', Journal of Risk Research, 14 (7), pp.819-835.

Hampton, J.J. (2009) 'Fundamentals of enterprise risk management: How top companies assess risk, manage exposure, and seize opportunity', AMACOM, Div American Mgmt Assn.
Hanisch, B. and Wald, A. (2012) 'A bibliometric view on the use of contingency theory in project management research', Project Management Journal, 43 (3), pp.04-23.
Henson, R.K. and Roberts, J.K. (2006) 'Use of exploratory factor analysis in published research common errors and some comment on improved practice', Educational and Psychological Measurement, 66 (3), pp.393-416.
Hoyt, R.E. and Liebenberg, A.P. (2011) 'The value of enterprise risk management', Journal of risk and insurance, 78 (4), pp.795-822.
ISO (2009) 'Risk management - Principles and guidelines', International Organization for Standardization (ISO), ISO 31000:2009, www.iso.org
Kaplan, R.S. (2009) 'Risk management and the strategy execution system', Balanced Scorecard Report, 11 (6), pp.1-6.
Kimbrough, R. L. and Componation, P. J. (2009) 'The relationship between organizational culture and enterprise risk management', Engineering Management Journal, 21 (2), pp.18-26.
Kirkpatrick, G. (2009) 'The Corporate Governance Lessons from the Financial Crisis', Financial Markets Trends, 96 (1), pp.52-81.
Kleffner, A.E., Lee, R.B. and McGannon, B. (2003) 'The effect of corporate governance on the use of enterprise risk management: Evidence from Canada', Risk Management and Insurance Review, 6 (1), pp.53-73.
Knechel, W. R. (2002) 'The Role of the Independent Accountant in Effective Risk Management', Journal of Economics and Management, 47 (2), pp.65-86.
Lai, F.W. (2014) 'Examining the dimensions of enterprise risk management implementation framework, its challenges and benefits: A Study on Malaysian Public Listed Companies', Journal of Economics, Business and Management, 2 (2), pp.81-86.
Lam, J. (2014) 'Risk Management: From Incentives to Controls', John Wiley & Sons.
Liebenberg, A. P. and Hoyt, R. E. (2003) 'The Determinants of Enterprise Risk Management: Evidence From The Appointment Of Chief Risk Officers', Risk Management and Insurance Review, 6 (1), pp.37-52.
Lundqvist, S. (2014) 'An Exploratory Study of Enterprise Risk Management: Pillars of ERM', Journal of Accounting, Auditing & Finance, 29 (3), pp.393- 429.
MacCallum, R. C., Widaman, K. F., Zhang, S. and Hong, S. (1999) 'Sample size in factor analysis', Psychological Methods, 4 (1), pp.84-99.
Markowitz, H. M. (1952) 'Portfolio selection', The Journal of Finance, 7 (1), pp.77-91.
Matsunaga, M. (2015) 'How to Factor-Analyze Your Data Right: Do's, Don'ts, and How-To's', International Journal of Psychological Research, 3 (1), pp.97-110.
McShane, M. K., Nair, A. and Rustambekov, E. (2011) 'Does enterprise risk management increase firm value?', Journal of Accounting, Auditing & Finance, 26 (4), pp.641-658.
Mikes A. and Kaplan R.S. (2014) 'Towards a contingency Theory of Enterprise Risk' (Working Paper 13-063), Harvard Business School, pp.13-063.
Meulbroek, L.K. (2002) 'Integrated Risk Management for the Firm: A Senior Manager's Guide', Journal of Applied Corporate Finance, 14, pp.56–70.
Muralidhar, K. (2010) 'Enterprise risk management in the Middle East oil industry: An empirical investigation across GCC countries', International Journal of Energy Sector Management, 4 (1), pp.59-86.

NYSE (2004) 'Final Corporate Governance Rules', New York Stock Exchange (2004), www.nyse.com
Nocco, B. W. and Stulz, R. M. (2006) 'Enterprise risk management: theory and practice', Journal of Applied Corporate Finance, 18 (4), pp.8-20.
Pagach, D.P. and Warr, R.S. (2010) 'The effects of enterprise risk management on firm performance', available at SSRN 1155218.
Pagach, D. P. and Warr, R. S. (2011) 'The characteristics of firms that hire chief risk officers', Journal of Risk and Insurance, 78 (1), pp.185-211.
Rao, Ananth and Marie, Attiea (2007) 'Current Practices of Enterprise Risk Management in Dubai', Management Accounting Quarterly, 8 (3), pp.10-22.
RIMS (2015) 'About the RIMS Risk Maturity Model', RIMS Executive Report, Risk and Insurance Management Society, Inc. (RIMS) and Logic Manager, www.riskmaturitymodel.org/rims-risk-maturity-model-resources
Rochette, M. (2009) 'From Risk Management to ERM', Journal of Risk Management in Financial Institutions, 2(4), pp.394-408.
Smallman, C. (1996) 'Risk and organizational behaviour: a research model. Disaster Prevention and Management', An International Journal, 5(2), pp.12-26.
Standard and Poor's (2013) 'Enterprise Risk Management', Standard & Poor's RatingsDirect, www.standardandpoors.com/ratingsdirect
Stulz, R. M. (1996) 'Rethinking risk management', Journal of applied corporate finance, 9 (3), pp.8-25.
Subramaniam, N., McManus, L. and Zhang, J., (2009) 'Corporate governance, firm characteristics and risk management committee formation in Australian companies', Managerial Auditing Journal, 24(4), pp.316-339.
Tabachnick, B.G. and Fidell, L.S. (2007) 'Using Multivariate Statistics, 5th ed. Allyn and Bacon, Boston.
Thompson, B. (2004) 'Exploratory and confirmatory factor analysis', Washington, DC: American Psychological Association.
Williams, B., Onsman, A. and Brown, T. (2012) 'Exploratory factor analysis: A five-step guide for novices', Australasian Journal of Paramedicine, 8 (3), pp.1-13
Yeoh, P. (2009) 'Causes of the global financial crisis: Learning from the competing insights', International Journal of Disclosure and Governance, 7, pp.42-69.
Yong, A.G. and Pearce, S. (2013) 'A beginner's guide to factor analysis: Focusing on exploratory factor analysis', Tutorials in Quantitative Methods for Psychology, 9 (2), pp.79-94.
Zou, P.X., Chen, Y. and Chan, T.Y. (2009) 'Understanding and improving your risk management capability: assessment model for construction organizations', Journal of Construction Engineering and Management, 136 (8), pp.854-863.

Appendix A: Summary of modifications made on the original survey from Dr. Lundqvist

Dr. Lundqvist's ERM Dimensions / Questions	Modifications	Explanation
"Compensation policies intended to align the long-term interests of managers and shareholders" "Formally defined remuneration policies of executive management" "Formally defined standards for hiring and firing of executive management."	Removed	Dimensions were removed. There are no requirements in the Saudi Code of Corporate Governance in order to implement these dimensions.
"Written document describing the role, structure, and responsibilities of the board."	Revised	This dimension was revised to read "Formally defined corporate governance requirements." The Saudi Code of Corporate Governance requires all organizations listed in the Saudi Stock Market to establish a written code of corporate governance that includes role, structure and responsibilities of the board.
"Formal mission (vision/purpose) statement" "Formal strategy to pursue the mission" "Formal business objectives/plan in place to execute the strategy to pursue the mission" were combined in to one dimension.	Combined	The three dimensions were combined into one dimension that reads "Formal strategy to pursue the mission (vision/ purpose) of the organization"
"Channels of communication with customers, vendors, and other external parties"	Removed	This dimension is too generic and has limited contribution to the study.
"Documentation and record to verify the use of policies and procedures"	Removed	This dimension was removed because it focuses on the availability of documentation and records not on how the practice that is taking place in the organization. Therefore, it has limited contribution to the study.
"Alternative risk responses for each significant event"	Removed	This dimension is repeated in another dimension: "Risk response plan for all of the significant events the organization has identified"
"Risk tolerances: formal guidelines or measures used at appropriate levels to assess whether the organization will accept risk"	Removed	It has been stated in the literature that many organizations use the terms risk appetite and risk tolerance interchangeable and majority are confused with the differences between them. The dimension related to risk appetite is kept where this dimension has been removed.
"Which of the following risks and/or opportunities does the organization consider? (The extent of liquidity, Interest rate, Foreign exchange rate, The cost of capital, Access to capital markets, The use of long-term debt) "Which of the following risks and/or opportunities does the organization consider? (Customer concentration, Product expansion, Acquisition aggressiveness, Manufacturing location concentration) "Which of the following risks and/or opportunities does the organization consider? (Compliance with regulations, industry codes, voluntary codes, recommendation of Corporate-Governance). "Which of the following risks and/or opportunities does the organization consider? (Data management systems (software), Computer systems (hardware) and the privacy of information held on customers) "Which of the following risks and/or opportunities does the organization consider? (Environment, Ethics, Health and safety)	Removed	These questions were removed because they have very limited contribution to the scope of this research. They are irrelevant to the ERM dimensions.
"The likelihood that financial risks and/or opportunities will affect the organization's ability to achieve its objectives." "The potential impact that financial risks and/or opportunities will have on the organization's ability to achieve its objectives."	Combined	COSO uses the terms Likelihood and Impact together in order to measure the risk level of each event. It is also difficult to assess risks based on likelihood alone or the impact alone. Therefore, the two dimensions combined into one dimension: "The likelihood and impact that financial risks and/or opportunities will have on the organization's ability to achieve its objectives." The same has been done for other dimensions Strategic, Compliance, Operational and Reputational
N/A	Added	"To what degree does the organization consider significant events (risks and opportunities) prior to strategic decisions such as investment in new projects, products or new merger & acquisition." This dimension helps to get an insight to what degree is risk management embedded into strategic planning.
N/A	Added	It would be better to gain an insight into the level of training provided to employees on ERM. Therefore, a new dimension "Formal training on the organization's risk management program" was added

Appendix B – Correlation Matrix

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15
D1	1.00														
D2	0.69	1.00													
D3	0.51	0.47	1.00												
D4	0.41	0.36	0.46	1.00											
D5	0.47	0.55	0.54	0.58	1.00										
D6	0.42	0.29	0.44	0.68	0.35	1.00									
D7	0.54	0.40	0.47	0.66	0.42	0.75	1.00								
D8	0.42	0.49	0.63	0.52	0.56	0.45	0.48	1.00							
D9	0.44	0.40	0.55	0.52	0.55	0.47	0.53	0.73	1.00						
D10	0.65	0.61	0.62	0.60	0.65	0.55	0.60	0.55	0.65	1.00					
D11	0.61	0.54	0.54	0.58	0.44	0.52	0.58	0.50	0.54	0.70	1.00				
D12	0.49	0.55	0.54	0.50	0.48	0.53	0.56	0.49	0.51	0.60	0.73	1.00			
D13	0.57	0.63	0.54	0.45	0.42	0.52	0.59	0.57	0.59	0.71	0.71	0.78	1.00		
D14	0.64	0.52	0.57	0.43	0.36	0.53	0.65	0.49	0.62	0.66	0.64	0.67	0.81	1.00	
D15	0.52	0.64	0.43	0.40	0.33	0.37	0.52	0.44	0.28	0.50	0.44	0.44	0.56	0.50	1.00
D16	0.49	0.54	0.40	0.33	0.41	0.29	0.40	0.52	0.36	0.40	0.33	0.34	0.49	0.38	0.72
D17	0.38	0.33	0.47	0.41	0.39	0.45	0.55	0.63	0.49	0.36	0.34	0.37	0.50	0.52	0.59
D18	0.50	0.51	0.47	0.44	0.40	0.40	0.55	0.50	0.38	0.48	0.51	0.51	0.56	0.53	0.72
D19	0.40	0.50	0.38	0.29	0.30	0.36	0.43	0.49	0.41	0.46	0.36	0.44	0.54	0.50	0.67
D20	0.39	0.46	0.43	0.31	0.34	0.36	0.49	0.55	0.49	0.46	0.34	0.43	0.56	0.51	0.63
D21	0.52	0.46	0.56	0.47	0.44	0.46	0.53	0.52	0.50	0.51	0.47	0.38	0.47	0.54	0.56
D22	0.45	0.52	0.51	0.33	0.43	0.29	0.37	0.52	0.45	0.53	0.40	0.44	0.57	0.49	0.54
D23	0.51	0.50	0.44	0.39	0.39	0.26	0.41	0.44	0.46	0.53	0.37	0.34	0.48	0.49	0.57
D24	0.62	0.62	0.39	0.41	0.51	0.30	0.40	0.40	0.37	0.52	0.36	0.32	0.43	0.35	0.58
D25	0.38	0.35	0.33	0.32	0.34	0.36	0.40	0.25	0.32	0.47	0.31	0.42	0.40	0.44	0.38
D26	0.51	0.47	0.50	0.44	0.40	0.38	0.42	0.52	0.53	0.53	0.46	0.37	0.50	0.48	0.56
D27	0.52	0.48	0.53	0.53	0.54	0.47	0.50	0.56	0.48	0.52	0.43	0.41	0.47	0.53	0.56
D28	0.48	0.50	0.51	0.41	0.45	0.34	0.50	0.52	0.43	0.46	0.46	0.43	0.50	0.48	0.61
D29	0.40	0.43	0.43	0.41	0.28	0.47	0.57	0.41	0.44	0.49	0.49	0.53	0.61	0.53	0.48
D30	0.46	0.48	0.44	0.44	0.43	0.39	0.55	0.42	0.45	0.43	0.47	0.43	0.52	0.58	0.45
D31	0.40	0.49	0.49	0.35	0.46	0.28	0.48	0.52	0.46	0.45	0.44	0.40	0.45	0.49	0.46
D32	0.45	0.41	0.50	0.47	0.41	0.47	0.55	0.45	0.55	0.52	0.41	0.47	0.56	0.61	0.52
D33	0.53	0.45	0.59	0.38	0.47	0.34	0.52	0.51	0.49	0.58	0.43	0.44	0.58	0.59	0.52
D34	0.40	0.37	0.44	0.45	0.41	0.39	0.55	0.52	0.68	0.54	0.50	0.61	0.62	0.63	0.32
D35	0.53	0.34	0.42	0.38	0.43	0.29	0.54	0.37	0.57	0.58	0.61	0.53	0.57	0.60	0.28
D36	0.36	0.37	0.41	0.39	0.48	0.28	0.43	0.54	0.54	0.43	0.48	0.50	0.53	0.48	0.30
D37	0.38	0.36	0.39	0.41	0.49	0.23	0.36	0.32	0.44	0.47	0.53	0.52	0.51	0.44	0.27
D38	0.42	0.47	0.50	0.46	0.50	0.44	0.57	0.55	0.60	0.62	0.50	0.51	0.53	0.53	0.37
D39	0.41	0.47	0.34	0.38	0.41	0.42	0.48	0.38	0.49	0.59	0.49	0.53	0.58	0.54	0.29
D40	0.45	0.39	0.46	0.37	0.42	0.37	0.52	0.45	0.62	0.59	0.51	0.48	0.59	0.62	0.37
D41	0.49	0.38	0.36	0.32	0.35	0.32	0.51	0.41	0.60	0.57	0.58	0.45	0.59	0.56	0.33
D42	0.54	0.59	0.47	0.40	0.49	0.26	0.53	0.52	0.58	0.47	0.51	0.56	0.66	0.61	0.48
D43	0.56	0.49	0.39	0.31	0.43	0.17	0.45	0.36	0.44	0.41	0.51	0.54	0.59	0.53	0.36
D44	0.48	0.43	0.38	0.28	0.35	0.32	0.49	0.47	0.52	0.52	0.65	0.56	0.60	0.56	0.38

Appendix B – Correlation Matrix: continued

	D16	D17	D18	D19	D20	D21	D22	D23	D24	D25	D26	D27	D28	D29	D30
D16	1.00														
D17	0.65	1.00													
D18	0.70	0.65	1.00												
D19	0.56	0.60	0.62	1.00											
D20	0.74	0.70	0.67	0.73	1.00										
D21	0.66	0.62	0.71	0.55	0.73	1.00									
D22	0.62	0.52	0.61	0.50	0.70	0.75	1.00								
D23	0.62	0.57	0.56	0.51	0.60	0.69	0.76	1.00							
D24	0.72	0.52	0.55	0.49	0.60	0.62	0.57	0.72	1.00						
D25	0.41	0.32	0.47	0.47	0.40	0.43	0.30	0.50	0.52	1.00					
D26	0.69	0.63	0.69	0.58	0.73	0.82	0.75	0.80	0.70	0.46	1.00				
D27	0.63	0.67	0.71	0.58	0.68	0.86	0.67	0.62	0.65	0.39	0.74	1.00			
D28	0.67	0.57	0.81	0.54	0.59	0.65	0.55	0.61	0.61	0.50	0.71	0.71	1.00		
D29	0.33	0.45	0.49	0.47	0.41	0.47	0.34	0.45	0.39	0.40	0.36	0.46	0.44	1.00	
D30	0.50	0.60	0.56	0.41	0.55	0.69	0.57	0.57	0.51	0.23	0.61	0.70	0.52	0.39	1.00
D31	0.52	0.61	0.59	0.54	0.61	0.68	0.62	0.55	0.50	0.27	0.70	0.67	0.62	0.28	0.76
D32	0.48	0.61	0.55	0.56	0.58	0.63	0.58	0.56	0.55	0.45	0.59	0.65	0.51	0.54	0.67
D33	0.56	0.56	0.62	0.51	0.57	0.67	0.71	0.66	0.56	0.41	0.73	0.67	0.66	0.46	0.65
D34	0.30	0.42	0.45	0.30	0.42	0.42	0.47	0.39	0.29	0.29	0.44	0.36	0.35	0.48	0.48
D35	0.20	0.35	0.43	0.28	0.26	0.35	0.29	0.33	0.28	0.27	0.39	0.34	0.38	0.43	0.46
D36	0.42	0.44	0.48	0.33	0.39	0.50	0.55	0.44	0.39	0.24	0.44	0.47	0.41	0.46	0.53
D37	0.29	0.25	0.32	0.31	0.22	0.38	0.38	0.37	0.32	0.24	0.35	0.37	0.32	0.41	0.44
D38	0.34	0.36	0.52	0.44	0.50	0.58	0.54	0.53	0.37	0.34	0.58	0.48	0.50	0.39	0.55
D39	0.22	0.22	0.35	0.37	0.37	0.43	0.38	0.39	0.31	0.25	0.38	0.40	0.34	0.51	0.47
D40	0.30	0.34	0.46	0.32	0.39	0.46	0.47	0.50	0.33	0.27	0.55	0.43	0.47	0.46	0.48
D41	0.27	0.29	0.41	0.28	0.31	0.38	0.37	0.42	0.33	0.22	0.47	0.33	0.43	0.44	0.40
D42	0.48	0.49	0.48	0.47	0.49	0.50	0.47	0.56	0.51	0.39	0.50	0.50	0.56	0.52	0.63
D43	0.36	0.35	0.39	0.39	0.35	0.40	0.36	0.41	0.44	0.32	0.41	0.40	0.47	0.36	0.49
D44	0.31	0.36	0.51	0.27	0.35	0.38	0.35	0.32	0.30	0.31	0.35	0.33	0.46	0.47	0.39

	D31	D32	D33	D34	D35	D36	D37	D38	D39	D40	D41	D42	D43	D44
D31	1.00													
D32	0.60	1.00												
D33	0.67	0.68	1.00											
D34	0.47	0.54	0.57	1.00										
D35	0.50	0.43	0.51	0.76	1.00									
D36	0.53	0.44	0.60	0.77	0.60	1.00								
D37	0.47	0.36	0.45	0.59	0.64	0.77	1.00							
D38	0.65	0.53	0.63	0.60	0.53	0.51	0.39	1.00						
D39	0.49	0.43	0.44	0.52	0.60	0.48	0.56	0.77	1.00					
D40	0.62	0.48	0.63	0.71	0.78	0.58	0.56	0.76	0.67	1.00				
D41	0.48	0.43	0.55	0.67	0.82	0.59	0.58	0.66	0.72	0.87	1.00			
D42	0.56	0.44	0.57	0.67	0.65	0.67	0.63	0.54	0.54	0.60	0.58	1.00		
D43	0.47	0.38	0.47	0.56	0.69	0.57	0.69	0.44	0.58	0.49	0.60	0.85	1.00	
D44	0.47	0.36	0.41	0.69	0.66	0.64	0.54	0.62	0.57	0.67	0.70	0.62	0.59	1.00

Appendix C: Permission from Dr. Sara Lundqvist to Use her Survey Questionnaire in this Study

UNIVERSITY OF LIVERPOOL
ONLINE PROGRAMMES

Yousef Aleisa <yousef.aleisa@online.liverpool.ac.uk>

Request for Permission – Dr. Sara's Research Questionnaire

5 messages

Yousef Aleisa <yousef.aleisa@online.liverpool.ac.uk> Wed, Feb 25, 2015 at 12:19 AM
To: sara.lundqvist@fek.lu.se

Dear Dr. Sara,

My name is Yousef Aleisa. I am pursuing my Doctorate studies in the field of Business Administration (DBA) in the University of Liverpool, UK. I have completed three years in the DBA program and recently started working on my thesis with the focus on Enterprise Risk Management.

I read your research paper with title "An Exploratory Study of Enterprise Risk Management: Pillars of ERM" and I would like to build my research on the ERM measurement you used in your research. Therefore, I am seeking your permission to use your research questionnaire in order to test the factor structure found in your study for samples of companies in Saudi Arabia. I also attempt to identify which of the factors are value creating in order to improve the implementation of ERM program in Saudi Arabian Organizations.

Regards,

Yousef

Yousef Aleisa <yousef.aleisa@online.liverpool.ac.uk> Thu, Feb 26, 2015 at 11:53 PM
To: sara.lundqvist@fek.lu.se

[Quoted text hidden]
[Quoted text hidden]

Sara Lundqvist <sara.lundqvist@fek.lu.se> Fri, Feb 27, 2015 at 11:50 AM
To: Yousef Aleisa <yousef.aleisa@online.liverpool.ac.uk>

Hi,

Thank you for your interest in the survey. The survey is attached.

I'll be interested to hear what you find.

Best regards,

Sara

From: Yousef Aleisa [mailto:yousef.aleisa@online.liverpool.ac.uk]
Sent: den 26 februari 2015 21:53
To: Sara Lundqvist
Subject: Re: Request for Permission – Dr. Sara's Research Questionnaire

Appendix D: Survey Questionnaire

Research Study on The Practice of Risk Management in Saudi Organizations

Participant Information Sheet: Introduction to the Research Study

Welcome to the survey and thank you for accepting my invitation to participate in the survey. The survey should **not take more than 15 minutes to complete**.

Please take your time to read the next sections before you answer the survey questionnaire in order to gain an insight to the content of the research study and participants' key questions.

Background: The risk management concept was traditionally used to manage individual risks using the silo-based approach where risks are managed individually. However, the silo-based approach proves to be inadequate to manage risks effectively across the organization. Therefore, the holistic approach known as Enterprise Risk Management (ERM) has emerged as a strategic tool to improve risk management practices at the corporate level. The ERM concept has broadened the definition of risk management to embrace all types of risks that have potential impact on achieving organization's strategic objectives. In addition, the 2008 financial crisis has led to renewed focus on improving risk management practices where international regulatory agencies require specific improvements in risk management programs as well as specific disclosure requirements. The understanding of the ERM concept and its application to practice has been evolving in order to take into account internal and external risks as well as their interconnections and potential impact to the organization as a whole. The evolution of the ERM concept is a result of the increasing variety, number and interaction of different risks facing organizations.

Aim of the research study: Several organizations are striving to establish and implement a comprehensive ERM program that is aligned with their strategic objectives and recommended international standards. However, organizations face several challenges to develop and execute an ERM program. This research study aims at investigating key factors affecting ERM implementation of based on how organizations in Saudi Arabia actually implement ERM dimensions. The researcher's role in this study is to use specific ERM dimensions identified in the literature to assess the degree of implementing these dimensions in Saudi organizations in order to identify factors affecting the implementation of ERM and to recommend a strategy for having a well-implemented ERM. The researcher uses quantitative method mainly surveys to collect data and test the degree of implementing ERM dimensions. Surveys in this research are based on the method of a questionnaire where it is applied to a sample of risk management professionals in Saudi organizations. The key role of the participants is to answer questionnaire in order to share their experience related to risk management practice in terms of how their organizations actually implement ERM dimensions. However, experience of the research participants in the field of risk management is one of key implications for this research. Participants might lack the adequate knowledge of the principles of risk management or do not possess relevant professional experience in the field of risk management. Identifying risk management professionals to provide their inputs is one of the key research implications for this study.

Objectives of the research study: are to identify factors affecting the implementation of ERM and recommend a strategy that helps key people in the organization e.g., Chief Risk Officers and Risk Management Professionals to develop and implement an effective ERM program. The strategy would also help management to integrate and embed the ERM program into routine key business processes

Do I have to take part?

No, your participation is voluntary and participants are free to withdraw at anytime without explanation and without incurring a disadvantage. If you have direct/indirect professional or personal relationship with the researcher, this is a written assurance that declining or discontinuing to participate in the research study will not negatively impact your relationship with the researcher.

Are there any risks in taking part?

Risk assessment has been conducted at the early stages of this research study in order to assess potential risks associated with this research study and their impact on participants. Potential risks such as psychological, relationship, legal, economic/professional, physical, and other risks have been reviewed and evaluated in relation to the approach used in this research study. Since this research study is limited to collecting and analyzing anonymously participants' views relevant to the practice of risk management, key potential risks related to this study are limited to relationship and economic/professional risks.

Are there any benefits in taking part?

There are no perceived benefits for participants at the time of participation. Although research activities place some degree of burden on the participants by asking them to share personal details, volunteer time, and assume risks; however participants' input to this research study contribute significantly to the success of this research. In order to minimize burden to participants, questionnaire will not require more than 15 minuets to be completed and there are no further interactions with participants after completing and submitting research questionnaire.

Will my participation be kept confidential?

Yes, research procedures are designed in a way that participation will be kept confidential and will remain anonymous during data collection and analysis. The demographic descriptors are limited to the most important areas such as size of the participant's organization and availability of ERM department where names of the participating organizations are *not* needed and will not be recorded. This is to ensure that the identity of individual participants is protected. Furthermore, all data collected for this research will not be utilized for secondary data analyses in order to avoid potential de-identification of individual participants. All participant's personal details and research responses collected for the purpose of this research study will be handled and stored securely using electronic data files that are protected by passwords in order to avoid potential accessibility by others.

What will happen to the results of the study?

Results of this study will be used only to meet the degree requirements for the researcher. There is no intention to publish the results of this study. However, participants will have the opportunity to receive a summary of the research findings which I will be more than have happy to share with them after the completion of the research project, if they are interested.

What will happen if I want to stop taking part?

Since participation is anonymous, participants can only stop taking part in the research study before filling the research questionnaire. It is not possible to retrieve participant's input.

Research Study on The Practice of Risk Management in Saudi Organizations

Participant Information Sheet: Contact Information of the Research Supervisor & Research Governance Officer

If you are unhappy or if there is a problem, please feel free to let us know by contacting the research supervisor Dr. Robin Luo at robin.luo@online.liverpool.ac.uk and we will try to help. If you remain unhappy or have a complaint, which you feel you cannot come to us with then you should contact the Research Governance Officer at ethics@liv.ac.uk or Research Participant Advocate at +1-612-312-1210 or liverpoolethics@ohecampus.com. When contacting the Research Governance Officer, please provide details of the name or description of the study the researcher involved, and the details of the complaint you wish tomake.

Research Study on The Practice of Risk Management in Saudi Organizations

Participant Contest

I confirm that I have read and have understood the Participant Information Sheet for this study. I have had the opportunity to consider the information and ask questions. The time allocated to review research information and clarify questions is adequate.
I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my rights being affected. In addition, should I not wish to answer any particular question or questions, I am free to decline.

I understand that, under the Data Protection Act, I can at any time ask for access to the information I provide and I can also request the destruction of that information if I wish.

By clicking on Next, I agree to take part in this research study.

Research Study on The Practice of Risk Management in Saudi Organizations

Demographic Questions

1. What is your title/position?

1. What is the primary industry of the organization?

- ◯ Banking & Insurance
- ◯ Oil, Gas and Petrochemical
- ◯ Retail
- ◯ Agriculture & Food Industries
- ◯ Energy & Utilities
- ◯ Telecommunication & IT
- ◯ Construction
- ◯ Transportation
- ◯ Healthcare
- ◯ Education
- ◯ Other industries

2. What is the annual revenue of the organization in Saudi Riyal (SAR)?

- ◯ Less than 1 Billion
- ◯ 1 Billion – 10 Billion
- ◯ 10 Billion – 50 Billion
- ◯ More than 50 Billion
- ◯ Don't know

3. To what degree are you familiar with the organization of risk management and risk management activities at the organization?

- ◯ Not applicable/The organization does not have any risk management or risk management activities
- ◯ Some familiarity
- ◯ Working knowledge
- ◯ Very familiar
- ◯ Don't know

Research Study on The Practice of Risk Management in Saudi Organizations

Survey Questionnaire

Please read each question and choose from the answers provided. Please answer based on the organization's activities in the **last three years.**

4. To what degree are the following dimensions implemented (as applicable: carried out, understood, applied, enforced, embraced, and/or followed-through) throughout the organization?

	Does not exist	Ad hoc implementation	Implemented but improvements needed	Robustly implemented	Don't know
Code of conduct/ethics	○	○	○	○	○
Training in ethical values for employees of all levels	○	○	○	○	○
Performance targets for employees of all levels	○	○	○	○	○
Formally defined responsibilities for executive management including authority and accountability	( )	( )	( )	( )	( )
Ongoing training, coaching, and educational programs available to employees of all levels	○	○	○	○	○
Formally defined audit committee responsibilities	○	○	○	○	○
Formally defined corporate governance requirements	○	○	○	○	○
Formal strategy to pursue the mission (vision/purpose) of the organization	○	○	○	○	○
Performance goals/targets set to assess whether the organization is achieving its business objectives/plans	○	○	○	○	○

	Does not exist	Ad hoc implementation	Implemented but improvements needed	Robustly implemented	Don't know
System to ensure that policies and procedures that are in place to manage the achievement of the organization's objectives/plans are functioning and effective.	◯	◯	◯	◯	◯

1. To what degree are the following activities implemented throughout the organization?

	Does not exist	Ad hoc implementation	Implemented but improvements needed	Robustly implemented	Don't know
Authorization procedures in place to ensure appropriate individuals review the use of policies and procedures	◯	◯	◯	◯	◯
Independent verification process/procedures to ensure the use of policies and procedures	◯	◯	◯	◯	◯
Channels of communication to report suspected breaches of code of conduct/ethics, laws, regulations, and other improprieties	◯	◯	◯	◯	◯
Monitoring of the organization's internal environment, processes, and control activities	◯	◯	◯	◯	◯

2. To what degree are the following risk management dimensions implemented throughout the organization?

	Does not exist	Ad hoc implementation	Implemented but improvements needed	Robustly implemented	Don't know
Determined correlations and portfolio effects of combined risks	○	○	○	○	○
Determined quantitative impacts risks may have on key performance indicators	○	○	○	○	○
Formal report submitted to the board level at least annually on the current state of risk and effectiveness of risk management	○	○	○	○	○
Key risk indicators or indicators aimed at emerging risks (not historical performance)	○	○	○	○	○
Centralized technology-enabled process to obtain risk-related information	○	○	○	○	○
Verification of the completeness, accuracy, and validity of risk-related information	○	○	○	○	○
Formal policies/procedures about how risk should be managed	○	○	○	○	○
Risk response plan for all of the significant events the organization has identified	○	○	○	○	○
Communication to all stakeholders, internal and external, of the importance of risk management	○	○	○	○	○

	Does not exist	Ad hoc implementation	Implemented but improvements needed	Robustly implemented	Don't know
Formal training in the organization's risk management program	○	○	○	○	○
Assessment of the organization's risk management function done by an independent/external party	○	○	○	○	○
Frequent and structured updates of risk-related information	○	○	○	○	○
Formal written risk management philosophy (policy) (a set of shared beliefs and attitudes characterizing how the organization considers risk in everything it does and delineates the responsibility of management and the board)	○	○	○	○	○
Formal written statement of the organization's risk appetite (the amount of risk specified at the board level that the organization is willing to accept in pursuit of value)	○	○	○	○	○

1. To what degree are the following risk management organizational dimensions implemented throughout the organization?

	Does not exist	Ad hoc implementation	Implemented but improvements needed	Robustly implemented	Don't know
Board level committee with responsibility for risk management oversight	○	○	○	○	○
A senior manager designated with the responsibility to oversee risks and risk management activities	○	○	○	○	○
Centralized department or staff function dedicated to risk management	○	○	○	○	○
Internal risk assessment group or internal audit function given the responsibility to evaluate the ongoing effectiveness of the organization's risk management	○	○	○	○	○
Allocated risk owners who have primary responsibility and accountability for managing risk within their respective areas	○	○	○	○	○

2. To what degree are the following events (risks or opportunities) considered when determining significant events affecting the organization's ability to achieve its objectives?

	Not considered	Very little consideration	Moderate consideration	Significant consideration	Don't know
To what degree does the organization consider financial risks and/or opportunities?	○	○	○	○	○

	Not considered	Very little consideration	Moderate consideration	Significant consideration	Don't know
The likelihood and potential impact that financial risks and/or opportunities will have on the organization's ability to achieve its objectives	◯	◯	◯	◯	◯
To what degree does the organization consider strategic risks and/or opportunities?	◯	◯	◯	◯	◯
The likelihood and potential impact that strategic risks and/or opportunities will have on organization's ability to achieve its objectives	◯	◯	◯	◯	◯
To what degree does the organization consider compliance risks and/or opportunities?	◯	◯	◯	◯	◯
The likelihood and potential impact that compliance risks and/or opportunities will have on the organization's ability to achieve its objectives	◯	◯	◯	◯	◯
To what degree does the organization consider operation risks and/or opportunities?	◯	◯	◯	◯	◯
The likelihood and potential impact that operation risks and/or opportunities will have on the organization's ability to achieve its objectives	◯	◯	◯	◯	◯

	Not considered	Very little consideration	Moderate consideration	Significant consideration	Don't know
To what degree does the organization consider reputation risks and/or opportunities?	○	○	○	○	○
The likelihood and potential impact that reputation risks and/or opportunities will have on the organization's ability to achieve its objectives	○	○	○	○	○
To what degree does the organization consider significant events (risks and opportunities) prior to strategic decisions such as investment in new projects, products or new merger & acquisition	○	○	○	○	○

1. A frequently cited definition of Enterprise Risk Management (ERM) is "a process, affected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives."

To what degree does the organization implement ERM according to the above definition?

○ Not at all

○ Ad hoc implementation

○ Implemented but improvements needed

○ Robustly implemented

○ Implemented ERM but only according to other definition

○ Don't know

1. **Does the organization follow any of the following ERM frameworks (mark those which apply)?**

- ☐ COSO's ERM Integrated Framework
- ☐ Joint Australia/New Zealand 4360-2004 Standards
- ☐ ISO 31000-2009
- ☐ The Turnbull Guidance
- ☐ Casualty Actuarial Society Framework
- ☐ International Association of Insurance Supervisors Framework
- ☐ Basel II
- ☐ Internally created framework
- ☐ Don't know

2. **Does the organization have any plans to implement ERM?**

- ○ Yes
- ○ No
- ○ Do not know

1. Please answer the following questions about the organization?

	Yes	No
Is the organization headquartered in Saudi Arabia?	○	○
Is the organization listed in the Saudi Stock Market (TADAWUL)?	○	○
Does the organization have a centralized risk management function/department at the corporate level?	○	○
Does anyone at the organization hold the title of Chief Risk Officer (CRO) or equivalent position/title?	○	○
Does the Chief Risk Officer (CRO) or equivalent position have the highest responsibility for overseeing the centralized risk management function/department?	○	○

2. Thank you for your participation. If you are interested to receive a summary of the research findings which I will be more than have happy to share with you after the completion of the research project, please provide your email address here.