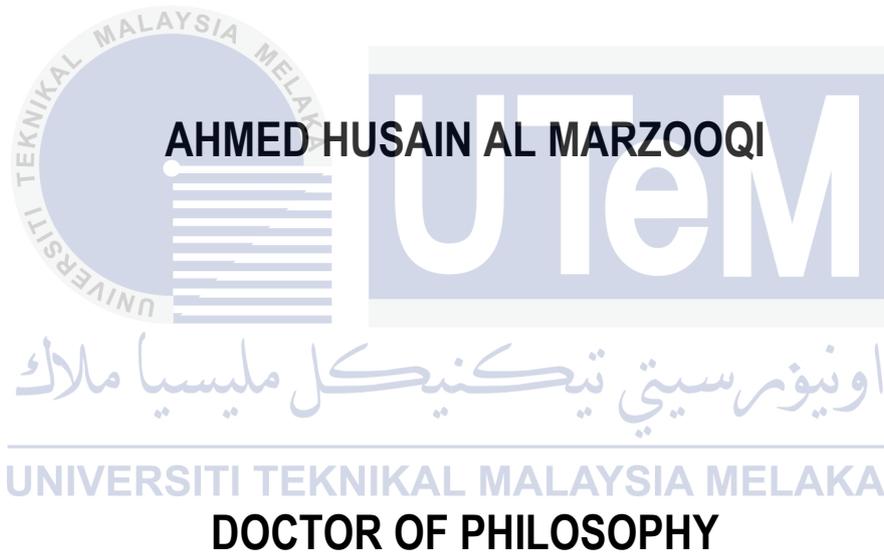




RISK MANAGEMENT IN THE ELECTRICITY DISTRIBUTION SYSTEM OF THE UNITED ARAB EMIRATES



2025



Institute of Technology Management and Entrepreneurship

**RISK MANAGEMENT IN THE ELECTRICITY DISTRIBUTION
SYSTEM OF THE UNITED ARAB EMIRATES**

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Doctor of Philosophy

2025

**RISK MANAGEMENT IN THE ELECTRICITY DISTRIBUTION SYSTEM OF
THE UNITED ARAB EMIRATES**

AHMED HUSAIN AL MARZOOQI



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2025

DECLARATION

I declare that this thesis entitled “Risk Management In The Electricity Distribution System of The United Arab Emirates” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :



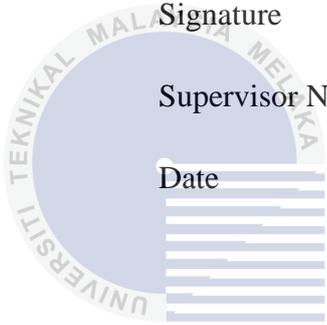
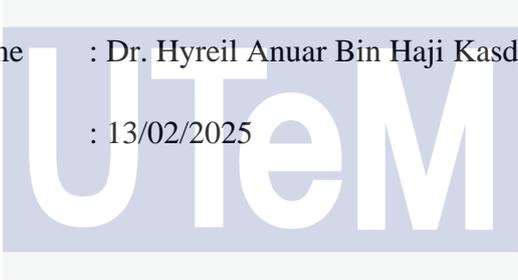
APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality as a partial fulfillment of Doctor of Philosophy.

Signature :

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Date : 13/02/2025



اونيورسيتي تيكنيكل مليسيا ملاك

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DEDICATION

I dedicate my thesis work to my family and many friends. A special feeling of gratitude to my loving parents, Zalikhah and Husain whose words of encouragement and push for tenacity ring in my ears. My brother Sultan and sisters Tahreer and AlAnood have never left my side and are very special.

I also dedicate this thesis to my wife Maith AlHosani and children who have supported me throughout the process. I will always appreciate all they have done and the patience for the times I was away.

I dedicate this work and give special thanks to my best friend Ali AlHammadi for being there for me throughout the entire doctorate program. You have been my best cheerleaders.



ABSTRACT

The current study focused on the aspect of risk management in the electricity distribution sector of the UAE. More particularly, the focus was on one of the key electricity distributors, the Abu Dhabi National Energy Company, PJSC (TAQA), which operates in the UAE and other countries across the globe. The overarching aim of this study was to investigate the optimization of risk management in the UAE electricity distribution sector using TAQA as the case study. The specific objectives were to evaluate the relationship between risk management methods, enterprise risk management (ERM), risk culture, and risk optimization recommendations with risk performance at the organization. The quantitative research methodology was used in this study. Using the quantitative methodology, data was collected from 390 participants from TAQA. Surveys were used for the collection of data and SPSS was used to conduct regression analyses to establish relationships between variables. Based on the regression analyses, all hypotheses were supported. One of the notable findings of the study indicated that risk management methods significantly impact risk performance. Better risk management methods lead to more efficient risk management approaches. More so, the implementation of ERM leads to better risk performance in the organization. It was also found that the presence of a risk culture leads to better risk performance. Lastly, it was found that elements such as ERM need to be put in place to enhance risk optimization in the organization. All study objectives were achieved. It is fundamental that risk management is prioritized in the electricity distribution system of the UAE. Through the example of TAQA, the entire industry stands the chance to do better in the future.

اونيورسيتي تيكنيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

PENGURUSAN RISIKO DALAM SISTEM AGIHAN ELEKTRIK DI EMIRIAH ARAB BERSATU

ABSTRAK

Kajian semasa memberi tumpuan kepada aspek pengurusan risiko dalam sektor pengagihan elektrik di UAE. Secara khusus, tumpuan kajian diberikan kepada salah satu pengedar elektrik utama, Syarikat Tenaga Nasional Abu Dhabi (Abu Dhabi National Energy Company), PJSC (TAQA), yang beroperasi di UAE dan beberapa negara lain di seluruh dunia. Matlamat keseluruhan kajian ini adalah untuk menyiasat pengoptimuman pengurusan risiko dalam sektor pengagihan elektrik di UAE menggunakan TAQA sebagai kajian kes. Objektif khusus kajian adalah untuk menilai hubungan antara kaedah pengurusan risiko, pengurusan risiko perusahaan (Enterprise Risk Management, ERM), budaya risiko, dan pengesyoran pengoptimuman risiko dengan prestasi risiko di organisasi. Metodologi kajian kuantitatif digunakan dalam kajian ini. Menggunakan metodologi kuantitatif, data dikumpul daripada 390 peserta dari TAQA. Tinjauan digunakan untuk pengumpulan data dan SPSS digunakan untuk menjalankan analisis regresi untuk mewujudkan hubungan antara pembolehubah. Berdasarkan analisis regresi, semua hipotesis kajian telah disokong. Salah satu penemuan penting kajian menunjukkan bahawa kaedah pengurusan risiko memberi impak yang ketara kepada prestasi risiko. Kaedah pengurusan risiko yang lebih baik membawa kepada pendekatan pengurusan risiko yang lebih cekap. Tambahan pula, pelaksanaan ERM membawa kepada prestasi risiko yang lebih baik dalam organisasi. Ia juga didapati bahawa kehadiran budaya risiko membawa kepada prestasi risiko yang lebih baik. Akhir sekali, didapati bahawa elemen seperti ERM perlu disediakan untuk meningkatkan pengoptimuman risiko dalam organisasi. Semua objektif kajian tercapai. Asas utama dapatan adalah bahawa pengurusan risiko diutamakan dalam sistem pengagihan elektrik di UAE. Melalui contoh TAQA, seluruh industri berpeluang untuk melakukan yang lebih baik pada masa hadapan.

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LIST OF ABBREVIATIONS

ERM	-	Enterprise Risk Management
TAQA	-	Abu Dhabi National Energy Company
UAE	-	United Arab Emirates



LIST OF SYMBOLS

- p-value - Probability value
- df - Degree of Freedom



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LIST OF PUBLICATIONS

AlMarzooqi, A.H., Kasdirin, H.A., and Mansor, N., 2022. Model of risk classification in the electricity distribution sector of the UAE. *Journal of Management Information and Decision Sciences*, 25(S3), pp.1-8.

AlMarzooqi, A. H., Kasdirin, H. A., and Mansor, N. 2022. Development of risk management practices in the electricity sector of the UAE. *Journal of Management Information and Decision Sciences*, 25(3), pp.1-9.



CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter introduces the theme of the thesis - analysis and assessment of risk management methods applied to the electricity distribution system in the United Arab Emirates (UAE) electricity markets. The information presented in this chapter is supposed to develop a general understanding of the study problem and objectives among the general audience. It includes the analysis of the research background, problem statement and the presentation of the key research questions and objectives. The scale of the study and the importance of its findings are discussed to identify the level of relevance and importance of the presented study, in addition to the discussion of the potential impact of the research in the fields of theory and practice. The thesis structure is presented to inform the readers about the content and structure of the research. The final section of the chapter included a brief summary of the chapter information is provided.

To clearly identify the theme of the study, it is important to identify and analyze in detail the specific terms that form its structure. The first term defined by the researcher in the process of literature sources analysis for the aims of the thesis is risk. The definition of the term stated in the Oxford English Dictionary, which defines risk as “hazard, danger; exposure to mischance or peril” (RAIS, 2020). In this definition, a clear negative characteristic of the risk as a theoretical phenomenon can be observed. Nevertheless, such a definition of risk management cannot be considered as proper for application in the context

of the thesis theme, mainly due to the limited nature of the concept and difficulties of its application to the research issue. In the conditions of the electricity distribution system in the UAE, which is the object of the study, the definition stated in the Oxford English Dictionary does not consider a full range of situations that can be estimated as risk-related. Hence, an alternative definition of risk is sensible in the context of the presented study.

Risk management is becoming one of the most critical aspects in contemporary organizations. For organizations to attain their goals in their respective industries, they need to comprehend the types of risks that they face and manage them in the best way possible. In the current thesis, the researcher utilizes the definitions of risk mentioned by Lyon and Popov (2022). Lyon and Popov (2022) define risk as, “the probability or likelihood of an occurrence, and the resulting severity of the consequences”. The meaning from this definition is that risk needs to be evaluated in terms of its occurrence and the effects that are associated with its occurrence. In this way, the term risk is applied to characterize the probability of any event that could upset the existing balance between the object of the study and the environment – both in the positive and in the negative way.

In this thesis, the focus is to investigate the management of risk in the electricity distribution system in the UAE. Hence, it is vital to comprehend aspects that constitute risk management in the organization. Srinivas (2019) opines that risk management is a planned and structured process that focuses on helping the project team make the right decision at the right time in regard to the identification, classification, and quantification of risks in order to manage and control risks effectively. Risk management is always geared at ensuring that any costs that could be associated with the failure to manage the risk are handled before the occurrence of the risk (Srinivas, 2019). Hardy et al. (2020) presents a more succinct

comprehension of risk management noting that it entails weighing alternative courses of action and selecting the most appropriate one based on the existing economic, social and political concerns or with the organization's level of risk appetite and tolerance. Therefore, risk management needs to be set up in a manner that enables managers to pick the most appropriate course of action in their decision-making process as far as organizational risks are concerned.

The risk management process in the organization needs to be elaborate. Latur (2020) points out that the risk management process needs to start with the establishment of the context, identification of the potential risks, assessment of the identified risks, putting in place measures to treat the identified risks, and the review and establishment of the plan towards risk management. In each of these steps, effective risk management in the organization is attained when managers have a clear understanding of the sources of the risks and the impact of each risk on the organization (Gephart and Topal, 2018). Generally, risk management should be all-inclusive where each of these steps is carefully followed to avoid exposing the organization to any shocks.

Risk management continues evolving and the management must work in line with the emerging trends. Traditionally, organizations managed their risks in silos where departments were separated from each other and risks handled separately (Lyon and Popov, 2022). In the modern context of risk management, organizations are integrating enterprise resource management (ERM) in their risk management processes. ERM is being integrated in risk management because of the perception that it makes organizations more agile and resilient in achieving their risk management goals (Lyon and Popov, 2022). A more common approach to risk management in the contemporary organization is the enterprise risk

management (ERM) framework. According to Hagg-Rickert and Gaffey (2020), effective planning in regard to the management of risks in the organization involves ERM. ERM entails notable characteristics such as governance and culture, strategy and objective-setting, performance, review and revision, as well as information, communication, and reporting (Carroll et al., 2020). Thus, the essence of contemporary risk management is to be efficient and this is attained using modern approaches that integrate ERM.

1.2 Background of the Research

The demand for electricity globally has been increasing significantly across the years. Due to the rising importance of electricity in the modern world, the parameter of the individual consumption of electric energy is estimated as one of the indicators of the socio-economic development in any given community (Babalola et al., 2022). Together with the development of the modern economy and society, the level of energy consumption and the dependence of society on the availability of energy resources continue growing. In these conditions, the ability of the state to deliver the required amount of energy resources to the end consumer during the required period of time becomes one of the key parameters of competitive advantage in global politics (Gray, 2017). As a result, effective production and management of energy resources are considered to be one of the key conditions for the successful operations of the global economy and society (Welsch and Biermann, 2014). The problem of effective risk management in the energy sector becomes one of the vital questions for the performance of modern society.

A prominent role of the electric energy sector in the performance of modern society also indicates the significance of risks related to the operations of this sector. The level of

risk should be assessed on the basis of the potential impact of the risk event on the environment, including human society. While other sources of risk for economic and social life might be difficult to estimate, risks related to the failure of the electric energy production and distribution infrastructure can be clearly defined and expressed by human imagination. According to Lee et al. (2022), the development of new information communication technologies (ICT) has played an instrumental role in helping boost energy security by mitigating against various risks such as economic risk, and risks linked to human capital. Consequently, there is need to incorporate ICT in the process of risk management in the energy sector. In this thesis, there is an explication of the quality of risk management in the electricity distribution sector of the UAE. According to Saleh (2024), the electricity transmission and distribution market in the UAE has continued to experience exponential growth. For instance, Saleh (2024) particularly points out that in 2021, the total revenue generated from electricity transmission and distribution market in the UAE was an estimated USD \$2.7 billion. The revenue was projected to increase over the next decade and reach an estimated USD \$3.74 billion by 2030. Besides being one the fastest growing markets, the electricity distribution market contributes substantially to the country's gross domestic product (GDP) by facilitating economic and social development.

The commercial, residential, as well as industrial sectors have continued to play a key role in advancing electricity distribution growth in the UAE and will see it expand even further in the future (GlobalData, 2024). The significance of the electricity distribution market underscores its need for a robust risk management strategy to ensure stability in power distribution across the country. The increasing demand for electricity and the need to meet the evolving needs of consumers across the country has made key electricity

distribution agencies to evaluate risks in the market. Major electricity distribution agencies such as the Dubai Electricity and Water Authority (DEWA) and the Federal Electricity and Water Agency (FEWA) continue to pay attention to robust risk management in the course of generating and distributing electricity. For instance, risk management in the electricity distribution market of the UAE has been facilitated primarily through the use of mixed energy sources such as natural gas, nuclear power, and solar power. More so, the UAE government has approved the strategy to increase the share of power generation from renewable sources to 7% by 2030 (Government of Dubai, 2020). The project of primary interest for the UAE electric energy sector is the Mohammed bin Rashid Al-Maktoum Solar Park, which is expected to become the largest renewable energy facility in the UAE by 2030 (Government of Dubai, 2020). It is planned to reduce energy consumption of the Mohammed bin Rashid Al-Maktoum Solar Park to 5GW by 2030 (Government of Dubai, 2020). Other strategic projects that are implemented in the sphere of electric energy production and distribution include 350MW Shweihan solar-based plant and additional 200MW of planned solar projects implemented with the support of the Federal Electricity and Water Authority (FEWA) (Government of Dubai, 2020). Overall, the diverse investment in the energy sector and particularly electricity distribution has been a critical part in the identification of risks and the development of robust risk management frameworks.

The discussion of the current projects in the sphere of renewable energy in the UAE demonstrates the efforts that are being made in regard to electricity distribution. The UAE power market had a total installed power capacity of 51.2GW in 2023 and is projected to achieve a CAGR of more than 3% from 2023 – 2035 (GlobalData, 2024). The electricity that is distributed is predominantly thermal power and renewable power (GlobalData, 2024).

As the capacity of electricity generated and distributed increases, there is need to evaluate risks in the electricity distribution system and develop the best risk mitigation strategies. Figure 1 below shows the UAE power market size with the representation of the expected growth, the top consumer (commercial). The success of electricity distribution would be based on the results of risk management and assessment for each of the stated initiatives. From this perspective, it is vital to investigate the quality of risk management approaches applied in UAE’s electricity distribution system. Understanding the risks and prioritizing them will go a long way into ensuring that they are handled effectively in the organization.

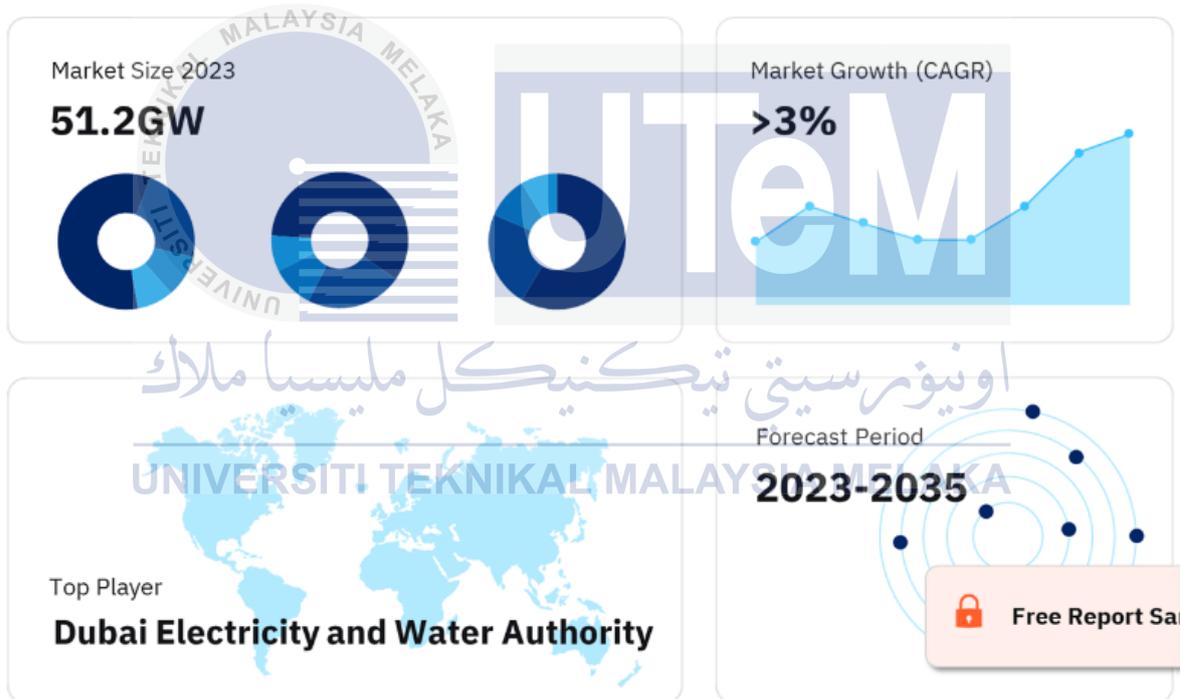


Figure 1.1: UAE Electricity Market as at 2023

Source: (GlobalData, 2024)

Note: The figure shows the UAE electricity distribution market as at 2023

The importance of this study is anchored on the identification of the novel approach that could be used to facilitate high quality performance of the electricity distribution market in the UAE through the implementation of sound risk management strategies. The UAE is

one of the key countries where the demand for electricity has continued to rise in both homes and the industrial sector (GlobalData, 2024). There has been continued encouragement of diversification of energy sources with clean energy sources such as solar power being adopted. In light of the increasing demand for electricity, companies such as FEWA have to come up with novel and sustainable approaches for risk management. Through this study, there will be an analysis of the electricity distribution market using primary research and finally the presentation of the most desirable approaches to risk optimization in the sector.

More so, this study is important because it will go a long way into enhancing the quality of electricity services that are provided to UAE citizens. Through this study, a comprehensive analysis of the electricity distribution market in the UAE will be provided and the required risk management approaches will also be discussed. Establishing effective risk management strategies would allow for the efficient operation of distribution agencies such as Abu Dhabi National Energy Company (TAQA), FEWA and DEWA. These agencies will be more aware of the diverse risks that they face and consequently come up with robust risk management strategies that benefit consumers by ensuring stable and safe power distribution.

1.3 Organization Analysis – The Function of TAQA and its Relation to the Study

The organization selected for analysis in this study was TAQA. TAQA is UAE organization based in Abu Dhabi. The organization was founded in 2005 and operates in the power and water, as well as oil and gas sectors (TAQA, 2024). TAQA operates in 11 countries globally including; the UAE, Canada, Ghana, India, Morocco, Iraq, the Netherlands, Oman, United Kingdom, Saudi Arabia, and the United States (TAQA, 2024).

The company prides itself as one of the leading organizations globally in regard to the supply of water and energy to communities across the world.

The core purpose of TAQA is to power a thriving future by efficiently providing sustainable and reliable energy and water to people (TAQA, 2024). The vision is to provide clean power and water to governments, businesses, and consumers in need for sustainable and successful life.

In the UAE, TAQA has focused on expanding its market and its distribution of power to both homes and commercial consumers. As part of its push towards renewable energy, TAQA plans to invest Dh40bn in infrastructure, as it aims at 27 gigawatts of power capacity by 2030 (Abu Dhabi Government, 2023). TAQA believes in sustainable distribution of electricity and it plans to generate 30% of its power from renewable sources compared to the 5% it currently generates (Abu Dhabi Government, 2023). The ultimate outcome of the investment is to expand TAQA's power capacity in the UAE from 18 gigawatts to 30 gigawatts (Abu Dhabi Government, 2023). Therefore, TAQA remains focused on succeeding further in the UAE market.

The significance of using TAQA in this thesis emanates from the understanding that it is one of the main organizations involved in the distribution of electricity in the UAE market. It is one of the largest organizations in the electricity distribution market. The organization would provide a great opportunity to comprehend the application of risk management, as evidenced in its operations in the UAE and even in other countries. On overall, TAQA has an estimated 2,700 employees who provide an appropriate population to pick the sample from (LeadIQ, Inc, 2024). The employees will help comprehend the

challenges with risk management and how risk management could be optimized for the success of risk management moving into the future. Therefore, TAQA is a critical organization in the electricity distribution market and this justifies its application in this thesis.

1.4 Problem Statement

Electricity distribution systems have become more sophisticated in the UAE as the demand for electricity increases across the country. In the UAE, the per capita electricity consumption as of 2022 was 15 MWh (8th highest in the world) because of factors such as air conditioning in buildings and electro-intensive industries such as the aluminum industry (Enerdata, 2024). The total energy consumption in the UAE has risen by 7.5% per year on average since 2020 and reached 92 Mtoe in 2022. By 2050, the UAE expects to produce 44% of its energy from renewable sources (Enerdata, 2024). As the demand for electricity increases and the aspirations of the government to expand energy sources rise, companies involved in the supply of electricity in the UAE face increased risks. Organizations in the electricity supply sector in the UAE face various risks including environmental risks, litigation risks, business process risks, liquidity risks, market risks, strategic risks, systems risks, as well as management risks (Qin et al., 2019). These risks do not only need to be understood, but also effectively categorized for proper implementation of risk management.

As much as risk management in organizations that are involved in electricity supply has become significant, there is still a theoretical gap in terms of how risk is managed in high-risk industries such as the energy sector. In the electricity sector, there is very minimal exploration of how risk is handled and practiced in industries such as the electricity sector. The fact that there is a dearth in literature underscores the problem in research and the need

to conduct research that would offer a clear picture of risk management in the electricity market, especially in the UAE.

More so, there are practical and theoretical issues in the UAE in regard to risk-management in the electricity distribution system in the UAE. Practically, organizations involved in electricity distribution such as TAQA, DEWA and FEWA face substantial risks including environmental and operational risks. Emerging climate change risks such as energy efficiency risks, infrastructural risks, health risks, and the risk to biodiversity need to also be comprehended in the energy sector (UNFCCC, 2024, p.98). The increasing demand for power coupled with the diversity of risks had posed a challenge to electricity supply agencies in regard to their efficiency to manage the risks they face such as environmental, financial, legal, and operational risks. Qin et al. (2019) opine that there are more uncertainties in the electricity distribution market and efficient risk management is becoming more elusive for electricity agencies in the UAE because of the absence of a holistic approach to risk management in their electricity distribution system asset management. Theoretically, there has been limited research on risk optimization in the UAE electricity distribution sector. Thus, this research is critical, as it will help comprehend the risks that abound in the electricity distribution sector in the UAE, as well as the risk management strategies that are applied at TAQA. With this, it would be easier to develop a holistic approach to risk management for TAQA.

1.5 Research Aim and Objectives

The overarching research aim of this study is to evaluate the risk management model applied in the electricity distribution systems of the UAE and particularly at Abu Dhabi National Energy Company (TAQA) and develop recommendations that would lead to the

optimization of risk management at the organization. Based on this aim, the study focuses on attaining the following specific aims:

- i. To evaluate the relationship between risk management methods and the risk performance of TAQA in the electricity distribution system in the UAE.
- ii. To investigate the impact of enterprise risk management (ERM) on risk performance in the UAE electricity distribution system, based on the case of TAQA.
- iii. To examine the impact of the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA.
- iv. To provide practical recommendations for the optimization of the quality and effectiveness of risk management methods to improve risk performance of the UAE electricity distribution system in organizations such as TAQA.

On the basis of the realization of the thesis objectives, the researcher aims to identify the key characteristics of the risk management methods and the risk management culture in the performance of the UAE electricity distribution system. At the same time, the results of the study are expected to demonstrate the impact of the existing risk management methods on the performance of the UAE electricity distribution system with reference to organizations such as TAQA and the key challenges that exist in the organization. The results of the study will be consequently applied in the development of recommendations in the field of optimization of the risk management methods to guarantee the reduction of risks in the UAE electricity distribution system performance in the future. Due to the considerable importance of the sustainable operation of the UAE electricity distribution system for the UAE society and economy, the realization of this objective is considered to be an important practical impact of the thesis.

1.6 Research Questions

Research questions are critical, as they help to effectively address the problem being investigated in the study (Rana et al., 2021). For an effective approach to the study, there has to be an alignment between research questions and research objectives. In the context of the defined problem statement and the research objectives, the following research questions are to be answered in this thesis:

- i. What is the relationship between risk management methods and the risk performance of TAQA in the electricity distribution system in the UAE?
- ii. What is the impact of enterprise risk management (ERM) on risk performance in the UAE electricity distribution system, based on the case of TAQA?
- iii. What is the impact of the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA?
- iv. What practical recommendations could be adopted for the optimization of the quality and effectiveness of risk management methods to improve risk performance of the UAE electricity distribution system in organizations such as TAQA?

1.7 Scope of the Research

The scope of the research includes analysis of the risk management methods utilized in the UAE electricity distribution system. More specifically, the performance of Abu Dhabi National Energy Company (TAQA) is assessed. The research methodology is an integration of quantitative and qualitative methods. The research methodology includes quantitative research design and applies SPSS for the aims of data analysis.

1.8 Significance of the Research

This study will provide useful knowledge for the positive transformation of the risk management procedures in the UAE energy sector. It aims to critically analyze the existing risk management culture and practices at the TAQA as a leading energy company in the UAE, define the weaknesses of the current risk management procedures and practices, together with the key future recommendations. The key performance indicators (KPIs) of the study shall include the clear recognition of the relationship between the risk management culture, practices and procedures, and the risk management outcomes at the level of TAQA. The current study should form the recommendations for risk management based on the critical review of survey data collected from the employees and management of TAQA, together with the qualitative analysis of the organizational risk management documentation. The clear vision of the target problems should form useful knowledge and propositions for the risk management area in the UAE and other countries.

From a theoretical standpoint, this research is significant because it will present the most important characteristics of the existing risk management methods in the UAE electricity distribution system and analyses the role of the risk management culture and different parameters of the research framework in the effectiveness of risk management procedures in the chosen organization. At the same time, this study's results will be the basis of the presentation of the critical challenges that impact the quality and effectiveness of risk management procedures utilized in the UAE electricity distribution system.

The summary of the theoretical outcomes of the presented study demonstrates the significance of the study from the position of generated opportunities for the improvement

of knowledge about the structure of risk management procedures in the chosen organization and the definition of the theoretical basis for its future improvement. From the theoretical perspective, summarization of current experience in the sphere of risk management in the UAE electricity sector will provide useful knowledge for practitioners operating in this sphere. The results of the study will serve as the mean of support for employees and managers in their decision-making activity related to risks management.

The theoretical significance of the study is also based on the understanding of the potential impact of the study results on the existing body of knowledge in the sphere of risk management in public organizations. In the process of discussion of the problem statement in the introduction section of the thesis, the researcher highlights that the problem of the specifics of risk management methods and procedures in the public sector was carefully discussed in the previous research. Nevertheless, the question of the specifics of the risk management methods and procedures organization in the public sector of the UAE, including the electricity distribution system, has not been addressed. The results of the thesis will make an important contribution to the existing body of knowledge in the field of the analysis of the specifics of risk management in the public sector. The results of the research will allow the researcher of this thesis to identify the existing differences in the organization of risk management procedures in the public sector of the UAE, contributing to the existing body of knowledge on this issue.

From the position of the practical significance of the study outcomes, they will form the basis for improved understanding of the specifics of the organization of risk management methods and procedures in the UAE electricity distribution system. On the basis of the insights and findings presented in the thesis, the researcher will be able to demonstrate the

key issues that do not allow the leadership of the UAE electricity distribution system to reach the potential levels of quality and effectiveness in the sphere of risk management. On the basis of the newly generated knowledge, the researcher will be able to develop and provide recommendations for the leadership of the UAE electricity distribution system. The definition of the most important challenges in the field of risk management should demonstrate weaknesses of the current practices utilized in the chosen field of practice and facilitate integration of improved methods of risk management.

Altogether, the significance of the study is considered from the theoretical and practical perspective. The results of the thesis will inform the scientific community about the specifics of the risk management methods and procedures in the UAE electricity distribution system, making it possible for scientists to gain a better understanding of the specifics of risk management in the public sector of the UAE. From the practical perspective, there will be recommendations that can be implemented to improve the electricity distribution market in terms of risk management capacities. On the basis of the study findings, the author of the thesis aims to improve the results of the risk management procedures in the UAE energy sector and contribute to increased sustainability in the performance of one of the key sectors of the UAE economy. The results of the study are supposed to serve both the general objectives of improvement of risk management processes, and the resolution of specific practical issues in the UAE electricity distribution system.

1.9 Operational Definitions

Operational definitions for constructs in the survey are as follows:

- i. Risk management – Risk management is a methodical and organized procedure designed to assist the project team in making timely and appropriate decisions to identify, categorize, measure, and subsequently manage and regulate risks (Srinivas, 2019).
- ii. Risk management culture -The concept of risk management culture encompasses the way individuals perceive and approach risk and risk management inside the organization (Huy et al., 2021).
- iii. Enterprise risk management (ERM) - Enterprise Risk Management (ERM) refers to the technique of managing risks at the organizational level, as defined by the International Labor Organization (2023).
- iv. Risk performance – The ability of the organization to achieve its objectives and manage its uncertainties in the most effective manner (Blunden and Thirlwell, 2022).
- v. Risk management optimization- Risk management optimization refers to a procedure that aims to minimize the likelihood of unfavorable outcomes and enhance the likelihood of positive outcomes (Quinn et al., 2022). This process takes into account several factors, such as expenses and legal requirements, in order to determine the best course of action (Quinn et al., 2022).

1.10 Terms of Reference

Chapter 1: Introduction

The introduction chapter informs the audience of the study about the background of the study, the key research problem, research framework, research questions, objectives, the significance and scope of the study.

Chapter 2: Literature Review

Chapter two of the study summarizes the theoretical information about the object of the study in the form of the literature review of the most relevant and reliable literature sources. The literature review is organized in a comprehensive way to guarantee a detailed discussion of the widest range of positions of scientists on the stated research questions.

Chapter 3: Methodology

Chapter three of the thesis provides information about the research methodology and the key characteristics of the research design. The discussion of the methods and tools applied for the aims of the study informs the audience about the potential level of reliability and limitations of the study outcomes.

Chapter 4: Results and Discussion

The results of the data collection and analysis procedure are summarized in chapter four of the thesis. The preliminary findings of the study are presented without additional discussion or interpretation. The discussion of the key findings of the study and the development of the thesis implications and recommendations for practice are also presented.

Chapter 5: Conclusions

Chapter five of the thesis summarizes different aspects of the study, mainly the most important outcomes and implications. The most significant and useful findings of the thesis are presented for the assessment and critique discussion of the study audience.

1.11 Summary

Chapter one of the thesis presents information about the background of the research, research problem, research framework, research questions, and study objectives, the scope of the research and its significance. The information stated in the first section of the thesis is aimed to present the key elements of the thesis to the audience, gaining their interest and inviting them for critical analysis and assessment of the thesis, stages of the research process and the main outcomes, including implications and recommendations for practical application. In the process of the discussion of the research background and the problem statement, the problem of the organization of risk management procedures in the UAE electricity distribution system is identified. The discussion of the research framework provides information about the theoretical background of the study. The presentation of the research questions, objectives and hypotheses summarizes the most important aspects of the chosen problem that are discussed in the context of the thesis. On the basis of the analysis of the research questions and hypotheses, it is possible for the audience to predict the outcomes of the thesis in the form of answers to these research questions. At the same time, this knowledge can allow the audience to assess the significance of the thesis findings both from the theoretical and the practical perspective.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review is an analysis of past literature and published works on the subject matter being investigated or on the research questions under focus. The purpose of the literature review is to establish the research gap, which will then act as a basis for the formulation and answering of the research questions in the results and discussion sections. The research gap refers to missing pieces where there is insufficient information that has been published on a research topic. The aim of the researcher, then, is to plug this research gap through their information gathering, analysis and presentation. This literature review therefore looks into research gaps when it comes to the issue of optimization of risk management, its application in the electricity distribution sector, and how it then applies to the UAE. The literature review covers several concepts, including the general idea of risk, definitions of risk and risk management. It also looks into the classifications of risk in organizations and the various sources of risk, their assessment, identification and the various analysis techniques. However, the literature review does not necessarily focus on specific literature on the electricity distribution system, especially within the context of the UAE or in comparable locations or countries in the gulf region in general.

2.2 Theoretical Framework – Enterprise Risk Management (ERM)

The main theoretical framework applied in this current thesis is the enterprise risk management framework. It is important to understand ERM and its fundamentals in order to

then outline how it fits into the current research as a theoretical perspective. ERM is more of a paradigm than a single concept. Anton and Nucu (2020) describe ERM as a leading paradigm that supports organizations in their bid to identify, evaluate and manage risks at enterprise level. The definition of risk provided by Aven (2016) is useful to note here when exploring the need for ERM. According to Khan et al. (2016), there are many motivators that would push firms to then engage in ERM. Some of the motivations include; the probability of financial distress, the lack of growth opportunities, as well as issues with the independence of the board, especially in a world that is increasingly focused on the need for integrity and the fight against corruption (Khan et al., 2016). Strelcova et al. (2018) note that the implementation of ERM programs has gained importance in different domains and industries. These include the typical high-risk industries like the banking and the insurance sectors. However, ERM has also become popular in the non-financial sector, especially notably in the SME sector. The growing uncertainty of most industries, especially in the recent dynamic world means that companies, including those that are smaller and considered SMEs, are now embracing ERM. Strelcova et al. (2018) provide some statistical context to evaluate the ERM implementation process in SMEs. In an analysis of SMEs from Slovakia, Strelcova et al. (2018) analyzed 485 SMEs from the Republic of Slovakia and established that up to 75% of companies deal with risk management in these sectors, with another 24% of the firms having put in place risk management at all organizational levels. This is a significant level of activity and indicates the importance not only of risk management, but also of ERM as an enterprise level of managing risk.

Both large and small companies globally are having to implement ERM initiatives. For instance, in an analysis of companies from Italy, Arena et al. (2011) provide empirical

evidence of ERM in practice on the example of several Italian companies from different industries. Similarly, from their studies of the business environment in Slovakia Strelcova et al. (2018) found that ERM has become one of the most important aspects of the business operations in businesses. However, the implementation of ERM comes with its own fair share of challenges. Some of the difficulties identified in the implementation of ERM are outlined by Fraser and Simkins (2016), and they include; misconceptions about the concept, internal challenges within the companies themselves, difficulties in changing the corporate culture, and low levels of knowledge by boards of directors on the ideas and frameworks of ERM. Other challenges include the fact that ERM typically tends to identify too many risks, all without specific timeframes. This then results in a situation where ERM is not recognized as a change management process, which then makes it less meaningful as a concept. Furthermore, research on the benefits of ERM has not always been straightforward in establishing the positives. On paper, any major decision involves a risk element, and ERM would therefore be an important part of improving outcomes in such scenarios (Crawford and Jabbour, 2024). However, there have been reservations on the ability of ERM to enable the articulation and the subsequent understanding of these risks, especially when it comes to the alignment of these risks with the decisions and the strategic performance of the company.

Despite these challenges, the implementation of ERM has persisted based on the general understanding of the advantages it offers to firms. The importance of ERM and its benefits have to be reviewed in context. Enterprise risk management (ERM) has grown in prominence and is now regarded as a leading paradigm for good corporate governance, especially in the current business environment where there is a degree of uncertainty. As the range of risks and uncertainties that must be managed has grown, so has the need for ERM

(Anton and Nucu, 2020). The main benefit of ERM is the fact that it enables the understanding and articulation of risks associated with business decisions. It enables proper judgments to be made regarding the levels of risk associated with strategic and operational decisions to be made continuously. As a result, the management of risks can be improved consistently (Jabbour and Abdel-Kader, 2015). As a result, from a managerial perspective, ERM improves managerial judgment and decision-making. In terms of outcomes, ERM has been identified as an important in improving such outcomes as firm financial results, how firms use their resources (Blanco-Mesa et al., 2019). These include human resources, information technology and other resources.

As a theoretical perspective, ERM has become more commonly used and mentioned in risk management. The past few decades have seen a heightened increase in the implementation of ERM within the ranks of organizations. To understand ERM as a theoretical paradigm, it is important to carefully distinguish it from the typical risk management. Typically, organizations tend to organize their work in terms of functional units. For instance, operations are divided in terms of departments like finance, legal, sales and marketing and so on (González et al., 2020). Further, within these units, there are individual projects. This means that risk management in the traditional sense is almost always considered at the levels of these functional units. This means the organization is likely to miss out on the effects of risk management at the larger holistic level. Risks that are targeted in the sales and marketing department might be different from the risks in the finance department. At organizational level, however, it is important to look at the risks facing the entirety of the enterprise. ERM enables the management of the net, aggregated risks of the organization (Jankensgård, 2019). Enterprise risk management as a theoretical

perspective is important in dealing with the manifest issues of the agency problem in risk management at firm level.

The agency problem generally refers to the balance between the principle and the agent in the management of assets. The principle in this case would be the owner of the assets, with the agent being the individual contracted to manage said assets. This separation between the ownership and control results in a conflict of interest. For the managers, the focus then becomes self-preservation and self-dealing. In the control of the smaller functional units mentioned by González et al. (2020), managers would tend to pursue projects that maximize their utility and maximize the wealth under their control. They are therefore likely to be risk averse than the owners of the firm, given that a large portion of their success is tied to the success and continued existence of the firm. However, this might lead to the setting of risk levels at places that would maximize the utility of the manager rather than maximizing shareholder value. Furthermore, differences in perception and attitudes towards risk can either lead to under or over-management of risks at different levels (Jankensgård, 2019). Ultimately, enterprise risk management reduces the chances of this happening by getting rid of the risk management silos.

Individual operating units are important for the success of the organization to gain from the benefits of specialization. However, these individual units result in silos within the organization, at least in part due to the agency problem. These silos exacerbate the information problem in risk management, in a business and operational environment where information is perhaps the single most important tool for the management of risks and the achievement of better risk performance in an organizational setting (Aljneibi et al., 2022). Enterprise risk management enables the understanding of risk from a larger, more holistic

perspective. Based on the TAQA case, the need for approaching risk management from an ERM perspective is particularly important. TAQA is a company whose operations in the supply and distribution of energy encompasses different countries and continents. The implication is that risks vary by location, as well as by functional unit. Understanding the relationship between risk management and risk performance in the TAQA context calls for the understanding of risk from the larger enterprise perspective given the variations of risks that each country faces, and the resultant need for an appropriate strategic focus.

The enterprise risk management (ERM) theory served as the grounded theory of the presented research. The choice of the presented theory is defined with the fact that it can be considered as the key theoretical model that considers the existing nature of risk and risk management in the modern business organizations. Specialization on the business-specific risks is one of the key advantages of this theory compared to other theoretical approaches to this issue (Kerraous, 2018; Tasmin et al., 2020). The enterprise risk management (ERM) theory is based on two key theoretical parameters that describe the process of risk management in any type of organization: risk governance and risk aggregation (Jankensgard, 2019; Gonzales et al., 2020). In this way, the chosen theory addresses two key aspects of the risk management problem – agency and information problems, which define the role of subjects in the process of risk management, and the information requirements for the risk management process (Anton and Nucu, 2020; Sprcic et al., 2015). Following factors were found to have a specific impact in the context of the ERM theory application for effective risk management processes realization: “a broader scope of risks associated with CG issues, institutional investor pressure, competitive advantage, technology advancement, increasing complexity of risk, and globalization, failures” (Gottwald and Mensah, 2015). Taken

together, the enterprise risk management (ERM) theory was selected for the aims of the study as the grounded theory to generate value for understanding of the role of key risk management procedures in TAQA.

The theory of the ERM delivers key role in the process of the risk management to the senior management of modern organizations. According to this theory, management defines the principles of available resources governance to mitigate the influence of the potential risks (Jankensgard, 2018). The decisions of management in aspect of risk management are defined by their incentives and behavior patterns in the specific risk conditions. As a result of high subjectivity of risk management process, the theory of the ERM identified two categories of issues existing in this sphere: over-management and under-management of the specific categories of risks (Jankensgard, 2018). Such format of discussion led to the conclusion about the need to consider the model of risk management that would prevent mistakes in actions of management.

Together with the issue of the management biases, the problem of information asymmetry was identified in the ERM theory. According to the theory, effective management of risks is complicated due to absence of full information about perspectives of risks development among all the engaged agents in the organization (Jankensgard, 2018). Effective organization of risk management processes in company would depend on the ability of management to optimize the performance of all decision-making agents and avoid information asymmetry issue.

In the context of the identified problem of risk management, the ERM theory identified the following categories of tasks performed by company's management: risk governance and

risk aggregation. Risk governance process is responsible for the prevention of situations of under- or over-management of risks in the organization (Jankensgard, 2018). As for the risk aggregation process, it is mainly performed to manage all available information about the potential risks: risk exposures, costs and benefits of risk management, and the portfolio of business risks (Jankensgard, 2018). Taken together, the ERM theory provides basic description of the mechanism of risk management in modern business that can be applied to effectively solve potential risks.

An important aspect of the study by Jankensgard (2018) is that it also identified the common limitations of the ERM theory. First, this theory lacks discussion of the actual role and position of senior management in the process of risk management in modern companies. According to Jankensgard (2018), the problem of understanding of the role of senior management in organizations is related to the fact that practitioners lack understanding of the end interests of senior management. From one side, senior management has responsibilities for shareholders of business. At the same time, other positions on this issue can be relevant. The presented study has to fill the gap in understanding of the decision-making mechanisms applied by senior management for control and prevention of risks.

Together with this, the presented theory lacks understanding of the factor of corporate culture and the existing risk management procedures on final decision-making in aspect of risk management. From this perspective, it is sensible to understand whether specific decisions in the sphere of risk management are dependent on the corporate culture factor and the existing procedural traditions in the organization. At the same time, it is important to understand the role of factor of flexibility of decision-making in effectiveness of risk management for modern business.

Taken together, the discussed ERM theory provided general understanding of the process of risk management applicable in modern organizations. The division of risk management process into risk aggregation and risk governance presents a basic model of effective risk management addressing key categories of problems in this sphere. Nevertheless, it is obvious that this theory lacks understanding of the role of specific parameters of decision-making related to interests of agents, decision-making culture and existing procedures, and the level of flexibility in decision-making. All these gaps will have to be addressed in the context of the presented research.

2.3 Managerial Characteristics of ERM

Hecht (2021) points out that one of the reasons there is not much in the way of research into the link between managerial characteristics and ERM is the fact that traditional economic theories such as neoclassical economics do not attach any value to managers as individuals. They are either assumed to be homogenous and therefore perfectly interchangeable, or believed to not be able to shape corporate decision-making. However, theoretical perspectives like the upper echelon theory help explore the link between managerial characteristics and ERM by analyzing the association between corporate decision-making and managerial backgrounds. The general idea here is that corporate outcomes are predicted, at least in part, by the managers and their characteristics, their values and previous experiences. Furthermore, Hecht (2021) opines that behavioral differences between managers matter for a wide range of business decisions. These include the influence managers have on such decisions as investment and financial practices. This is further reinforced by Doukas and Mandal (2018) who identify specific differences between managers and how they might affect outcomes. For instance, Doukas and Mandal (2018)

note that the age and tenure of the CEO, as well as their MBA education influences their corporate risk management practices, and by extension, their enterprise risk management involvement. Other researchers such as Malmendier et al. (2010) have also focused on describing manager characteristics and their effects on firm outcomes. Malmendier et al. (2010) note that managers vary in their age, education, experience on the job, their functional backgrounds and their tenure. These managerial characteristics then determine several outcomes, including their appetite for risk within the organization (Malmendier et al., 2010). The fundamental challenge with managerial characteristics is the idea that they in some cases are not measurable. Nonetheless, when managerial characteristics are measurable, they have been proven to have significant predictive power on organizational outcomes beyond the traditional structural determinants (Hecht, 2021). Managerial characteristics can easily be grouped into observable and non-observable characteristics, which can then be measured qualitatively or quantitatively (Hecht, 2021). Overall, managerial characteristics have to be understood and measured effectively in their relationship to ERM.

Salehi et al. (2022) approach the subject from a different perspective, outlining different levels and types of managerial behavior and highlighting their influences on the levels of managerial risk. The three managerial behaviors that Salehi et al. (2022) point out include managerial entrenchment, myopia and overconfidence. Furthermore, the research by Salehi et al. (2022) find differences in the effects of managerial characteristics between companies in developing countries compared to those in developed countries. The results by Salehi et al. (2022) indicate that behaviors like managerial entrenchment and myopia have a positive relationship with the risk-taking at firm level, with the variations expected to be higher in developing countries compared to the developed countries. Kunz and

Sonnenholzner (2023) mention managerial overconfidence and its relationship with organizational resilience through risk. Overconfidence here is described as a cognitive bias where the managers tend to overestimate their own levels of knowledge or the validity of their judgment in situations where there is no personally favored outcome or hypothesis (Kunz and Sonnenholzner, 2023). It stems from self-belief as managerial behavior. Self-belief is described as an important part of the managerial role, and is actually believed to be an important success factor. However, when it crosses the threshold into overconfidence, the outcomes vary (Kunz and Sonnenholzner, 2023). In some situations, like takeovers and mergers, it is noted to have positive effects. However, in some financing decisions, the effects might be negative (Kunz and Sonnenholzner, 2023). Ultimately, the conclusion here is that there is a strong relationship between managerial characteristics and ERM.

2.4 Risk Concept

2.4.1 Understanding Risk

A contextual definition of risk is important given that it is an important cornerstone of the research topic and research questions. Deloitte (2020) provides a simple, overall definition of risk, outlining how important it is in strategic business. The general idea here is that risk is one of the most important variables in business. The implication is that business orientation towards risk and its assessment is important can lead to serious challenges in the future if the term is not clearly defined. The definition of risk by Aven (2016) is one of the simplest and most straightforward. It is a social definition that describes risk as the probability of unexpected outcomes that can have a serious negative impact on humans and cause damage or losses to the object of human value. This definition of risk perfectly fits the

constructivist philosophical paradigm since it places a human subject in the center of the definition of the phenomenon. Sotic and Tehnikum (2015), however, offer an alternative, quantitative definition of risk. They define risk using a mathematical formula that involves three important elements. In this context, the quantitative definition of risk is “the triplet (s_i , p_i , c_i), where s_i is the set of scenarios, p_i is the likelihood of that scenario, and c_i is the consequence of the scenario, $i = 1, 2, N$ ” (Sotic and Tehnikum, 2015). This mathematical definition of risk allows the researcher and practitioner to perform a quantitative assessment of the risk parameter and apply it as an instrument of calculation of future outcomes of the organization’s performance in relation to potential risks. While this model of risk definition is attractive from the position of the quantitative and mathematical application for the aims of prediction and calculation of business performance outcomes, it lacks complexity for the description of a full range of parameters and characteristics of risk as a social phenomenon.

Regardless of the definition of risk provided, the general consensus is that risk, its definition and the subsequent management, are important elements in the successful running of any business. A specific characteristic of the performance of modern organizations is the orientation on the strategic plan in the long-term performance. Before the initiation of any type of activity, modern organizations are required to develop and present a strategic, tactical and operational plan of their performance (Shu-Hsiang et al., 2015). On the basis of the strategic plan, the management of the organization is able to identify the desired state of the organization in each moment of time and build future performance on the perception of this state. As a result, the success of the development plan for an organization depends on the success in the realization of the planned state of business in each moment of time. In these conditions, if deviation from the desired outcome due to risk realization occurs, actual future

conditions of the organizations do not correspond to the desired state that was initially planned. Such a situation can cause the failure of the strategic development plan for the organization in general. Ultimately, the research will adopt the simplistic, straightforward definition of risk provided by Aven (2016) in describing risk.

The discussion of this aspect of the risk phenomenon in the context of business organizations is provided to indicate the importance of a more profound understanding of the risk phenomenon in business. Business organizations should focus on the analysis of risk not only from the position of actual losses caused at the moment of risk occurrence. It is also important to consider long-lasting losses for the strategic development plan of the organization caused by specific risks. From such a perspective, it might be possible for the management to identify a small risk event that can cause the overall failure of the organization during the period of the next several years.

2.4.2 Classification of Risks in the Organization

The second important question is the definition of the phenomenon of risk according to the classification of types of risks in the organization. Prior to the assessment of specific types of risks, it is important to acknowledge the fact that it is difficult to define general principles of risk classification that can be considered applicable for each business organization. Thus, companies usually identify specific types of risks that are relevant for them on the basis of the analysis of the internal and external environment of the organization (Dunovic et al., 2016). Organizations are capable of identifying specific parameters for the classification of risks and are free to assess the relevance and importance of specific risks for their operations (McGowan et al., 2024). This fact supports the previously stated

argument about the subjective nature of risk. This finding also leads to the conclusion that definition of risks for the organization is a potential source of mistakes. Due to the subjectivity of this phenomenon, it is impossible to define the objective nature of risks for each organization and business scenario.

Despite the subjective nature of risks, it is possible to offer a basic classification of risks that can be observed in any type of business organization. The level of relevance and importance of each of these categories of risks can vary for each specific organization. The list of potential types of risks for the organization includes strategic risk, operations risk, supply risk, customer risk, asset impairment risk, competitive risk, reputation risk, financial risk, fiscal risk, regulatory risk and legal risk (Ennouri, 2013). It is important to discuss each of these types of risks to identify their main characteristics and potential impact on the organization's performance.

Strategic risk is the type of risk that affects business strategy implementation. This type of risk should be considered as one of the most important in the context of risk management. As it was earlier stated, risks can cause the failure of the strategic development plan of the organization due to the effect of deviation from the desired result in the future development of business (Ennouri, 2013). From this position, it is important to understand the impact of each potential risk on the future success of the organization in the realization of its strategic objectives.

Another category of risks is operations risk. According to Ennouri (2013), this type of risk should be considered as the probability of an event that impacts the internal ability of the organization to produce and supply products and services to the market. From this perspective, Becker and Smidt (2015) provide a wider definition of the nature of operational

risk. According to the scholars, operations risks integrate a wide range of risk categories, each of them contributing to the failure of the organization in the realization of its performance objectives. While both definitions are quite similar, Becker and Smidt (2015) provide an argument that the organization's risk should be considered as located at the hierarchically higher level compared to other types of risks presented earlier. In this case, the change of vision of the organizations' risk can contribute to a more effective organization of risk assessment and management procedures in the organization. If the management observes each specific type of risk as a part of potential operations risks, they are motivated to assess the impact of this risk on the overall quality of operations in the company.

Other categories of risk can be considered as specific examples of undesired and unpredictable events that can cause negative value losses for the organization. Supply risks characterize a situation when the organization cannot guarantee a stable flow of resources to guarantee the effective realization of performance objectives (Ennouri, 2013). Customer risks take place when the poor quality of organization performance causes the reduction of the likelihood of customers placing orders (Ennouri, 2013). Asset impairment risk is the situation when the utility of assets application in the organization is reduced due to the impact of specific factors in the internal and external environment of the organization (Ennouri, 2013). Competitive risk characterizes situations when the organization faces serious competition and is not capable to develop an effective strategy for overcoming competitors' pressure (Ennouri, 2013). Reputation risk impacts the operations of the company in a negative way due to the worsening of business reputation among customers and other stakeholders (Ennouri, 2013).

Financial risks can cause losses for the organization due to changes in the financial markets or reduction of the quality of financial management in the company (Ennouri, 2013). Fiscal and regulatory risks take place when the losses for business are caused by negative changes in the state regulations of business operations (Ennouri, 2013). Finally, legal risks are also caused by the change of the state regulations through the instrument of the provision of legal changes for business (Ennouri, 2013). As a result, a wide range of risks is available for analysis and assessment in business organizations.

In general, the classification of the existing types of risks for modern organizations is presented in Figure 2.1. As can be seen from the figure, a wide range of risk types can be divided into four categories: strategic risks, operative risks, financial and hazard risks (ACCA, 2024). These are the key categories of risks that should be addressed by modern organizations to mitigate potential losses.

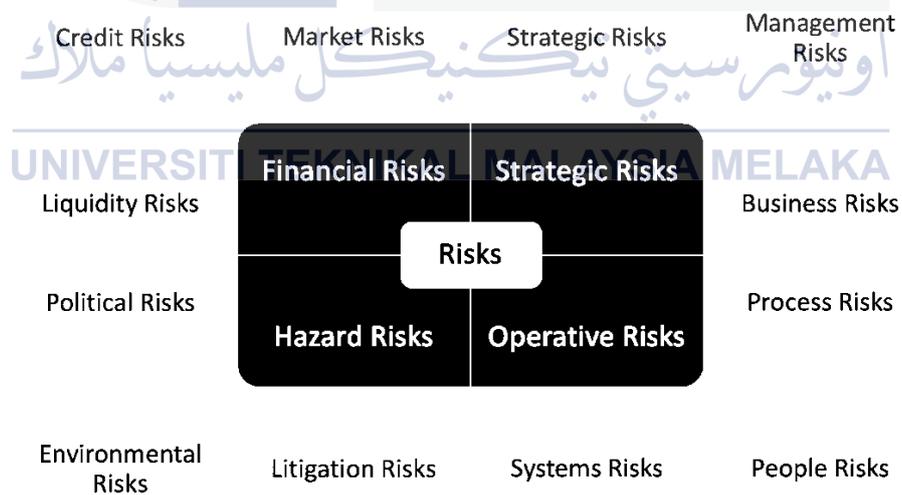


Figure 2.1: General Classification of Risks
(Source: Ruukki, 2012)

Apart from the provided classification of risks, another interesting approach to the definition of key categories of risks is presented in the research by Dandage et al. (2018). According to the authors' classification, the following categories of risks should be considered in the process of risk management procedures organization: financial and economical, contractual and legal, subcontractor, operational, safety and social, design, physical, delay, political, internally generated, cultural, technical, level of competition, fraudulent practices, managerial, health-related and force majeure risks (Dandage et al., 2018). Such a classification of types of risks might contribute to the complex vision of risk categories presented earlier.

In addition to the specific types of risks that are common for organizations, it is important to discuss specific risk classification parameters and values that are currently applied in organizations. Among them, the following types can be mentioned: economic and non-economic risks, dynamic and static risks, pure and speculative risks (Al-Haj, 2014). Economic and non-economic risks vary depending on their potential impact on the economic well-being of the chosen organization. The difference between dynamic and static risks is that static risks can be easily predicted and mitigated in the conditions of their unchanging nature. By contrast, dynamic risks are not easily mitigated since their nature and influence can change depending on the changes in the environment. The difference between pure and speculative risks is that the former should always be considered as a source of negative outcomes for the organization and the subject, whereas speculative risks can be considered as a source of any type of change – both positive and negative (Al-Haj, 2014). The impact of a speculative risk depends on the context of the organization's performance.

The results of discussion of different categories of risk classification must serve as a basis for integration of improved risk definition methods in modern organizations. First, it is important to classify risks by the value of their potential impact on the strategic development of the business. In this regard, risks can be divided into strategic and current risks. While strategic risks are currently presented in the risk classification model, the definition of this type of risk lacks the proper level of relevance for the management (Al-Haj, 2014). Such a format of risk classification can support risk management activities in the aspect of risk prioritization. On the basis of the study of this format of risk classification, new objectives in the sphere of risk management can be identified. Management and personnel are required to adequately assess the potential threats for the future and adapt their performance accordingly.

Another parameter for the classification of risks that can be offered is related to the division of risks according to their dependence on risk management activities. Among the mentioned risk types, regulatory, fiscal and legal risks can be considered as not dependent on risk management procedures (Al-Haj, 2014). Despite all the strategic moves of business management, it is impossible to directly influence the state regulatory agency to reduce the pressure of this category of risks. Orientation on this parameter of risk classification can allow the management to avoid excessive expenditure of resources for the management of risks that cannot be influenced in such a way. Together with this, such approach to classification of risks can help management to avoid excessive stress in desire to reach optimal performance results. For the success of organization, it is important to understand what specific format of behavior in relation to not-dependent risks are optimal.

2.4.3 Key Sources of Risks

The final section of the discussion of the nature of risk for the aims of the thesis should include assessment of the key sources of risk for modern organizations. The discussion of this question is important for the future analysis and assessment of the effectiveness of risk management methods in different organizations, including TAQA (IAIS, 2015). From this perspective, the definition of the source of risk can contribute to the reliable assessment of the effectiveness of the procedures of risk management applied in the organization. The appropriate definition of the key risk sources can help the scholar to classify the type of risk an organization is currently facing, also inspiring the manager for definition of the optimal resolution strategy (Hudakova and Dvorsky, 2018). If the character of risk management procedures does not correspond with the defined sources of risks, it will be possible to identify the existing limitations of the chosen risk management methods in the chosen institution.

The discussion of the risk sources can be considered as an important step for the further procedure of assessment of the quality of risk management methods. The definition of the sources of risks should contribute to the proper understanding of a wide range of spheres in an organization's performance that should be accurately assessed and monitored in the process of the risk management procedures (IAIS, 2015). From this perspective, knowledge of the key sources of risks can help the researcher in the process of assessment of the effectiveness of the organization's risk management procedures in determining and mitigating risks from each of the defined sources. If the analysis of the risk management methods and procedures in TAQA demonstrates that the management lacks interest in the

analysis of certain sources of risks, it will be considered as a serious threat of risk generation and a limitation of the risk management procedures.

The importance of the definition of risk sources for the aims of risk management methods organization is explained by the fact that the realization of this objective should not be considered as a simple task. Specialists and practitioners in the field of risk management traditionally consider the problem of the definition of risk sources as a simple task (IAIS, 2015). However, relevant changes in the definition and vision of the nature of risk sources lead to the conclusion that this problem should be considered as one of the vital questions in the process of assessment of the reliability and effectiveness of risk management methods and procedures applied in the organization.

The discussion of the sources of risks for modern organizations should be started from the presentation of the conceptual model of risk. The conceptual vision of the problem of risk sources definition in modern society was provided in the fundamental work by Ulrich Beck in 1992 (Curran, 2018). According to the researcher's vision of this problem, modern society should be considered as an ultimate source and generator of risks. This problem is partly addressed in the introduction to the thesis. In the context of the question about the nature of risk sources, Beck stated that due to the current level of technologies development, it is extremely difficult to define the key sources of risks effectively since the volume of new risks generation is considerably higher compared to the assessment potential of modern society. New sources of risks appear rapidly, and risk management systems have to guarantee the proper quality of reaction and their assessment in the organization. From this perspective, the effectiveness of risk sources definition might be considered as one of the important criteria for the assessment of the risk management procedures quality.

Other relevant studies support Beck's position in the question of the rapid generation of new sources of risks for organizations. For instance, Srinivas (2019) provided a model of risk management required for the successful operations of modern organizations which outlines the general process of risk management. In the context of this model, the authors divided the procedure of risk sources assessment into several different steps within the context of the construction sector (Srinivas, 2019). Such an approach to the organization of risk management procedures for the aims of risk sources definition demonstrates the fact that the traditional means of risk source identification cannot be considered as sufficient and reliable in the modern conditions. That is why it is important to consider the existing risk management methods from the position of the risk sources assessment model.

At the end of the discussion of the risk sources problem in the context of the thesis, it is important to provide a description of the traditional sources of risks for organizations. The discussion of these sources of risks should be included in the process of risk management methods assessment. As stated earlier, if risk management methods in an organization neglect the need for assessment of potential risks for each of the stated sources, this is a serious reason for the concern about the reliability of the risk management model applied in the institution. In this context, the following sources of risk for organizations are considered as basic ones: "environment, suppliers, manufacturer, wholesaler, distributor, retailer and customer" (Clarke et al., 2015). As for the key sources of risk as elements of the organizational structure of the company, the following sources can be mentioned: "network, organizational, industrial, and environmental" (Clarke et al., 2015). Altogether, the presented sources of risk make it possible for the researcher to identify the main spheres of risk generation inside and outside the organization. They can be effectively analyzed and

compared in the process of risk management methods application. The main objective of the risk management methods applied in the organization is to guarantee reliable and effective analysis of all the mentioned sources of risk.

On the basis of the discussion of the nature and role of the parameter of risk sources in the process of risk management methods assessment, the author of the thesis forms a clear understanding of the changing role of risk sources as an element of risk management procedure. The conceptual and practical meaning of the parameter of risk sources has changed, its nature has become more unstable and fluctuating, less predictable and less transparent in the process of risk management methods application (Clarke et al., 2015). As a result, the procedures and methods of risk management should be adapted to comply with new challenges in the sphere of risk sources definition. Different models and approaches to the issue of risk sources definition in the process of risk management are discussed.

It is important to assess the existing risk management procedures in TAQA from the position of the analysis of different sources of risk using relevant procedures and models (Clarke et al., 2015). Acknowledgement of the fact that the management of the chosen organization relies on the wrong methods of risk management that do not guarantee the proper quality of risk sources definition will be considered as one of the reasons for arguments about the importance of changes in the applied risk management methods.

2.5 Risk Management Methods

In the previous sections of literature review, the focus was on the nature and definition of risk as a phenomenon, presented classification of different types of risks and identified one of the relevant issues in the process of risk management methods application

– the problem of effective definition of real sources of risk. The literature explored in the previous sections of the literature review demonstrate the importance of focusing on the most complex and varied sets of risk management procedures and methods to guarantee proper identification and mitigation of the existing and future risks in the organization. From this perspective, the presented section of the literature review summarizes information about the nature of risk management in the organization.

On the basis of the detailed and complex discussion of different approaches to the definition of the risk management phenomenon the following criteria should be applied in the process of assessment of the risk management methods effectiveness:

- i. The procedure of the risk management methods application should include the processes of identification, assessment, treatment, and monitoring of potential risks;
- ii. The parameter of risk appetite should be integrated into the organization's risk management procedures and methods as one of the vital criteria for the assessment of the risk management effectiveness;
- iii. Different stakeholders inside the organization should take part in all activities of the risk management procedures;
- iv. Risk management methods in the chosen organization should contribute to the development of a specific culture and structure;
- v. Risk management methods should effectively assess risks coming from all potential sources;
- vi. Risk management methods should assess not only the sources of risk but also analyze potential opportunities for the organization.

To realize effective risk management, a full list of risk assessment and management methods should be presented. In this way, risk management methods are divided into three categories: risk assessment, identification, and analysis methods. The specific methods applied in the process of risk assessment and management in modern organizations include project network diagrams, precedence diagramming method, generalized activity networks, design structure matrices, IDEF0 functional modeling, and IDEF3 process modeling (Chandrasekar, 2016). At the same time, the specific methods of risk identification in the process of risk management include checklists, influence diagrams, cause-and-effect diagrams, failure mode and effect analysis, hazard and operability study, fault trees and event trees (Chandrasekar, 2016). Finally, methods of risk analysis include probability and impact grids, estimation of system reliability, fault tree analysis, event tree analysis, sensitivity analysis and simulation and multiple criteria decision-making method (Mohammadi, et al., 2021). All these methods should be discussed in detail for the researcher to identify the requirements of the procedure of assessment of risk management processes in the chosen organization.

a. Risk Assessment

A detailed discussion of the risk assessment methods is provided. The method of project network diagrams allows the management of the organization to present detailed diagrams of specific processes or projects inside the organization. Such a format of presentation makes it possible for the management to clearly observe the performance structure for different elements of the organization and simplifies the process of decision-making and risk analysis (Bromily et al., 2015). Compared to this simple model of organization, the precedence diagramming method allows the researcher to identify the lead-

lag connections between different processes and elements of the organization (Isaac and Hajdu, 2016). Such an approach contributes to effective assessment of the causes and effects in the project or processes of the organization. Additionally, the generalized activity network method of process modeling is applied with the support of the probabilistic branching of activities. In this way, the risk manager in the organization can assess the perspectives of different scenarios realization based on the probabilities of associated events occurrence. This approach is connected with the probabilistic phenomenon of risk when an event can take place with a certain level of probability. Finally, the design structure matrix, IDEF0 and IDEF3 models also contribute to the effective presentation of the existing structure and processes in the chosen organizations for the aims of risks assessment and analysis (Bromily et al., 2015). As a result, a combination of these methods can contribute to the effective presentation of the processes and associated risks in the organization. It is important to assess the effectiveness of these methods' application in the chosen organization.

b. Risk Identification

Risk identification methods and practices should be discussed. The method of checklists is applied as one of the simplest and least effective tools of risk identification and assessment. According to this method, the management of the organization identifies pre-defined crucial points in the performance of the organization, and tracks changes for these parameters to identify symptoms of negative and undesirable changes (Srinivas, 2019). The limitation of this risk management method is that it is primarily oriented on the monitoring and definition of the risks on the stage of practical realization of negative and undesirable outcomes (Bromily et al., 2015). In this situation, the preventive influence on the sources of risks is complicated.

Influence diagrams and cause-and-effect diagrams are instruments that are considered to be more effective from the position of preventive risk management. Influence diagrams serve for the presentation of the cause-and-effect connections between separate processes and objects in the organization, helping the risk manager to gain an understanding of the causal mechanisms leading to the development of risky events and negative outcomes (Carriger et al., 2018). While influence diagrams serve for the presentation of the connections and influence of parameters in the organization, cause-and-effect diagrams can be considered as an instrument of complex presentation of the connection between key causes and risk events in the organization.

For the performance of the manufacturing and infrastructure objects, including electricity distribution systems, the most common risk management methods include failure mode and effect analysis (FMEA) and hazard and operability study. FMEA tool is applied to determine causes, effects, and connections between parameters in the technical system (Bromily et al., 2015). Hazard and operability study are a risk management method that is more complicated compared to FMEA and allows the risk manager to track the performance of the technical system and associated risks using specific check words and parameters (Herrera et al., 2018). The application of the hazard and operability study method allows the risk manager in the organization to avoid the need to monitor and track a large number of organization performance parameters. Instead, a small number of check words and key parameters are monitored as the key sources of risks and losses for the technical system.

Fault and event trees are the methods of risk assessment that serve for the complex presentation of the causes and effects of risk events. The instrument of a fault tree is applied for the aims of breaking down failure as a result of risk realization into source events. From

this perspective, the objective of the risk manager is to provide the most detailed and careful presentation of the main causes of negative and undesirable event realization. By contrast, the event tree instrument is applied for the presentation of a full range of potential consequences of the undesirable event caused by risk. As a result, fault and event trees are two risk assessment methods that comply with each other and contribute to the most detailed presentation of the connections between organizational structure and risk sources.

c. Risk Analysis Techniques

The final element of risk management methods discussion should include the presentation of the risk analysis techniques. First, probability and impact grids can be mentioned as tools for risks presentation and assessment. In this format, the parameters of the probability of specific events and the potential negative impact of their realization are structured onto the risk management grid (Karel and Pustka, 2014). Such a format of data presentation contributes to the clear illustration of the full list of defined risks and associated probabilities and losses for the organization.

Another risk analysis method is the estimation of system reliability. In this format, each element of the operating system is assessed from the position of its potential for effective operations without the risk of failure in the realization of the objectives of its operations. After the definition of the probabilities of each element's operation without the risk of failure – reliability level, the overall reliability level for the organization or a system is defined. In this way, the cumulative format of system reliability level assessment leads to the careful assessment of the impact of all sources of risk for the organization.

Fault tree and event tree analysis tools are applied to estimate the probability of the defined event or outcome realization in the organization. While the tools of event and fault trees are applied just for the identification of potential causes and effects of risk in the organization, the analysis of these tools should provide the risk manager with reliable assessments of associated probabilities of each event or effect realization.

The most complicated method of risk analysis is sensitivity analysis and simulation. This method of risk analysis is applied in the format of what-if assessment, which means that the risk manager in the organization is required to define the potential risks for the organization and develop a model of potential effects of the specific risk's realization for the chosen organization (Srinivas, 2019). Such a model should provide the risk manager with important information about the potential outcomes of the specific risk realization and the mechanism of its influence and serve as a basis for the development of an effective mitigation strategy for the specific risk.

In the context of risk management methods discussion, it is important to mention multiple criteria decision-making method, which the method of risk management that contributes to the most detailed identification and planning of the negative impact of specific risk factors. This method assesses different attributes of organizational performance and separate processes, including both positive and negative factors of organizational performance (Srinivas, 2019). Each factor of influence on the performance of an organization is assessed in terms of the probability of its realization in practice. In the final model, the risk manager of the organization can receive the scenario of the future impact of specific factors on the performance of the organization and predict the potential risks to define an effective mitigation strategy.

The final risk management method that should be mentioned in the context of the electricity distribution system performance is the organization of site visit activities to assess the effectiveness of system performance and definition of associated risks and potential losses. In this way, the procedure of site visits in the modern organization is oriented on the risk management personnel with the objective of field assessment as an element of the risk management procedure (Oboni and Oboni, 2013). The purposes of a site visit, which define the format of this activity realization, include the following:

Altogether, the discussion of the risk management definition and specific methods allow the writer of this thesis to define specific requirements to the results of the risk management methods assessment in TAQA. From this perspective, the results of this section can be considered as a basis for the development of criteria and specific questions in the process of the research methodology formation (Christiansen, 2013). It will be important to consider the risk management methods and procedures of the chosen organization from the position of compliance with the norms and findings discussed in this section.

Together with the discussion of the risk management elements, the specific tools and approaches to risk management should be considered. Rehacek and Bazsova (2018) presented the following classification of risk response planning activities: risk avoidance; risk transfer; risk mitigation; risk exploit; risk sharing; risk enhancement; risk acceptance and risk control. Another study by Ahmadi-Javid et al. (2020) discussed the variety of risk response strategies, assigned to the specific forms of risk existing in the organization. The classification of risks presented by the scholars mainly included known unknowns and unknown unknowns, which could have a specific impact on the organizational performance

(Ahmadi-Javid et al., 2020). The clear recognition of different forms of risk that could impact the modern organization is a viable step towards risk management.

2.6 Risk Management Process

The next step in the process of risk management procedures realization is the identification of potential hazards and the evaluation of their probability. In this context, the defined structure should be discussed from the position of the potential hazards that can emerge in the process of operations of an organization and probability of hazardous events occurrence (Oboni and Oboni, 2013). This element of the risk management process is sensible and required for the proper understanding of the risk sources and potential opportunities for their realization in practice.

The next set of activities that should be implemented in the risk management process includes evaluation of potential targets and costs of failure as a result of risk event occurrence. In this way, it is important to analyze the earlier defined structure of the chosen organization from the position of the existing risks and their impact on the operations of the structure. It is important to determine the specific target elements and connections in the earlier defined structure (Oboni and Oboni, 2013). As stated earlier in the literature review, the main challenge for the risk manager in the organization can be related to the identification of the full range of potential risks and proper assessment of the potential outcomes for the organization.

On the basis of the definition of targets and potential outcomes of risks for the organization, the definition of tolerable and intolerable risks should be performed. This element of the risk management process demonstrated that modern organizations can hardly ever effectively mitigate and manage potential risks (Oboni and Oboni, 2013). In these

conditions, the effectiveness of estimation of potential risks and their impact should allow the management of the organization to develop the model of risk prioritization and identify risks that can be effectively ignored for the aims of the optimization of risk management costs. In some situations, ignorance of certain risks might be a more reliable solution compared to the development of risk management projects and the realization of associated costs. In these conditions, risk management methods and culture of the organization should integrate opportunities for effective identification and prioritization of risks in the organization's performance. This is one of the important criteria for the assessment of the effectiveness of risk management processes.

The earlier presented model of risk management processes organization is a summary of the position stated by a single research group. In these conditions, it is important to provide a description of an alternative structure of the risk management process provided in the research by Vasvari (2015). This researcher has an alternative vision of the risk management process, which should also be effectively studied to reach a conclusion about the most reliable and effective format of risk management process planning and organization. The risk management process is divided into the following phases: identification of relationship that affects the activities of the decision-maker in the process of risk management; identification of the key risks and the following characteristics – sources, generated challenges and future impact; risk analysis; risk evaluation and implementation of risk management processes (Vasvari, 2015). In this way, certain differences from the structure of risk management processes that were earlier presented can be seen. It is important to provide a detailed description of each step to define the level of significance of the identified differences.

The first step in the risk management process according to Vasvari (2015) is related to the definition of the existing relationship and influence of different factors on the decision-making processes in the risk management team. In this way, it is important to assess the role of different internal and external factors in the environment of the organization that can impact the decision of the management to perform the risk management process and factors that can impact the potential outcomes of this type of activity (Vasvari, 2015). Thus, compared to the previously defined model of risk management process organization, where the first steps included definition of the organizational structure and connection between the elements in the organization, the risk management process approach developed by Vasvari (2015) focuses on the assessment of the environment of the risk management team. Such an approach is quite new and interesting for discussion. At the same time, the first phase of the risk management process serves for the identification the risk management objectives.

The second phase of the risk management process is characterized by the definition of risks for the organization and identification of the key parameters of risks – their sources, the generated problems from risk events and the future impact of these risks on the organization. In this phase of the risk management process, all potential risks should be properly registered regardless of the associated impact or probability of occurrence (Vasvari, 2015). Similar to the previously presented approach, the objective of risk management is to provide a discussion of all potential risks, while their prioritization and assessment are performed on the further phases of the risk management process.

The procedure of risk identification is followed by their adequate assessment. The third phase of the risk management process is related to risk analysis, where the probability of occurrence of different risk events and the associated losses for the organization are

identified (Vasvari, 2015). In this context, the procedure of risk assessment by Vasvari (2015) includes the application of qualitative and quantitative risk assessment methods. Quantitative risk assessment methods can be applied in case the organization obtains a sufficient amount of reliable statistical data about the prior experience of similar risk occurrence and realization (Christiansen, 2013). In these conditions, it is possible to identify the potential outcomes and perform statistical analysis for the careful prediction of risks and their impact on the organization. However, if the organization does not obtain the required statistics about the realization of a similar risk in the past, qualitative analysis tools are applied (Vasvari, 2015). In this case, the role of experts, who can provide a qualified opinion about the characteristics of a specific risk, is important. As a result, the procedure of risk analysis suggested by Vasvari discussed it in more detail compared to the previous approach to risk management process discussion.

The fourth step of the risk management process according to Vasvari (2015) is related to the assessment of risks and identification of the acceptable level of risk. The acceptable level of risk as the parameter of the risk management process in the organization is directly related to the phenomenon of risk appetite, which was mentioned earlier in this study. The fact that Vasvari (2015) applied the parameter of risk appetite in the discussion of the risk management process demonstrates the fact that the author of the thesis made the right decision indicating risk appetite as one of the key parameters in the risk management process (Ho et al., 2015). In this way, the organization should be able to define risks that can be effectively ignored and those that should be provided with the highest priority and properly managed to minimize undesirable losses for the organization.

For the final phase of the risk management process, Vasvari (2015) highlights the role of implementation of the risk management model and the monitoring of its implementation process. On the basis of the discussion and prioritization of risks, the risk management team should develop a specific strategy for addressing the specific risks (Ho et al., 2015). In these conditions, the role of risk management is to initiate the process of the defined strategy realization and control the process of effective implementation of all the defined solutions (Vasvari, 2015). Altogether, the discussion of the model of risk management process provided by Vasvari (2015) supports the previously defined model and provides useful insights for expanding the risk management process model as a basis for assessment of the risk management process quality in the chosen organization.

On the basis of the discussion of risk management process models provided in two different literature sources, the author of the thesis determines the basic structure of risk management activities and defines requirements that should be stated to the procedure of the risk management processes organization in TAQA. The applied knowledge will serve as a basis for the definition of specific criteria that should be integrated into the questionnaire form for the management and personnel of the chosen organization. The results of analysis in the context of the thesis should demonstrate whether TAQA implemented the most important stages and principles of risk management process organization or additional improvements to the existing system are required.

The comparison of key positions and requirements stated in both risk management models identified potential differences in the organization of risk management procedures for the specific organization. From this perspective, it is sensible to perform detailed assessment of effectiveness and reliability of specific decisions in the sphere of risk

management applied in modern organizations to understand what specific solutions would be optimal for operations of the UAE energy sector. According to this logic, it might be sensible to develop integrated form of risk management that would unite best practices from both of the mentioned models. The final solution must be based on the combination of best international experience in the sphere of risk management and the end requirements of specific business organization – UAE energy distribution system.

2.7 Role of Documentation in Risk Management

Specific attention in the context of risk management discussion should be paid to the role of documentation. The factor of documentation and its influence on the risk management process is usually underestimated. Nevertheless, clear understanding of this problem can contribute to the development of additional criterion for the assessment of the risk management methods effectiveness.

2.7.1 Role of Documentation

The prior discussion of different questions related to the risk management sphere of activity in organizations provided reliable information about the practices and tools, processes and structures that should be developed and implemented in modern organization to guarantee effective risks management and mitigation. The researcher provided the discussion of the conceptual and practical aspects of the issue that were supposed to contribute to the strengthening of the management positions in the organization and planning of risk management procedures. Nevertheless, it is still important to say that many questions related to effective risk management have not been properly addressed. The lack of interest in these questions can lead to the situation when the procedure of assessment of the risk

management methods' effectiveness in TAQA leads the researcher to wrong conclusions and recommendations for the organization. In these conditions, separate attention should be devoted to the discussion of the role of the parameter of documentation in the organization of the risk management process.

Risk documentation is an important step related to the development of the risk management processes and culture in modern organizations. The earlier provided discussion of the risk management process allowed to identify the main elements of the risk management process that should be implemented in the modern organization for effective prediction and mitigation of potential risks and threats. At the same time, the realization of the proposed risk management process is directly related to the application of the reliable documentation model, which would include a full range of documents required for the effective organization of the risk management process in the modern organization. The role of the effective documentation is related to the organization of the processes of data collection and analysis in the process of risk management and development of guidelines and strategic documents that would ease the process of decision-making for the risk management team in case of emergency (PMO, 2017). From this perspective, it is important to consider the role of documentation in the risk management process and discuss documents that should be present in the modern organization to guarantee high quality of risk management.

The risk management process can be divided into several key phases. Among them, the following should be mentioned: risk assessment, risk control, risk review and risk communication (Sachdeva, 2012). The realization of the risk management process requires provision of sufficient resources, personnel, organization of the communication structure

and effective decision-making. In the conditions of modern organizations, the development of the effective structure for the realization of these objectives requires the creation of an adequate documentation base that would systemize the rules and principles of cooperation and coordination of activities for a wide range of elements inside the organizational structure (PMO, 2017). Among the basic elements of the documentation base that is expected to guarantee effective operations of such structure, the following document categories can be mentioned: policies, procedures, analysis-specific plans, records and reports (Sachdeva, 2012). The objective of an effective model of risk management methods in the organization is to guarantee the development of the proper principles of data documentation and the rules of organization of specific documents. If the applied risk management procedures and methods do not provide a basis for the organization of data and strategy documentation in the organization, it is difficult to consider such a model as effective.

2.7.2 Documentation Structure for Risk Management

Since the question of the theoretical importance of documentation for effective risk management in modern organizations is addressed, it is important to consider specific recommendations for the organization of the documentation base in the modern organization. It is important to mention and discuss specific documents that have to be provided by the risk management model of modern organizations to guarantee the effective mitigation and management of risks. Specific documents that have to form the basis of the risk management methods in the organization include “Risk appetite statement; Risk management framework; Risk materiality; Risk register; Risk taxonomy; Risk charters and mandates; Risk management policy and procedures; Methodologies; Risk escalation

process; Risk metrics; Risk communications; Risk training courses” (Thackeray, 2018). This is a complex model of documents that should be included in the risk management structure of the modern organization. This set of documents shares some common characteristics: they should be relevant, easily understood, stored in a well-organized library, meet industry and regulatory standards, be a living document that can be changed and improved, have a clear approval process and time frame, be reflected in the internal and external communications of the organization, and be applied at all stages of organizational performance – from personnel training to strategic decision-making (Thackeray, 2018). If the developed documents do not fulfill all the defined functions or are not properly applied, the documentation strategy of the organization should not be considered as effective. In this case, an additional criterion for the assessment of the effectiveness of risk management methods in TAQA was identified.

From the point of the identified risk documentation requirements, it is important to estimate the quality of risk documentation in the UAE energy distribution system. The existing requirements in the sphere of risk documentation must be applied for analysis of current situation in TAQA. Analysis of current risk documentation practices must identify strong and weak sides of the existing risk documentation model, providing requirements and recommendations for future improvement of operations in this sphere. In the process of specific recommendations’ development, it is important to orient on the best industry practices and the requirements of the specific organization.

2.7.3 Characteristics of Risk Management Documents

In the final part of the section, it is important to consider the characteristics and functions of specific documents that should be applied as a part of the risk management procedure in the chosen organization. On the basis of the results of prior discussion, the first important document that should be mentioned is the risk management plan. Risk management plan (RMP) is the document developed and applied in the specific organization to identify the “processes, tools and procedures that will be used to manage and control those events that could have a negative impact on the organization” (PHE, 2018). This document includes a set of guidelines that should serve as a basis for the risk management processes organization. In fact, RMP is considered to be the documented basis for the realization of the risk management procedures in the organization. It is important to consider existing risk management plan applied in TAQA, and identify requirements for its improvement.

The second important document that should be present in modern organizations is the risk register. This tool is applied by the risk management team to address and document specific risks faced by the organization in the process of its operations (PMO, 2017). This document provides a complex list of key risks faced by the organization and the spectrum of strategies and instruments that should be applied for effective management and mitigation of these categories of risks in the organization (PMO, 2017). In the context of the earlier defined risk management process, risk register should be developed after the procedure of risk identification is finished. A full list of identified risks with associated probabilities and potential impacts for the organization should be collected and documented into a single source for the purpose of internal personnel application. In the conditions of TAQA, it is

sensible to estimate the character of risks mentioned in the risk register, identify the quality of risk registering practice applied, and develop recommendations for future improvement of practice in this sphere. It is sensible to answer a question about whether the management of TAQA adequately assesses potential risk sources currently, and whether the risk register model contributes to effective mitigation of risks for organization.

The third important document that should be included in the process of the risk management processes organization is the risk appetite statement. As stated earlier, the final stage of the risk management process is related to the prioritization of risks based on the risk appetite level of the organization. Thus, the risk appetite statement provides specific and detailed guidelines in the sphere of risks and their impact prioritization (Thackeray, 2018). The management of the organization should be able to apply this document for the resolution of the issue about the prioritization of risks defined in the process of risk identification and analysis. Unless the organization develops the risk appetite statement, the management will not be able to implement the risk prioritization, leading to the failure of the risk management process in general. For the conditions of TAQA, it is sensible to estimate the risk appetite statement of the organization if such document is present. If not, one of the main recommendations of the study must include development of such format of risk management. As it was earlier stated, similarity in assessment of values and objectives of risk management for different subjects in single organization can impact overall quality and effectiveness of risk management.

In addition to the mentioned risk management documents that have to be present in modern organizations, it is also important to guarantee effective development of the risk metrics, risk communication documents and risk training courses. Risk metrics are

documents that can be applied to effectively identify specific tools and mechanisms of risk probability and impact assessment in the specific organization (Thackeray, 2018). On the basis of utilization of this document, the risk management personnel should be capable to identify methods that should be utilized for effective risk assessment – estimation of its occurrence probability and potential impacts for the organization. The procedure of risk assessment should be formalized to minimize the influence of the subjectivity factor on the assessment of the potential risk impact. As mentioned previously, the risk assessment procedure is important for the future prioritization of risks. If risk assessment is performed with mistakes, the risk management team might not be able to properly prioritize the specific risk source and will ignore the risk, which will cause significant losses for the organization in general. The detailed and effective risk metrics document is developed to mitigate the probability of such an event.

Risk communication document is a set of instructions that defines the format of communication among the personnel in the risk management team and the organization in general. It sets the rules of communication and cooperation among the personnel in the process of risk management procedure realization (Thackeray, 2018). If the risk communication rules are not properly stated, there is a risk that the team will fail to develop an effective risk management process and reach the expected objectives of risk management. In these conditions, the risk communication document should contribute to the definition of the effective format of personnel cooperation in the organization. In case of TAQA, it is important to estimate the quality of current risk communication processes, estimate its weak and strong aspects, and provide recommendations for future improvement of performance in this sphere.

Finally, risk training courses should be considered as a basis for the definition of requirements for training and support of the personnel responsible for the risk management objectives realization. This document is expected to systemize the standards and guidelines for the management and personnel to follow in the process of training and education of new specialists in the sphere of risk management inside the organization (Thackeray, 2018). The problem of personnel retirement and attraction of new employees is relevant for any type of organization. In these conditions, the objective of personnel management is related to the development of effective procedures for training and education of new workers. If no such document is created, it will be impossible to guarantee the product support and training of employees. Development of specific recommendations in aspect of personnel training can contribute to serious improvement of risk management procedures in TAQA.

Altogether, the results of the discussion of the role of documentation in the realization of risk management processes in the modern organization demonstrated the fact that the effective realization of documentation objectives can contribute to the minimization of issues in the process of risk management and guarantee a high level of effectiveness in the realization of risk management objectives. In these conditions, the procedure of risk management effectiveness assessment in TAQA should include estimation of the degree of realization of the documentation objectives. It is important to assess whether the mentioned documents are present in the chosen organization and whether their characteristics comply with the defined requirements and standards.

2.8 Risk Management Team Organization

The assessment of the effectiveness of the risk management process in the chosen organization should include the discussion of a wide range of parameters and characteristics of organizational performance. In addition to the earlier discussed parameters used for analyzing modern organizations, the question about the organization of risk management teams should be discussed. From this perspective, it is sensible to demonstrate the existing approaches to the resolution of the issue of risk management team development, to identify the key principles and rules in this sphere and apply the findings of the literature review as a criterion for the assessment of the effectiveness of the risk management team development format in TAQA.

2.8.1 Risk Management Team Structure

The structure of the risk management team should be considered. In this context, the guidelines provided by the PMO (2017) provide an understanding of the key roles and responsibilities of the team members in the process of risk management. The most important members of the risk management team in any type of organization include project manager, executive regional manager, initial risk owners, project risk team members, designer and risk management support group (PMO, 2017). While this format of distribution of roles and responsibilities in the process of risk management is developed for the aims of project risk management, it can be adapted to the performance of the organization in general since the performance of any type of organization can be considered as the process of realization of a continuous set of projects. In this context, the functions of each risk management team member should be considered.

The first important member of the risk management team is the project manager. This is a person who is provided with the widest range of competencies and responsibility for the success of the project in the conditions of a risky environment (PMO, 2017). In the organization, the role of a project manager can be transmitted to the representative of the medium-level management of the organization who is responsible for risk management activities. The objectives of the project manager performance include the development and presentation of the RMP, maintenance of risk register, active monitoring and timely reaction to all risks in the performance of the organization, organization of meetings of the risk management team for the discussion of the current progress and planning, and informing the senior management of the organization about the main risk management concerns and procedures (PMO, 2017). The work of the project manager is directly related to the executive regional manager. The latter supports the project manager in the process of implementation of risk management requirements, provides assistance and direction in the field of risk management, obtains expert risk management services if necessary and consults with the project manager on the issues of emergency in the risk management sphere (PMO, 2017). In the conditions of modern organizations, the role of the executive regional manager is associated with the representative of senior management of the organization. The role of the executive regional manager is not directly related to the organization of risk management procedures. They deliver these responsibilities and competencies to the project manager, guaranteeing full support of the manager.

2.8.2 Initial Risk Owners

An important element of the risk management team in modern organizations includes the initial risk owners' category of actors. This category includes internal and external stakeholders of the project, whose performance can lead to the generation of risks for the organization (PMO, 2017). From this perspective, the list of potential initial risk owners can include customers, suppliers, employees of the organization and other stakeholders. A full list of stakeholders who can be potentially included in this section is presented in the part of the literature review devoted to the discussion of risk sources. For this category of risk management team members, the key functions include identification of risks and development of effective strategies of risk mitigation and management. For example, if the management of an organization defines suppliers as a potential source of risk for its performance, it is important to develop effective communication and cooperation with this stakeholder to develop mutually beneficial cooperation strategy and mitigate associated risks.

One of the most important actors in the risk management team is the designer. The objectives of the performance for this actor include the realization of effective and responsible structure design for the definition of risks in the risk management process and the production of documents that implement the risk response strategies (PMO, 2017). According to the defined functions and objectives of designer performance, their effective work forms the basis for the realization of the first steps in the risk management process – the definition of the structure and connections in the organization and the resolution of the issue of proper documentation of risk management procedures in the organization. The

project manager and designer should work in a single team, with support from the risk team members and risk management support group.

2.8.3 Risk Team Members

The final elements of the risk management team that should be mentioned include risk team members and risk management support groups. Risk team members are the representatives of executive power in the risk management team, whose main function is to support the main project manager in the process of risk management process realization (PMO, 2017). This category of team members should perform all functional tasks and objectives assigned by the project manager, providing them with sufficient time and opportunities for strategic decision-making in the question of risk management planning. From this perspective, the role of the project manager should be related to the definition and initiation of risk management procedures, while risk team members should execute the defined plans.

2.8.4 Risk Management Support Group

As for the risk management support group, this category of risk management team members serves for support of the project manager, designer and risk team members. Its role is associated with the provision of guidance on the realization of risk management tools and review of risk reports to identify potential weaknesses of the risk management strategy and inform the management about associated risks (PMO, 2017). Altogether, the presented structure of the risk management team demonstrates that the effective performance of the system requires coordination and cooperation of a large number of specialists. In the

conditions of the large business organization or infrastructure institution, the requirements to the scale of the risk management team will be even higher. In the context of the study, it will be important to assess the effectiveness of risk management team organization in TAQA.

2.9 Specifics of Risk Management in the UAE Electricity Distribution System

As a result of the analysis of risk management methods and procedures from different perspectives, the author of the thesis demonstrates a complicated and varied nature of risk management and the importance of orientation on a wide range of parameters and criteria in the assessment of its effectiveness and quality in the organization. The obtained knowledge leads the researcher to the definition of criteria that should be applied for assessment of the effectiveness of risk management procedures and methods in TAQA. It is important to discuss the issue of risk management in the conditions of the energy sector in the UAE to define the specific factors and conditions that should be considered in the process of analysis to guarantee a high level of results reliability.

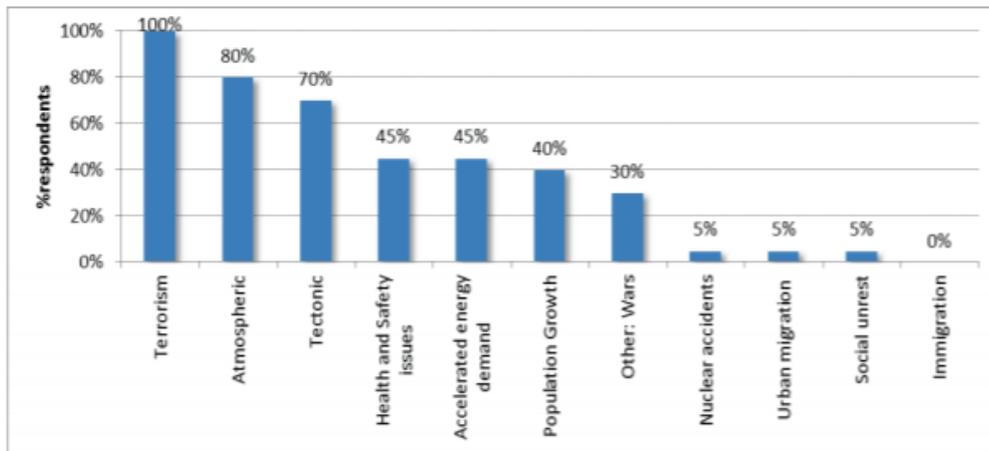
The first specific condition of the energy sector from the position of risk management activity is that this is the riskier environment compared to the majority of other sectors of economy and public life. Among the main categories of risk sources in TAQA, the following should be mentioned: market risk, credit risk, operational risk and business risk. At the same time, the provided report indicates that the relevance and level of significance of the defined risk sources has increased. As for the parameters of market risk, high volatility of demand and small energy storage opportunities define imbalance in the energy consumption system. Credit risks became more relevant after the collapse of the US-based utilities in Europe at

the beginning of the 21st century (McCaul, 2023). No accidents of financial or credit collapse in the energy sector had happened earlier, so these facts became a sign of new risks for the sector. In the sphere of operational risk generation, the issues related to extreme weather events and other environmental risks are found to be the most serious (Gerlak et al., 2018). In this way, the recent experience of hazardous weather events in different parts of the world led to the unprecedented scale of energy infrastructure destruction during a short period of time, a significant increase of costs for the reconstruction of infrastructure facilities and reduced potential of energy companies to guarantee proper quality of services delivery to the customers in case of emergency. Finally, business risks in the energy sector are related to the reduction of the state regulation level and increase of the competition level in the sector (Zhilkina and Akhmetshin, 2019). Altogether, the energy sector can be characterized as the environment with a high level of risks, and the performance of industry players, including state regulatory agencies, should be adapted to these conditions.

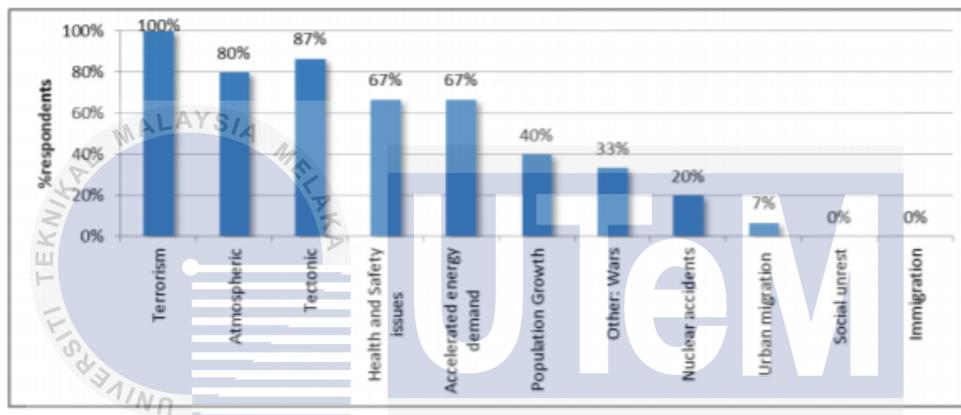
For the UAE in general, the problem of crisis events leading to destruction of the energy distribution infrastructure was not a relevant problem, and no recent accidents in this sphere can be mentioned. Nevertheless, country can face specific risks for its energy infrastructure due to geographic conditions and the specifics of the energy distribution system organization. Current geographic conditions of the UAE create risks for the losses caused by the flooding of coastal areas where most of the country's population lives (Kaili et al., 2014). As for the situation with critical energy infrastructure in the UAE, it is currently vulnerable to wide list of different sources of risk. Among the key sources of risk for the energy distribution system of the UAE, they were summarized in Figure 2.2. According to the provided model of risks distribution, the energy distribution system of the UAE must be

adopted to comply with all potential threats. To reach this goal, complex understanding of key methods of risk management and current practices applied in the UAE is required.

The specific risk conditions in the energy sector also result in the higher risk management requirements for the actors in this sphere. As for the organizational structure of the risk management department in the modern energy sector organizations, the following elements of the structure are defined as crucial to comply with new challenges: risk committees, corporate risk management and risk owners (Srinivas, 2019). As a result, the organization that aimed to comply with new risk conditions in their performance had to integrate all these elements in their performance. The role of risk committees includes the idea that the Board of Directors in the modern energy sector organization should include the Risk and Audit Committee and the Corporate Risk Committee. Without these elements in the structure of the Board of Directors, the organization is not likely to effectively manage new sources of risks. In the context of the corporate risk management structure development, it is necessary for organizations in the energy sector to provide the positions of the chief risk officer, chief architect of the enterprise risk management structure and the risk management team, which was discussed earlier in the paper (Srinivas, 2019). Finally, the integration of risk owners means that the responsibility in the sphere of risk management should be effectively diversified among all departments of the organization. Altogether, these requirements define relevant changes to the organizational structure of risk management in the energy sector.



(a) Abu Dhabi



(b) Dubai

Figure 2.2: Risk Causes in the UAE Energy Sector
 Source: (Kaili et al., 2014)

The specific requirements in the sphere of risk management in the energy sector define the requirements for the personnel skills and guidelines for the risk management process realization. The specific skills required for the personnel refer to two categories: risk professionals and trained managers. Risk professionals are specialists who have significant experience and professionalism level in the sphere of risk management in an organization, while trained managers are operational managers who obtain basic skills in the risk management sphere and follow the orders of risk professionals. Among the specific

guidelines defined for the operations of the energy sector, the following were defined: incremental and iterative implementation, integrated approach and focus on value creation (Visser and Kymal, 2015). The requirement for incremental and iterative implementation means that the process of the risk management procedures development and improvement in the organization should be logically organized, each step following the previous one, without logical mistakes or failures.

In the aspect of risk management solutions applied in the UAE, findings of prior studies can be applied to form general understanding of this problem. According to the results of the study, modern UAE organizations operating in the sphere of energy distribution can base their decisions in the sphere of risk management on variety of methods, depending on their complexity and needs of end decision-making subject. In this context, the presented study will have to assess the risk management needs of the specific organization – TAQA and form the set of risk management methods that would perfectly fit the stated objectives of risk control in the institution. Taken together, existing model of risk management in the UAE energy sector can be considered as facing rising number of challenges and risks, and the objective of the scientist is to systemize information about current challenges, also offering reliable solutions and recommendations.

Table 2.1: Methods of Risk Management in the UAE Energy Sector

Source: Nordgård et al. (2010).

Category	Type of analysis	Description	Example of methods
Simplified risk analysis	Qualitative	Informal procedures that analyses risk using e.g. brainstorming sessions and group discussions.	<ul style="list-style-type: none"> - Coarse risk analyses - Brainstorming sessions
Standard risk analysis	Qualitative or quantitative	More formalized procedures in which recognized risk analysis methods are used. Risk matrices are often used to present the results.	<ul style="list-style-type: none"> - Risk analysis assisted by HAZOP - Risk matrices - Job safety analysis
Model-based risk analysis	Primarily quantitative	Formal methods using e.g. event tree analysis (ETA) and fault tree analysis (FTA) are used to calculate risk.	<ul style="list-style-type: none"> - Fault tree analysis - Event tree analysis - Reliability analyses - Bayesian networks - Electrical system simulation - Benchmarking methods

On the basis of discussion of the key parameters and characteristics of risk management in the energy sector, it was possible to define specific characteristics of risk in this industry and define optimal recommendations that were provided for this sector in the past. The results of the performed analysis should contribute to the definition of the optimal solutions for the effective assessment of risk management methods in TAQA. It will be

important to define whether this organization orients on the defined trends in the sphere of risk management methods and practices development.

2.10 Barriers to Effective Risk Management in the Organization

Prior to the presentation of results and summary of the literature review for the thesis, it is important to consider the final question related to the sphere of risk management processes and methods in modern organizations –the role of barriers to effective risk management practice. It is important to state that successful realization of the risk management procedures in modern organizations is complicated not only due to the variety of factors and requirements that were stated earlier in the presented literature review but also due to the existing internal and external barriers. The main categories of barriers to effective risk management in modern organizations include lack of connection between risk management and strategic planning in organizations, organizational culture influence, poor quality of communication in risk management teams, orientation on operational rather than strategic objectives in risk management, process design and tools selection challenges (Cho, 2016). In general, the existing barriers to effective risk management in organizations are traditionally divided into behavioral and cultural barriers (Flassig, 2013). It is important to present and discuss these barriers and their impact on the quality of risk management.

The category of cultural barriers includes the idea that the culture of the organization and personnel can differ from the requirements of effective risk management, mainly in the sphere of risk appetite definition. As it was stated earlier, the process of risks management and assessment is quite subjective and usually depends on the readiness of a specific decision-making subject to accept certain risk level. The realization of this condition is

complicated, especially in the conditions of multicultural risk management teams (Cho, 2016). The main problem here is that multicultural teams are characterized by differences in the perception of risk appetite among team members. While one person considers risk as acceptable, another person can consider the same risk as unacceptable due to cultural background (Flassig, 2013). On the basis of these differences, conflicts and issues in the risk management process can take place. It is important for the risk management to develop single rules and principles of risk management that would mitigate cultural barriers and challenges.

Among the behavioral barriers to risk management, it is most important to mention the fact of the lack of connection between the risk management process and the strategic objectives of the organization. The board of directors of modern organizations rarely participates in risk management activities, which leads to the situation when strategic development plans do not consider the existing risks and mitigation strategies (Cho, 2016). Another challenge is related to the fact that the format of communication in modern organizations does not guarantee effective communications between the representatives of the risk management team (Cho, 2016). As a result, the risk management team usually focuses on the current and operational targets of their performance instead of discussing strategic goals and objectives as a basis for the risk management process organization (Cho, 2016). Finally, risk management teams usually lack integration of the most useful and relevant risk management methods in their performance (Cho, 2016). Altogether, these factors can be considered as serious barriers to the effective realization of the risk management objectives in modern organizations, which need proper assessment in the context of TAQA.

2.11 Conceptual/Research Framework

In the process of development of a research framework for the aims of the presented thesis, the author applies the traditional sequence of steps. First, it is necessary to identify the problem of the study. According to the earlier presented problem statement, the key issue of the thesis is identification of the key characteristics of the risk management methods and the culture of management of the electricity distribution system in the UAE. The second step of the procedure includes the development of a conceptual map – definition of the connection between the problem and the stressors. To develop a set of independent variables for the study, it was important to summarize information about the stated features of the risk management procedures utilized in the UAE energy distribution sector. To reach this goal, the experience in this sphere and best practices collected in the relevant literature were assessed.

The discussion of the key elements of risk management models applied in modern organizations highlighted the significant role played by effective leadership in the process of risks identification and removal. For instance, Ahmeti and Vlad (2017) stated that the absence of a productive leadership model in an organization could be estimated as one of the main sources of poor risk management. Similarly, Borgelt and Falk (2007) stated that effective balance of strategic leadership and current management can contribute to innovative development of business despite the need to perform permanent risk management procedures. Therefore, the existing leadership structure in the organization should be discussed as a valuable parameter of the final decision-making. It is sensible to define the role of this factor in the UAE energy sector.

In addition, the analysis of risk management in the literature review demonstrated that the success of activities in this sphere is dependent on the level of interest in the problem of risk management among employees and management. Al-Haj (2014) stated that both management and employees must share a similar vision of risk management procedures importance, including the aspects of risks mitigation and control. If there is no agreement on the importance of risk management is demonstrated in the organization, the company can face significant challenges. It is important to identify whether this argument is relevant for the UAE energy sector.

The development of an effective risk management model in a modern organization was found to be dependent on effective cooperation of all actors inside the organization. The problems in the sphere of risk management can be considered as a result of conflict between the strategic leadership and current management (Borgelt and Falk, 2007). From this perspective, for the study framework, the factor of dependency on mission and objectives of the organization was selected. It was found to be sensible to assess whether the UAE energy distribution sector is dependent on the defined mission and objectives of performance in the process of risk management. Provided that the performance of modern organizations was found to be highly dependent on strategic objectives and mission, changes had to be offered to increase the system's flexibility level.

The analysis of different elements of the risk management process in the context of literature review demonstrated the relevance of flexibility in decision-making. Clarke et al. (2015) argue that the current situation in the sphere of risk sources changes rapidly, and organizations must be capable to adapt to new sources of risks and means of their realization. In this way, the optimal strategy for modern business can be associated with the development

of a flexible risk management model. A similar position was stated by Paslawski (2010). However, it is important to assess the actual role of flexibility for effective risk management.

The parameter of the risk management culture was selected for the aims of analysis as it plays a dominant role in the UAE energy distribution sector. According to Bromily et al. (2015), risk management can be considered as an element of specific leadership and management culture existing in the organization. From this perspective, the effectiveness of specific measures in the sphere of risk identification and prevention can be considered as related to a specific culture of risk management. It is sensible to identify specific culture of risk management that is applied in the UAE energy distribution sector and a specific role that is played by this specific factor in the final result of risk management.

The discussion of the risk documentation process as an element of risk management in modern organizations demonstrated that success in the process of risk identification and prevention is attributed to the effective organization of related procedures. Requirements for the existence of a wide range of risk documentation and associated instructions can make the process of risk management complicated due to the rising bureaucracy. From this perspective, it is important to define whether the existing risk documentation norms and procedures play a serious role in the risk management for UAE energy distribution sector and whether the current system should be improved to avoid potential challenges and barriers.

The research framework was developed after the formulation of the research topic, the determination of the research question and the resultant variables, the dependent and the independent variables. The research framework brings together all these different aspects of

the research, outlining the relationships between them in a single framework than then enables the understanding of the research objectives and outcomes. The conceptual framework is presented in figure 4 below. The independent variables based on the conceptual framework shown below include; risk management methods, risk management culture, enterprise risk management (ERM), and risk optimization. The dependent variable is risk performance. The following hypotheses are developed and are explained based on the underpinnings of literature as follows;

H1: There is a positive relationship between risk management methods and risk performance at TAQA in the electricity distribution system of the UAE

Bourne and Moura (2018) view risk performance and risk management as two sides of the same coin or spectrum. Risk performance focuses on the steering of an enterprise towards a viable and profitable future. In a business and operational environment that is riskier than ever, the need for risk performance is stronger than ever. Out of control business conditions have raised the stakes in terms of the scope of risks that businesses faced, the costs involved in these risky situations materializing in terms of direct losses and opportunity cost, as well as the reputational losses (Faedfar et al., 2022). It is therefore important to engage in risk management initiatives to reduce the impact of these risks. Research points to the engagement in risk management having positive outcomes for risk performance measures (Ghazieh and Chebana, 2021). However, different industries and companies face different types of risks, and would therefore define risk management and risk performance differently. This is why it is important to understand the relationship between risk management and risk performance in specific contexts. Based on the research, this hypothesis contends that risk management has a positive correlation with risk performance

in the TAQA case of electricity distribution in the UAE. Risk performance was measured using questions that targeted 5 areas of risk. These included the numbers of risks that the company faces, the numbers that ended up occurring, the percentage of these occurring risks that were then monitored and those that were mitigated based on this monitoring. Finally, the questions also gauged the costs of the monitoring and management of the risks, including direct and indirect risks. Risk management was operationalized here by looking at the presence of risk management initiatives within the company, including the presence and integration of risk management staff in the company hierarchy, and the presence of a risk framework and policy statement that the company operates with.

H2: There is a positive relationship between enterprise risk management (ERM) and risk performance in the UAE electricity distribution system, based on the case of TAQA

ERM is much more than the traditional risk management, as it goes further in attempting to understand and mitigate the effects of risk. According to Anton and Nucu (2020), ERM has a positive correlation with risk performance. ERM enables the identification and understanding of risk, its evaluation based on this understanding and the eventual management. All this happens at a larger, enterprise level, which means better holistic understanding of risks. González et al. (2020) also points to the benefits of ERM in the collective understanding of risks. Most organizations end up with silos in their understanding and evaluation of risks, given that operations almost always happen in the form of business units. ERM enables a holistic view of risk for the whole organization or enterprise rather than simply for individual business units. This hypothesis therefore suggests that the same relationship exists based on the case of TAQA. There is no single,

accepted measure for ERM, so the operationalization here was done using proxies which led to questions that attempted to outline the enterprise level focus on ERM with the TAQA case or ranks.

H3: There is a positive relationship between the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA

The past few years have seen a high number of risky situations that have further cemented the place of risk management cultures and its relationship with risk performance. These risky situations have resulted not only in revelations of how companies and organizations have poor risk management systems and controls, but also how they had deficient attitudes towards risk. These risk situations therefore led to significant losses and institutional failures, and losses of trust (Ghafoori et al., 2023). According to Kumar and Anbanandam (2020), the development of a risk culture has been found to reduce the chances of risky situations materializing, enhance the identification and management of risk and result in improved risk performance outcomes. Hypothesis 3 posits that an improvement in the risk culture at TAQA will lead to improvements in the risk performance at TAQA. Measurements of risk culture within the TAQA example and context are based on the scale provided by Ghafoori et al. (2023), with the adapted questions focusing on such aspects of risk culture as the levels of management commitment, incentives across the company to identify and deal with risks, risk communication across the company, capabilities and training, strategic approaches and the levels of support.

H4: Adopting risk management recommendations positively improves the optimization of risk management leading to more effectiveness

Managerial recommendations for the improvement of risk in the TAQA case would be immensely useful in dealing with risky situations and improving risk performance. Risk management initiatives would take theoretical aspects of risk management at various levels, both the traditional and enterprise levels, and adapt them to the specific TAQA case, eventually improving effectiveness. This would especially be the case given the fact that the recommendations would be backed by research. Some of the recommendations would include embracing the benefits associated with ERM and developing a strong risk culture (Ghafoori et al., 2023). Further recommendations include the inclusion of technology and the understanding of the specific risks the company faces, and especially how these risks have evolved over time (Hillary et al., 2023). The risks and their recommendations for resolution would depend on the nature of the risks and the context in which they occur.

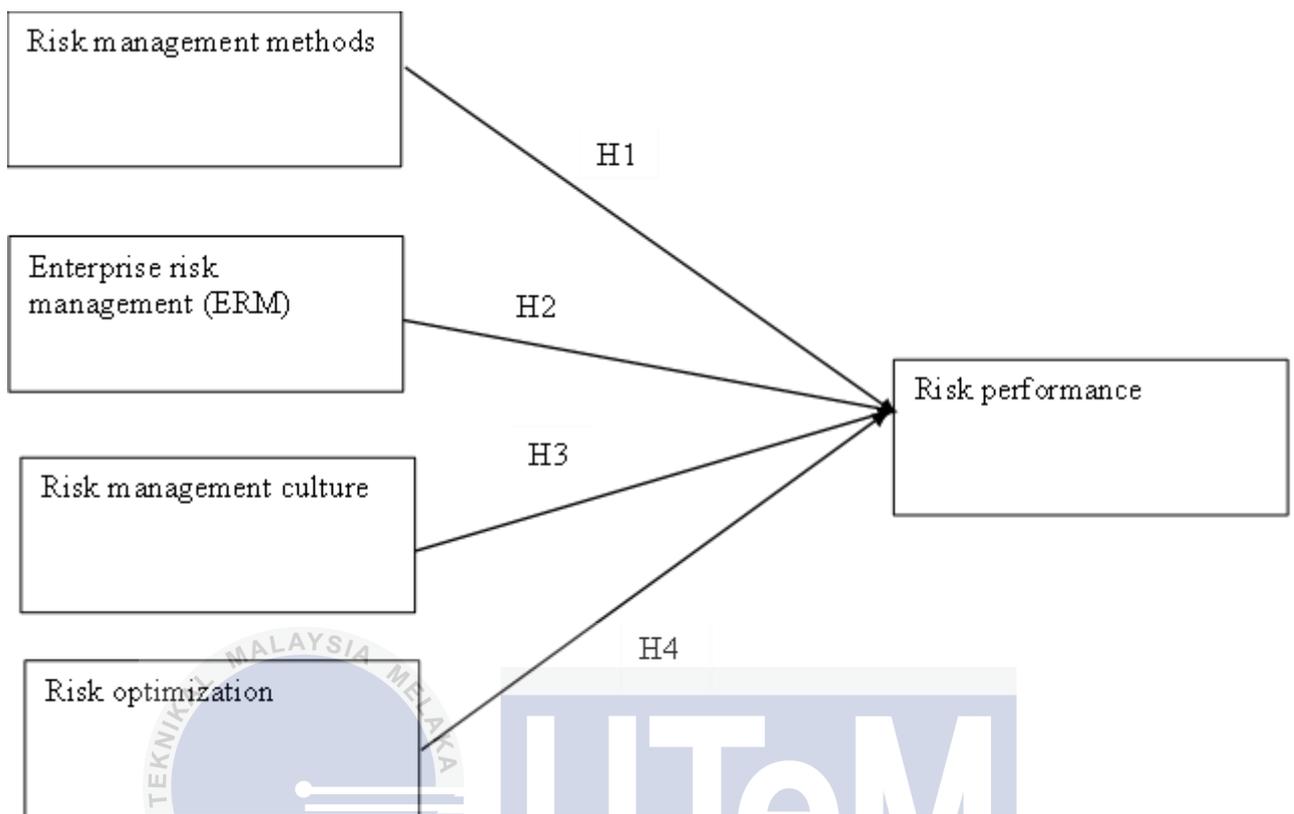


Figure 2.3: Conceptual Framework

Source: Researcher's personal work

2.12 ISO31000 Risk Management Framework

The following step in the context of the research framework development was related to the definition of the key features of the risk management framework presented by the ISO31000 standard. Summary of the theoretical framework defined by the ISO31000 standard is presented in (Figure 2.4). The key principles of the risk management framework organization defined by the ISO31000 standard contributed to the identification of the final scheme of theoretical framework applied in the study.

The idea of the risk management framework defined by the ISO31000 standard is based on the standards of permanent optimization of the risk management process through

integration of the best solutions available in the organizational environment, evaluation of the reliability of the proposed solutions and the improvement of the risk management strategy. The principles of risk management include continual improvement of the risk management methods, customization and structuration of the risk management procedures, dynamic and inclusive character of tools applied for risk management, and orientation on the best available information, human and cultural factors (IRM, 2018). The presented principles of the risk management process organization could be applied in the study to contribute to the presentation of the final set of parameters that could impact the effectiveness of the risk management processes organization in the target organization.



Figure 2.4: ISO31000 Risk Management Framework

2.13 Resource-Based View Theory Risk Management Framework

An alternative vision of the potential risk management framework that could be applied in a business organization was provided based on the resource-based view theory. This theory holds that any type of organization operates on the basis of a specific set of resources, and the resources of the company could be considered as a key source of risks for the organization (Figure 2.5).

In the context of the risk realization process, three key elements could be defined: condition event, risk event and consequence. Condition events include factors in the environment of the company that could impact the capabilities of the institution and pose risks for the business. Impact of the condition events leads to the creation of risk events, which are associated with the realization of the risk-caused scenario. Finally, risk events create specific consequences that impact the overall performance of the organization (Govan and Damjanovic, 2016). From the position of the resource-based view theory, it is important to develop connection between the risk events and key resources of the organization to define risk sources and risk management strategies for the organization.

The reliance on the resource-based view of risk nature allows the researcher to define the main factors contributing to the emergence of the specific risk conditions and events. The analysis of the condition events can help the analysts and practitioners to recognize the factors in their environment that should be adjusted to minimize the probability of risky event's occurrence. The specific risk events can also be measured via the parameter of potential consequences. In the conditions of limited resources for risk management, the organization can determine the risk events with the most significant consequences for different stakeholders, distributing the resources for risk mitigation most effectively.

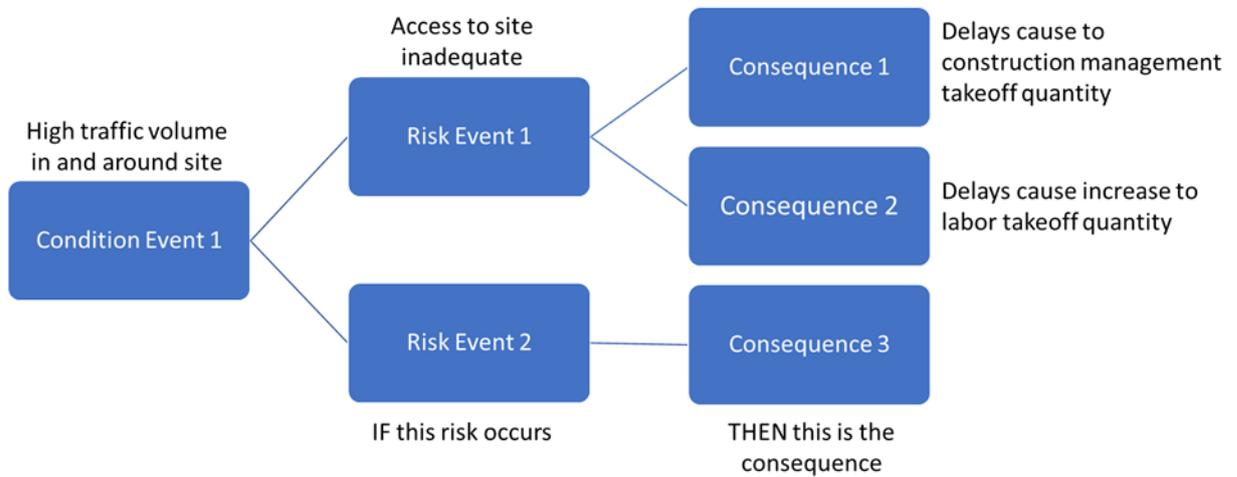


Figure 2.5: Resource-Based View on Nature of Risk

The outcomes of the resource-based view theory application for the aims of the risk management process study led to the definition of the risk management framework model presented in Figure 2.5. This model involves two key categories of variables: the key resources of the organization and the key categories of risks faced by the organization. From this position, the risk management procedure is associated with the definition of solutions that would allow the management and employees to minimize the negative impact on the long-term performance of the organization. The combination of resources and risk categories could differ based on the characteristics of the target organization and industry. Nevertheless, the general principle of risk nature definition and the role of risk management would remain similar for all types of organizations.

In Figure 2.6, the upper part of the cube includes the key types of resources available for the risk management in modern organizations. For mitigation of the key risk categories, management can apply external resources, support of customers and suppliers, facilities and operational assets, adjust the existing processes and plans, rely on the personnel and current

organizational structure. As for the key categories of risks that can be targeted via the selected resources, following were mentioned: hazard risk, financial risk, operational and strategic risk. These are the major categories of risks impacting wide range of companies, including the organizations in the energy sector.



Figure 2.6: Risk Management Framework

(Source: Mishra et al., 2019)

2.14 Summary

The results of the literature review in the context of the thesis development contribute to the understanding of the complex nature of the risk management process and methods applied in modern organizations. The discussion of the nature and definition of risk demonstrates that modern organizations should consider risk as a subjective and varied parameter, which should be analyzed both from a positive and negative perspective. The

objectives of risk management should include not only the management and mitigation of risks as negative events but also effective definition and presentation of risks as sources of opportunities and benefits for the organization. Altogether, different types of risks and the definition of risk management procedures are provided in the section. In the context of the literature review, a detailed description of the required documents that should be developed in the process of risk management organization is provided. It will be important to assess the existing level of quality of documentation management in TAQA. In addition, the risk management team's structure will have to be assessed from the position of compliance with the standards that were earlier defined in the literature review. Assessment of the energy sector specifics demonstrates that this sector can be characterized with a higher level of risk compared to the majority of other industries, hence specific requirements to the organization of the risk management process and methods in the energy sector are required. In addition, the risk management process should adequately assess the potential barriers that exist in this sphere. Altogether, the findings of the literature review allow the researcher to identify the list of criteria and parameters that can be applied in the process of analysis of the effectiveness of the risk management methods and procedures in TAQA.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The presented chapter provides detailed information about the methodology of the study that was chosen for this thesis. The research methodology is considered to be the design of procedures for gathering, selection, analysis, and summarization of the raw data in the process of research for the aims of development of useful insights, clarification of the study hypotheses and the realization of the study objectives. This chapter presents a detailed description of the chosen methods and tools of data collection and analysis in the context of the study questions and objectives, which were defined earlier in the thesis thesis.

The methodology chapter explains the process that was undertaken to collect and analyze data that was used in answering research questions. More particularly, the application of the quantitative research design, as well as the target population at TAQA is explained. The development of the survey for the collection of data is also explained and the entire process of data collection from the organization explored. Lastly, the analysis of data using SPSS is explained in this chapter.

3.2 Research Design

The first question that should be considered in the context of the study methodology is the chosen research design. The definition of the research design is considered to be the most important decision in the process of research after the identification of the research

questions and objectives, together with the clarification of the hypotheses (Abutabenjeh and Jaradat, 2018). The objective of the research is to investigate risk optimization at TAQA. The results of the study are expected to contribute to the definition of the recommendations for the improvement of the quality and effectiveness of the risk management procedures in the chosen organization. According to the stated research questions and objectives, successful implementation of the study requires a detailed analysis of the high amount of information gained from a wide range of participants and experts in the field of organization of risk management methods and procedures in TAQA.

A research design is a blueprint of any study and it explains the process of conducting the research. The two main research designs that could be applied to research include; the quantitative and qualitative design. The qualitative research design focuses on the subjective aspects of human experiences, such as emotions, thoughts, and personal perceptions. The primary objective of data collecting is to discover insights that may be formulated into testable hypotheses. This process is often carried out in the form of narratives. Qualitative research does not incorporate statistics in any kind (Flick, 2022). Conversely, the quantitative research design focuses on the collection of numerical data and representing statistical outcomes about the target population (Xiong, 2022). Generally, the quantitative methodology is concerned with statistics.

In the current thesis, the quantitative research design was used to evaluate the optimization of risk management in the electricity distribution system in the UAE, and particularly at TAQA. One of the justifications for choosing the quantitative research design is that it can help gather vast amounts of data in the research in a short time (Williams et al., 2022). Essentially, data can be collected using a survey from a large sample from in a short

time. More so, the justification for using the quantitative research design is that its outcomes are verifiable and can be easily generalized to similar contexts (Williams et al., 2022). The data collected from TAQA could be generalized to other companies in the electricity distribution system. Lastly, the quantitative research design is justified because it can be easily done anonymously. This enhances the ethical standards of the overall research.

The specific quantitative design applied was the cross-sectional research design. The justification for using cross-sectional research is that there was need to save time and collect data from participants only once. Cross-sectional studies examine many variables simultaneously, but do not account for the impact of time on the observed variables (Wang and Cheng, 2020). However, cross-sectional research can be performed in relatively less time (Wang and Cheng, 2020). A cross-sectional study involves the simultaneous measurement of both the outcome and the exposures according to the results from study participants. Overall, the cross-sectional quantitative research method was selected due to its ability to analyze numerous variables related to risk management simultaneously, its efficient setup time, and its cost-effectiveness, which enables the use of a high sample size.

Table 3.1 below is illustrative of the research questions and their corresponding research objectives showing the data analysis approach that was applied in the results section;

Table 3.1: Methodology for Research Questions and Objectives

Research Questions	Research objectives	Research Methods	Analysis techniques
What is the relationship between risk management methods and the risk performance of TAQA in the electricity distribution system in the UAE?	To evaluate the relationship between risk management methods and the risk performance of TAQA in the electricity distribution system in the UAE.	cross-sectional quantitative study	Quantitative data analysis (SPSS)
What is the impact of enterprise risk management (ERM) on risk performance in the UAE electricity distribution system, based on the case of TAQA?	To investigate the impact of ERM on risk performance in the UAE electricity distribution system, based on the case of TAQA.	cross-sectional quantitative study	Quantitative data analysis (SPSS)
What is the impact of the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA?	To examine the impact of the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA.	cross-sectional quantitative study	Quantitative data analysis (SPSS)
What practical recommendations could be adopted for the optimization of the quality and effectiveness of risk management methods to improve risk performance of the UAE electricity distribution system in organizations such as TAQA.	To provide practical recommendations for the optimization of the quality and effectiveness of risk management methods to improve risk performance of the UAE electricity distribution system in organizations such as TAQA.	cross-sectional quantitative study	Quantitative data analysis (SPSS)

According to the stated objectives and research questions, the presented thesis is expected to contribute to the objective and generalized discussion of the risk management methods and procedures utilized in TAQA. According to the stated objectives, the effective

development of practical recommendations for the improvement of risk management results in the chosen organization requires maximization of objectivity and generalization potential of the study results. For the realization of this objective, orientation on the widest range of sources of useful data is considered as an effective alternative to the study approach. Together with the requirement for the study results objectivity, the specific conditions of the thesis define the choice of the quantitative study approach.

3.3 Research Process

The two main research approaches that are used in research include; inductive and deductive research approach. Deduction involves progressing from the general to the specific, such as beginning with a theory, deducing hypotheses from it, conducting tests on those hypotheses, and then modifying the theory accordingly (Woiceshyn and Daellenbach, 2018). In the current thesis, the theory that was applied is the enterprise risk management theory. Induction, in contrast, entails progressing from specific instances to broader generalizations, such as when conducting empirical observations on a particular phenomenon of interest and deriving concepts and hypotheses from them (Woiceshyn and Daellenbach, 2018). Thus, induction and deduction move from different directions to reach a conclusion.

The current thesis employed a quantitative research design and this set the ground for the application of the deductive research approach. Quantitative research is commonly linked to the philosophical framework of post-positivism. Researchers strive to achieve the highest level of accuracy in their findings, prioritizing objectivity and aiming for results that may be applied universally (Kahlke et al., 2022). Following the deductive research approach,

four hypotheses were formulated and the enterprise risk management theory applied to evaluate the problem. The application of the deductive research approach was also relevant because it leads to the development of conclusions from the data that was gathered from participants.

3.4 Research Philosophy

The research philosophy is described as a belief about the manner in which data about a phenomenon should be gathered, analyzed, and used. The research philosophy element of the study includes a description of the elements of the researcher's worldview model about the most important elements of the study – evidence, facts, trustworthy and unreliable data and sources of information. Research philosophy forms the basis of the theoretical paradigm applied by the researcher in the context of the real assessment and integration of specific findings into the research procedure. It allows the researcher to identify the nature of the surrounding reality and define the format of the assessment of the connections between separate variables in the conceptual model of the study (Cresswell, 2014). From this perspective, the research methodology format is based on the assumptions and ideas that form the research philosophy of the scholar, which defines the importance of its early discussion. According to Kumar (2019), the research methodology as a set of tools and principles of data collection and analysis should be considered as a factor of secondary importance compared to the research philosophy. The research philosophy selection should provide the researcher with a set of useful assumptions that will be applied in the research methodology development and realization for the aims of the study (Creswell and Creswell, 2017). According to the presented logic, the objective of this section is to provide a discussion of the vision of the study philosophy followed by the thesis author.

There are four primary research philosophies that are applied in research including; positivist, interpretivist, pragmatist, and realistic (Žukauskas et al., 2018). The pragmatist research philosophy focuses on empirical evidence and objective facts (Žukauskas et al., 2018). Realism is founded upon the ideas of both positivist and interpretivist research philosophies. The realistic research philosophy is founded on essential assumptions that enable the recognition of the subjective nature of human beings (Žukauskas et al., 2018). Philosophic realism posits that phenomena have an existence that is not dependent on an individual's perception or their beliefs regarding them (Eastwood et al., 2018). More so, interpretivism is a social science method that emphasizes the need of comprehending the beliefs, motivations, and reasoning of individuals within a social context in order to interpret the meaning of collected data related to a particular occurrence (Nickerson, 2024). Interpretivist research methodologies diverge from positivist ones by placing greater importance on qualitative data and centering their analysis on the contextual factors (Nickerson, 2024). Positivism is in agreement with the hypothetico-deductive paradigm of science. The hypothetico-deductive technique is a cyclical procedure that initiates with theoretical concepts derived from existing literature to construct hypotheses that can be tested. It involves the development of an experiment by precisely defining and measuring variables, followed by the execution of an empirical investigation (Park et al., 2020).

From the above research philosophies, the most appropriate research philosophy that was applied in this study was the positivist philosophy. The justification for the choice of the positivist research philosophy is that it enhances the independence of the researcher. In the current thesis, the researcher wanted to gather independent data from TAQA in regard to risk optimization in the course of their electricity distribution. Further, positivism resonates

with the overall quantitative research design consequently making it more relevant to this study. The objective of the study is not only the generation of new knowledge but also its synthesis and useful practical application for the aims of the improvement of the existing situation in TAQA and the UAE. According to positivism, objective reality exists independently from the research subject, and the influence of the researcher on the object of the study in the process of research does not have a serious impact on its characteristics. Positivism will improve independence while also ensuring that the required objectives are attained.

According to the position of the positivism paradigm, the research's objectivity is guaranteed by the fact that the object of the study is not under influence of the researcher, and the researcher's subjectivity has no impact on the parameters of the studied object and the results of the research (Bryman, 2016). In the context of the positivism paradigm, social reality events and objects can be studied using the instruments and methods of natural science, and the research process is based on the application of the deductive research process to the earlier defined study hypotheses. This paradigm is based on the deterministic philosophy, where the objective causes determine the effects of the object of the study. At the same time, the researcher is removed from the mechanism of causes and effects, and their objective is just to identify this mechanism and describe it in the research process. The positivist paradigm is usually associated with the orientation on the quantitative research methods, which are applied for the collection and analysis of empirical and numerical data for the description of the objective reality. In general, the positivist paradigm considers the researcher as the subject that has no serious impact on the changes in the object of the study,

leading to the creation of real opportunities for the effective investigation and research of the objective reality, hence, important for this study.

3.5 Unit of Analysis

The unit of analysis for this study was an organization, the Abu Dhabi National Energy, PJSC, TAQA. TAQA is a prominent entity in the energy industry of the UAE, responsible for managing substantial aspects of power production and delivery. Data was collected from participants mainly selected from TAQA. The corporation possesses significant expertise in overseeing the distribution network through its subsidiary entities, namely the Abu Dhabi Distribution corporation (ADDC) and the Al Ain Distribution Company (AADC) (TAQA, 2022). These subsidiary companies guarantee the efficient and sustainable distribution of water and electricity to more than 600,000 service locations (TAQA, 2022). Considering its significant importance in the UAE energy sector, TAQA was a suitable unit of analysis, as it is directly involved in electricity distribution and faces risks as any other organization.

TAQA aims to construct an intelligent, enduring, and interconnected distribution network (TAQA, 2022). The company's emphasis on innovation, safety, and sustainability is in line with successful risk management techniques, making it a valuable subject for study (ADDC, n.d). TAQA has proven its ability to manage large-scale and intricate energy projects through its portfolio, which includes notable endeavors like the Al Dhafra Solar PV IPP Project, one of the largest solar PV projects in the world, and the Fujairah F1 and F2 power and water plants (TAQA, n.d). This expertise yields abundant data for studying risk mitigation measures in extensive infrastructure projects.

3.6 Population and Sample

The first step in the process of the study design clarification includes the definition of the target population and the adequate sample size for the aims of the study. The target population of the research is a group of potential participants applied by the researchers to generalize the result of the study to a particular population (Salkind, 2011). In this way, orientation on the target population allows the researcher to avoid significant time and resource expenses for the organization of a complex study that would integrate the widest range of potential participants.

The population that was used in the current thesis was made up of individuals working at TAQA. TAQA has an estimated workforce of 606 individuals who are located in the United Arab Emirates (LeadIQ, 2024). The team of TAQA workers is led by the Chief Executive Officer. Out of this population, a sample size of 390 was chosen to help with the comprehension of how risk management could be optimized in the organization. The sample chosen in the current study is consistent with previous researches such as that by Memon et al. (2020) who suggests that the sample size should be aligned with the characteristics of the target population. For instance, in a research project focused on a business with a total of 200 employees as the target audience, a sample size of 100 can be regarded substantial (Memon et al., 2020). TAQA boasts a substantial workforce with several individuals including senior managers, middle managers, and supervisors. Consequently, the investigation necessitates a substantial sample size.

However, it is also critical to be aware of potential challenges of dealing with a large sample, as it might cause statistical significance to become excessively sensitive, leading to

a Type 1 error. A sizable sample size has the ability to statistically detect relationships that otherwise would not (Memon et al., 2020). A sample that exceeds the required size will more effectively represent the population and hence yield more precise results. Nevertheless, once a certain threshold is reached, the marginal improvement in precision becomes negligible, thus becoming the recruitment of more participants both laborious and costly (Andrade, 2020). A sample size ranging from 30 to 500 is appropriate for most behavioral investigations, however a sample size over 500 may result in a Type II error (Memon et al., 2020). The study utilized a sample size of 390, which falls between the range of 30 to 500. By using this specific sample size, the study guarantees that the results will be statistically strong and applicable to all TAQA employees in the UAE.

The sample was made up of senior managers, middle managers, supervisors, and employees. From the table 3 below, there were 254 (65.1%) employees, 107 (27.4%) supervisors, 24 (6.2%) middle managers, and 5 (1.3%) senior managers involved in the study.

Table 3.2: Sample Characteristics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employee	254	65.1	65.1	65.1
	Middle-level manager	24	6.2	6.2	71.3
	Senior Manager	5	1.3	1.3	72.6
	Supervisor	107	27.4	27.4	100.0
	Total	390	100.0	100.0	

The choice of the sample was guided by a procedure. The initial step of the sample characteristics definition demonstrates the need to focus on the target population whose everyday operations in TAQA are related to the application of the risk management methods.

At the same time, it is important to perform the procedure of the participants' selection, which would allow the researcher to collect the most relevant and useful information for the aims of the study. The existing format of personnel operations in any type of organization shows that the distribution of useful information about the management system among personnel is tied with the specific competencies and position of the employees (Vasconcelos et al., 2016). As a result, the most important and useful information about the performance of the risk management structure in the chosen organization is concentrated in the hands of the senior management and executives of the organization. Organization of the information distribution model in any type of organization suggests that employees at the lower hierarchy levels are provided only with the proper amount of information for the high-quality realization of their tasks. From this perspective, orientation on the employees in the lowest hierarchical levels of the organization is not a sensible decision since they cannot be considered as sources of reliable and useful information for the researcher.

More so, effective cooperation with the management of the chosen institution (TAQA) is required to guarantee that they support the researcher in the process of the selection of most prospective candidates. A new method of data collection in this procedure includes the principle that the researcher does not mainly focus on the position of senior management in the selection of the study participants. The researcher plans to perform negotiations with the management of the electricity distribution system of the UAE and TAQA to receive their consent to additional cooperation with the management of the risk management department in the organization or managers who mainly operate in this field. Based on direct cooperation with the responsible management teams, the researcher asked them to provide information about the most interesting and prospective employees who

could contribute to the realization of the study objectives. This procedure guarantees the selection of the most promising candidates for the study.

3.7 Data Collection

Organization of the procedure of data collection is the next logical step in the process of research methodology definition after the choice of the research design. In the process of the data collection planning, it is important to apply a strategy that would both minimize the resource expenses for data collection required from the researcher and make the procedure of data collection comfortable for the audience. At the same time, the procedure of data collection should be optimized according to the needs of the target audience, their working conditions, and available time resources that could be spent on the primary data provision.

In the context of the study, it will be important to organize the procedure of data collection among the employees of TAQA. The total number of study participants is 390 people. Such a scale of the research requires the development of the method of data collection that would ease the procedure of the primary data summarization for the researcher. Thus, the procedure will be divided into two main segments – the selection of the participants of the study and the delivery of the survey forms for them to fill and send to the researcher. In the process of the selection of participants, the researcher will actively cooperate with the management of the chosen organization for them to support the researcher in the process of selection of prospective participants in both of the chosen categories. At the same time, the management of the organization should support the researcher in the process of initial cooperation with the participants of the study. It will be important to obtain

consent form to the potential participants of the study and to keep them informed about the objectives and outcomes of the research.

The choice of methodology is contingent upon various elements in the investigation, including time constraints, financial resources, sample size, and environmental conditions (Aldhaen, 2020). Some notable data collection instruments include; interviews, focus group talks, and surveys. During interviews, questions are posed to gather data through direct responses, which is different from the questionnaire approach where data is obtained indirectly (Taherdoost, 2021). Therefore, it is possible to obtain sensitive information from interviewees, but this task demands certain expertise that is not required for questionnaires (Taherdoost, 2021). Focus groups is a research technique employed to explore human behavior, attitudes, and the perspectives of individuals towards a specific idea. It is primarily utilized in qualitative studies (Nyumba et al., 2018). However, focus group talks are costly and time-consuming, requiring skilled facilitators (Taherdoost, 2021).

In the current thesis, a survey was employed in the collection of data on the optimization of risk management in the electricity supply at TAQA. A survey design entails a meticulous analysis, scrutiny, and depiction of a specific matter, topic, or entity. The term "design" in this case refers to the specific approach used to study a particular issue or problem within a positivistic framework (Bihu, 2021). A survey design involves the use of quantitative or numeric methods to describe trends, attitudes, or opinions of a group by surveying a representative sample from that population (Asenahabi, 2019). Based on the findings obtained from a sample, the researcher draws conclusions or asserts statements about the entire population (Asenahabi, 2019). Surveys can only be conducted at a single moment in time in a cross-sectional research approach. Aldhaen (2020) states that it provides

the necessary research with a concise overview of the current events occurring within a specific group during a specific period. A cross-sectional survey aligns with the research strategy of the study. Surveys have the ability to gather information from a wide portion of the population through the use of large samples (Aldhaen, 2020). Given the substantial sample size of the current study, a survey is an appropriate method for collecting data. Lastly, the preference for the use of a survey also stems from its economical nature in regard to time and costs of the research. They are cost-effective, requiring less time for the collection of data.

3.8 Survey Development and Research Protocol

The development of the survey for data collection was critical, as it helped in the collection of data on risk management optimization at TAQA. The survey was divided into seven parts. The first part of the survey focused on demographic data where participants were to answer questions related to their gender, age, as well as their position in the organization. The second part was based on a Likert Scale and focused on risk management methods in the organization. Participants were to show their level of agreement in regard to issues such as risk appetite and the significance of risk management. The third part of the questionnaire was also based on a Likert Scale and focused on the construct of enterprise risk management (ERM). In this section, participants were to show their level of agreement on issues such as the presence of an ERM model in place and the prioritization of risks in the organization. The fourth part was the construct of risk management culture and it was based on a Likert Scale that helped participants show their level of agreement with management's adherence to risk management and the execution of risk management responsibilities. The fifth part focused on risk optimization and was focused on assessing the

level of agreement on issues such as accountability. The sixth section was on risk performance and measured the level of agreement with aspects such as the employees' understanding of risk management and the improvement in the level of risk tolerance. The last part was an open-ended question that asked for opportunities for risk optimization in the organization.

The survey items are presented as below;

Part 1: Demographic Data

1. What is your gender?

- Male
- Female

2. What is your position in the organization?

- Senior Manager
- Middle-level manager
- Supervisor
- Employee

3. How many years have you worked in the organization?

- Less than 5 years
- 5-10 years
- More than 10 years

4. My organization considers risk management important

- Yes
- No

where;

1 – strongly disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree. Tick appropriately based on your level of agreement.

Part 2: Risk Management Methods

5. Risk management is considered important in achieving the organization's objectives

1	2	3	4	5
---	---	---	---	---

6. The organization has an active program for monitoring and reporting risks

1	2	3	4	5
---	---	---	---	---

7. Communication is critical in facilitating risk management in the organization

1	2	3	4	5
---	---	---	---	---

8. The management has put in place contingency and continuity planning for risk management

1	2	3	4	5
---	---	---	---	---

9. The overall risk appetite of the company is manageable

1	2	3	4	5
---	---	---	---	---

Part 3: Enterprise Risk Management (ERM)

10. The organization has a working enterprise risk management (ERM) in place

1	2	3	4	5
---	---	---	---	---

11. Risk assessments are conducted frequently in the organization

1	2	3	4	5
---	---	---	---	---

12. ERM is an interdepartmental practice at the organization

1	2	3	4	5
---	---	---	---	---

13. Risks are prioritized differently more in the organization

1	2	3	4	5
---	---	---	---	---

14. Risk appetite is clearly defined and communicated in the organization

1	2	3	4	5
---	---	---	---	---

Part 4: Risk Management Culture

15. The management 'walks the talk' on risk management

1	2	3	4	5
---	---	---	---	---

16. Risk tolerance is aligned with the organization's strategy in electricity distribution

1	2	3	4	5
---	---	---	---	---

17. Risk management is regularly considered and reflected as a core part of decision-making

1	2	3	4	5
---	---	---	---	---

18. In the organization, risk management expectations are frequently communicated

1	2	3	4	5
---	---	---	---	---

19. Risk management responsibilities of employees are clearly communicated

1	2	3	4	5
---	---	---	---	---

Part 5: Risk Optimization

20. Risk management accountabilities are included in an employees' performance objectives

1	2	3	4	5
---	---	---	---	---

21. There is a clear understanding of emerging risks in the organization

1	2	3	4	5
---	---	---	---	---

22. Risk management duties are shared across departments

1	2	3	4	5
---	---	---	---	---

23. There is regular monitoring of the organization

1	2	3	4	5
---	---	---	---	---

24. In the organization, there is a clear understanding of the need to improve risk management

1	2	3	4	5
---	---	---	---	---

Part 6: Risk Performance

25. The organization has documented all the potential risks it faces

1	2	3	4	5
---	---	---	---	---

26. Employees have an understanding of the organization's risk environment

1	2	3	4	5
---	---	---	---	---

27. Risks are immediately prioritized and managed when they emerge in the organization

1	2	3	4	5
---	---	---	---	---

28. The organization continues to invest in risk management performance

1	2	3	4	5
---	---	---	---	---

29. The level of risk tolerance has improved in the organization

1	2	3	4	5
---	---	---	---	---

Part 7: Open-ended question

In what ways can risk management be optimized in the organization to improve efficiency?

Altogether, the survey form helped collect both personal information about the respondents and responses about their visions of the risk management process at the TAQA. Personal information collected during the study shall include information about the respondents' gender, current workplace position, previous work experience in the energy sector, age, overall working experience level. As for the information about the experience of risk management processes review in the organization, each respondent will have to assess 60 questions presenting specific statements, using the Likert scale measurement scale. The survey form was developed and validated based on the findings of prior literature review, which determined the key knowledge gaps that should be filled. It was difficult to orient on the sample survey forms applied in prior studies due to the deficit of reliable and relevant academic publications dedicated to the current study theme.

3.9 Validity and Reliability of the Survey

Determining the validity and reliability of the survey was critical. Face validity is determined by the visual aspects, structure, and organization of the questionnaire, as well as the clarity and understandability of all its items (Dalawi et al., 2023). This pertains to whether the items in the questionnaire are presented in a manner that will provide the necessary information. Face validity refers to the subjective evaluation of several aspects of a questionnaire, including its relevance, layout, readability, clarity, and appropriateness for the intended audience. Nonexperts can assess face validity, which is a crucial aspect during the initial development of a questionnaire (Ranganathan et al., 2024). A pilot study was undertaken using a sample of 10 participants from TAQA to detect any problems with the questionnaire items and to evaluate the credibility of the questions.

Reliability refers to the consistency and stability of the measured values obtained from repeated measurements conducted under same conditions using the same measuring device (Vu, 2021). The main approach that was used in the determination of reliability of the items of the questionnaire was the measurement of internal consistency using Cronbach's Alpha. In this case, all the items and the constructs had a Cronbach Alpha value of 0.7 and above showing a high level of reliability of the items.

3.10 Dealing with Response Bias

Personal factors can exert an influence on both the scores and the validity of the interpretations of test items. Response bias is a term used to describe an individual's inclination to reply to a question or item in a way that is not influenced by the actual content being evaluated (Suárez Álvarez et al., 2018). This can lead to a distortion in the score of the characteristic being tested (Suárez Álvarez et al., 2018). The survey items were balanced as they had response options that are impartial and unbiased. This was to prevent influencing respondents towards a specific answer. Additionally, a well-balanced Likert scale was applied, such as one that includes options including "Strongly Agree", "Agree", "Neutral", "Disagree", and "Strongly Disagree". Leading questions were also avoided and clear, brief, and neutrally phrased items were employed to prevent bias. Furthermore, pilot research was conducted in which the questionnaire was delivered to a small and representative population. The purpose of this pilot study was to uncover any potential biases or misunderstanding of the questionnaire items.

3.11 Expert Validation

An expert validation was conducted to assess the effectiveness of the survey that was developed. In the pilot study, 10 participants were involved and were mainly drawn from academia and the industry of risk analysis. The justification for involving 10 participants in the pre-test and pilot study was to get diverse outcomes from these experts to improve the quality of the survey. More so, time and budget constraints made it only possible to include 10 participants in the pre-test and pilot study drawn from academia and the industry of risk analysis.

The process of conducting expert validation was elaborate. In the first step, the objectives of the study were defined. This was to determine their alignment with the survey that had been initially developed. The second step involved the evaluation of the sample size. The sample size that was selected for the study was only 10 randomly selected individuals drawn from academia and the field of risk analysis. The third step was the explanation of the purpose of the study and the pilot study. Participants needed to understand why the pilot study was critical, especially in terms of improving the survey. The fourth step was the collection of feedback and the fifth step was the analysis of results and making revisions to the survey.

The participants of expert validation are summarized as below in Table 3.3;

Table 3.3: List of Experts

Expert	Field and Position	Years of Experience
Expert 1	Academia – University Lecturer	6 years
Expert 2	Academia – University Lecturer	5 years

Expert 3	Academia – University Lecturer	7 years
Expert 4	Academia – University Professor	10 years
Expert 5	Academia – University Professor	10 years
Expert 6	Academia – Research Assistant	8 years
Expert 7	Risk Management Expert	6 years
Expert 8	Risk Management Expert	7 years
Expert 9	Risk Management Expert	15 years
Expert 10	Risk Management Expert	10 years

The completion rate of the expert validation was 80% as 8 participants returned their feedback and 2 did not report back. The expert validation was completed with a week by the participants who returned their feedback. Based on the expert validation that was conducted, the following Table 3.4 shows a summary of the results, especially the changes that were made to the survey.

Table 3.4: Expert Validation Outcomes

Initial Question	Recommendation for Change (Based on Feedback)	Change Made
Risk management is perceived helpful in achieving the organization's objectives	'Use important'	Risk management is considered important in achieving the organization's objectives
ERM is used by all departments	'Include interdepartmental'	ERM is an interdepartmental practice at the organization
Risk management is always considered and reflected as a core part of decision-making	'Use regular'	Risk management is regularly considered and reflected as a core part of decision-making

There is a clear comprehension of new risks in the organization	‘Use emerging’	There is a clear understanding of emerging risks in the organization

The feedback of the expert validation as shown in the table above was critical in enhancing the validity, reliability, and overall quality of the survey. The survey benefitted from accurate and simple representation of statements that made it easier for participants to answer the questions. It is the ease of answering the questions that enhanced the quality and reliability of the final survey that was developed for this study. Lastly, the fact that experts from both academia and the industry were involved in improving the survey played a critical role in enhancing its reliability and validity.

Data analysis was done using SPSS. SPSS was chosen for the analysis of data because it is an advanced statistical software that had the capacity of effectively displaying data in terms of tables and charts. Besides, the use of SPSS was justified by the fact that it helped evaluated the relationship between independent and dependent variables of the study such as risk management methods and risk performance in the organization. Thus, the hypotheses were easily evaluated using the software. For qualitative data analysis, content analysis was used to evaluate the information presented in the sources while also comparing them.

3.12 Ethical Issues

The procedure of data collection should also follow the existing ethical standards for the protection of the participants’ interests. No personal information of the study participants will be utilized or presented in the research outcomes. At the same time, the researcher will

provide guarantees that participation in the research will not lead to negative outcomes for the participants.

Cooperation with the management of the chosen organization allowed the researcher to select the target participants of the study and organize effective communication with them, using their emails. The second stage of the data collection procedure included the creation of the online survey form using Google Forms instrument. The online survey form was provided via a special link, which was delivered to all the target participants on their email addresses. Each participant will be provided with a period of 7 days to fill the survey form and submit it in the application. As a result, each participant was able to select the most comfortable time and location to finish the survey since the only resources required for this task will include the device with access to the Internet and a sustainable Internet connection. The procedure of survey form filling was expected to take about 10-15 minutes and did not require additional knowledge and skills from the participants.

The research had pertinent ethical issues that needed to be addressed. The first ethical issue was in regard to obtaining informed consent. The informed consent form was provided to participants and was developed in a clear and comprehensible manner, ensuring that participants understood it. Participants were given ample time to carefully evaluate their decision to participate. Nevertheless, informed consent is not only a document that is signed, but rather a procedure in which the participant comprehends the research and its potential hazards (Manti and Licari, 2018). Ultimately, after it becomes clear that the person has comprehended the study or trial sufficiently, they make a well-informed decision regarding their willingness to take part. Upon choosing to partake, participants usually complete a consent form and receive a duplicate of the signed document along with the pertinent

study/trial details for their reference (O'Sullivan et al., 2021). Collaborating with the administration of the selected organization helped in identifying and choosing the desired participants. Efficient communication channels, such as email, were established to contact potential participants and provide the consent forms to them.

Confidentiality is another ethical issue that was addressed in the study. Should the participants be willing to offer private or sensitive information, the researchers must make additional endeavors to maintain the confidentiality of the information. Invasive data collection procedures could potentially compromise the privacy of research participants. If data is not kept and treated intelligently, there is a higher probability of experiencing a data breach after collection, even throughout the publication process (Rana et al., 2023). Hence, the research results did not include or disclose any identifiable data of the study participants. The online survey guarantees anonymity, allowing participants to provide their responses confidentially. The data obtained from the online survey was securely preserved and restricted to authorized people directly involved in the research. This measure ensured the preservation of participants' privacy and the integrity of their data.

3.13 Summary

Overall, this chapter focused on the explanation of the methodology that was applied in this study. The quantitative study was the primary research methodology that was applied in the explication of the optimization of risk management in electricity supply at TAQA in the course of its operations in the UAE. A survey to collect data from 390 participants from participants drawn from TAQA. For the evaluation of the validity of the questionnaire, an expert validation was conducted with 10 respondents drawn from academia and the risk

analysis industry. This led to the construction of a final questionnaire that made it easier to collect data. The chapter also explains ethical issues such as the consideration of the confidentiality and informed consent of the participants.



CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

This chapter is linked to chapter three and it entails the presentation of data and extensive analysis. In this chapter, the results of the quantitative study are presented. The findings are followed by extensive discussion that involves linking the findings to existing literature. The first part entails the presentation of demographic factors such as the age and gender of the participants. In the second part, there is more extensive analysis of the data including the presentation of the internal consistency (Cronbach's Alpha) of each of the constructs that were used to collect data. Regression analysis is also presented as it related to each hypothesis. The reasons for either supporting or rejecting each hypothesis are also presented. Ultimately, the findings are discussed based on the research questions and are linked to existing literature. The pilot study that was conducted is presented and consequently the findings of the study.

4.2 Pilot Study

A pilot study plays a critical role in leading to the collection of quality results, as it helps in testing the reliability and validity of the survey. According to In (2017), a pilot study always entails the use of a smaller sample size to help in the assessment of the feasibility of the research tool to collect quality results. In the present study, it was necessary to conduct a pilot study to determine the feasibility of the survey and ensure that it would effectively help evaluate risk management in the electricity distribution system of the UAE. The

motivation for the pilot study arose from the understanding that a pilot study is an invaluable tool that provides the necessary information to develop and increase the likelihood of success of a larger study (Kunselman, 2024). As was intended in this study, the pilot study is purposed to check whether the questionnaire can be correctly understood by the participants and if the participants can provide logical responses to the questions (Blatch-Jones et al., 2018). With the pilot study, it was expected that the survey would be refined and the methodological rigor would be enhanced to desirable levels.

4.2.1 Pilot Study Participants

In this study, 39 participants were selected to be part of the pilot study. This was as per the recommendation of Ismail et al. (2018) who explain that a sample size for a pilot study should be 10% of the total expected sample size at the final study. The total number of participants for the main study is 390 participants. Therefore, the number of respondents targeted to participate in the pilot study was 39 respondents, sufficient and practical enough to assess the preliminary questionnaire.

For the pilot study, convenience sampling was used and 39 participants who were readily available and willing to participate were chosen. Because pilot studies require tests of research instruments without the logistical complexities commonly encountered with more rigorous sampling strategies, convenience sampling is widely recognized as an effective approach (Golzar et al., 2022). Convenience sampling was chosen due to its feasibility and accessibility, as the participants chosen were easy to contact and could respond quickly. The feedback gathered from the chosen participants was crucial in the identification of ambiguities and the design improvement in order to achieve the effectiveness of the survey for a target population of TAQA employees.

4.2.2 Results of the Pilot Study

The pilot study provided useful information about the instrument performance and the need to make some refinements to make sure that it was highly reliable and valid. The response rates, completion times, and clarification of questions were all assessed. This has allowed the final survey to be clear, complete and aligned with the study's objectives. The results of the pilot study are presented based on response rates, recommended changes to the questionnaire, and changes that were made to ensure it was reliable.

a. Response Rates and Completion Times

Great response rates and completion times are crucial to the success of surveys in the final study. Essentially, the quality and reliability of survey results depends greatly on the good response rate (Wu et al., 2022). A high response rate ensures accuracy in collected data; the collected data sufficiently represents the target population which in turn guarantees the reliability of the study (Meterko et al., 2015). From the 39 participants selected to take part in the pilot study, there was a response rate of 89.7%. This is because, four participants were unable to participate as a consequence of their schedules, hence, underscoring the need for flexible participation.

The completion terms were also a key factor of consideration in the course of conducting the pilot study. According to Revilla and Ochoa (2017), an ideal survey should take about 10 minutes, with the maximum at 20 minutes to complete. The completion time is determined by respondents' preferences towards length of survey and trust in data anonymity (Revilla and Ochoa, 2017). The Socio-demographic factors apart from age do not significantly affect the completion time of surveys (Revilla and Ochoa, 2017). The pilot study therefore evaluated the completion time of the survey. For the current pilot test used

in this study, the time it took to complete the survey ranged between 40 and 50 minutes, and the average overall time was 45 minutes. The participants who were a bit familiar with risk management concepts got through the survey faster, while the participants who had less knowledge of the concepts took a little longer. However, it was interpreted that the concepts used could have made it more challenging to complete the survey within a shorter time because of complexity.

b. Clarity of Questions

Participants generally indicated that they found the questions easy to understand, but there were specific phrases flagged as possible causes of misinterpretation of some questions. For instance, in Question 9, the phrase “The organization’s tolerance for risk is acceptable” was described as being vague. It was therefore rephrased for clarity as “The overall risk appetite of the company is manageable.” Moreover, in Question 7, participants felt that the initial wording should be clarified, that is, “Good communication facilitates risk handling in the organization.” The phrase was changed to, “Communication is critical in facilitating risk management in the organization,” which had had more specific wording and maintained the original aim of the question.

c. Relevance of Questions

The participants agreed that the survey questions were appropriate to the themes of risk management and enterprise risk management (ERM). For example, Question 10, “The organization has a working enterprise risk management (ERM) in place,” was regarded as highly relevant to the study’s objective. But terms like 'risk appetite' and 'risk tolerance' got feedback that they needed clear definition. These terms were therefore briefly defined in the survey instructions in order ensure that all the participants understood them. The original

phrase, “Risk tolerance corresponds to the goals of the organization,” was changed to “Risk tolerance is aligned with the organization’s strategy in electricity distribution,” to make it more specific and relevant to the study context.

Table 4.1 below is illustrative of the pilot study outcomes in terms of the initial question, recommendation for change based on feedback, and the change that was made.

Table 4.1: Pilot Test Recommendations and Changes

Initial Question	Recommendation for Change (Based on Feedback)	Change Made
Question 9: The organization’s tolerance for risk is acceptable	Use “risk appetite” instead of “tolerance for risk”	Question 9: The overall risk appetite of the company is manageable.
Question 7: Good communication supports effective risk handling in the organization	Clarify “supports effective risk handling”	Question 7: Communication is critical in facilitating risk management in the organization.
Question 16: Risk tolerance corresponds to the goals of the organization	Specify “business goals” as “strategy in electricity distribution”	Question 16: Risk tolerance is aligned with the organization’s strategy in electricity distribution.

<p>Question 13: The organization handles risks in unique ways</p>	<p>Rephrase to “risks are prioritized differently more”</p>	<p>Question 13: Risks are prioritized differently more in the organization.</p>
<p>Question 24: The need to improve risk management is evident in the organization</p>	<p>Add “clear understanding”</p>	<p>Question 24: In the organization, there is a clear understanding of the need to improve risk management.</p>
<p>Question 12: The organization’s ERM is applicable across departments</p>	<p>Include “interdepartmental”</p>	<p>Question 12: ERM is an interdepartmental practice at the organization.</p>
<p>Question 17: Risk management is always considered in decision-making</p>	<p>Use “regularly” instead of “always”</p>	<p>Question 17: Risk management is regularly considered and reflected as a core part of decision-making.</p>
<p>Question 21: The organization</p>	<p>Replace “new risks” with “emerging risks”</p>	<p>Question 21: There is a clear understanding of</p>

comprehends new risks		emerging risks in the organization.
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4.2.3 Implications of the Pilot Study

Important considerations for enhancements to the main survey were provided by the pilot study. Response rates, completion times, and survey effectiveness were improved in the main study in order to optimize these variables.

a. Time Management

Some of the participants in the pilot study did not finish the survey on time, therefore having better or the time management strategies was important. To address this issue, pre-survey communications were used to inform study participants about how much time they would have to spend completing the survey. In the main study, participants knew that completing the survey would take approximately 15 minutes and were given the chance to do this. Furthermore, a longer window for survey completion was used in order to accommodate various schedules and to remain flexible. They included measures to reduce the time related barriers, to increase accessibility of participants and ultimately in terms of participation and completion of surveys, to increase response rates.

b. Survey Flow Improvements

From the pilot study, there was an indication of the need for improvement in the survey structure and flow. It was also suggested that better organization would further improve the participants' experience through the survey. Therefore, section headers in each part of the survey were added. Additionally, questions in the survey were grouped together more cohesively to reduce any appearance of redundancy and to enhance the flow of the survey.

The goal of these changes was to make the survey more engaging and user friendly, so that participants can have a smoother and more engaging survey.

c. Terminology Clarification

The introduction of the survey was modified to assist the participants of the main study to fully grasp the meaning of important terms. Terms such as 'risk appetite' and 'emerging risks' were explained using a brief glossary or explanatory notes which were added to help participants to understand these concepts within the context of the study. This was done to minimize confusion so that all participants better understood the contents and responded more accurately. Furthermore, an attempt was made to keep consistent terminology throughout the survey. That consistency prevented ambiguity and made sure participants would interpret the questions in the intended way. Therefore, participants would be more comfortable to provide thoughtful and reliable feedback on the data collected, which would subsequently lead to enhancement of the data quality. Beyond the added clarity and understanding, the survey became a smoother experience that cut down misunderstandings and increased in reliability of the survey results.

4.3 Results

4.3.1 Demographic Results

In this part, the demographic results of gender, position in the organization, as well as the age range of the participants are presented.

Gender

In the Table 4.2 below, the findings for gender characteristics of the population are shown. The number of female participants was 171 (43.8%) and that of male participants

was 219 (56.2%). Generally, the study involved a significantly high number of both male and female participants.

Table 4.2: Participant Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	171	43.8	43.8	43.8
	Male	219	56.2	56.2	100.0
	Total	390	100.0	100.0	

In the Figure 4.1 below, participants were asked about their position in the organization. From the findings, employees were the majority and they were 254 (65.1%), followed by supervisors, 107 (27.4%), middle-level managers, 24 (6.2%), and senior managers, 5 (1.3%). Hence, participants included individuals drawn at different levels in the organization.

Position in the Organization



Figure 4.1: Participant Position

In the Table 4.3 below, information on the participants' years of experience in the organization is presented. From the findings, majority of the participants, 202 (51.8%) have worked at TAQA for 5-10 years and 139 (35.6%) have worked for less than 5 years while 49 (12.6%) have worked for more than 10 years. Employees at the organization have worked for several years that help in the understanding of risk management approaches in the organization.

Table 4.3: Years Worked

How many years have you worked in the organization?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5-10 years	202	51.8	51.8	51.8
	Less than 5 years	139	35.6	35.6	87.4
	More than 10 years	49	12.6	12.6	100.0
	Total	390	100.0	100.0	

4.3.2 Internal Consistency

Internal consistency underscores the focus on establishing the reliability of the scale that was used in the collection of data through the survey. From the five-point Likert Scale, there were five constructs each with five items. The key constructs that were measured in the research included; risk management methods, enterprise risk management (ERM), risk management culture, risk optimization, and risk performance. Internal consistency in this case is reflective of the manner in which the elements of the scale measure various aspects of the same measure. The general rule of the thumb is that a Cronbach alpha value of 0.70 and above is good, 0.80 and above is better, and 0.90 and above is the best (Coolican, 2024). From the Table 4.4 below, the construct of risk management methods has a Cronbach alpha value of 0.84, enterprise risk management (ERM) has a value of 0.70, risk management culture has a value of 0.90, risk optimization has a value of 0.90, and risk performance 0.90. From the table below, all the constructs, as computed, have a Cronbach alpha value of 0.70

and above. Therefore, it could be concluded that the scale had a significant internal consistency.

Table 4.4: Testing Internal Consistency for Pilot Test

Construct	Cronbach's Alpha
Risk management methods	.74
Enterprise Risk Management (ERM)	.70
Risk Management Culture	.75
Risk Optimization	.80
Risk Performance	.77

4.3.3 Regression Analysis

Regression analysis is critical, as it allows for the analysis of relationships between variables in the study. In the current study, regression analysis was used in testing the relationship between variables, as well as in establishing whether to support or reject the hypotheses that were developed. The regression analysis is done as follows based on each of the variables that were evaluated in this study;

H1: There is a positive relationship between risk management methods and risk performance at TAQA in the electricity distribution system of the UAE

In the first regression test, the focus was on evaluating the relationship between risk management methods and risk performance in the organization. The regression analysis was conducted at a 95% confidence interval. The general rule is that the null hypothesis is rejected in cases where the p-value of the analysis is less than or equal to the significant

value of 0.05 ($p < 0.05$). In the table 4.5 below, the findings of the regression analysis show that the p-value is 0.000 ($\beta = .350$, $p < 0.05$). This p-value is less than the significant value of 0.05 meaning that H1 is supported. The findings mean that as risk management is implemented in the organization, risk performance at the organization increased positively by 0.350.

Table 4.5: Regression 1: Risk Management Methods and Risk Performance

Variables Entered/Removed ^a						
Model	Variables Entered	Variables Removed	Method			
1	Risk management Methods		Enter			
a. Dependent Variable: Risk Performance						
b. All requested variables entered.						
Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.350 ^a	.122	.120	.787		
a. Predictors: (Constant), Risk management is considered important in achieving the organization's objectives						
ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.471	1	33.471	54.029	.000 ^b

	Residual	240.365	388	.619		
	Total	273.836	389			
a. Dependent Variable: Employees have an understanding of the organization's risk environment						
b. Predictors: (Constant), Risk management is considered important in achieving the organization's objectives						
Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.672	.182		14.650	.000
	Risk management is considered important in achieving the organization's objectives	.329	.045	.350	7.350	.000
a. Dependent Variable: Employees have an understanding of the organization's risk environment						

H2: There is a positive relationship between enterprise risk management (ERM) and risk performance in the UAE electricity distribution system, based on the case of TAQA

The second regression analysis focused on the measurement of the relationship between enterprise risk management and risk performance in the organization. Enterprise risk management is deemed critical in leading to the transformation of an organization's risk management. Its implementation is always expected to take the whole process of risk management to a new level in the organization especially in terms of handling emerging

risks. From the Table 4.6 below, regression analysis findings showed that the p-value is 0.000 ($\beta = .225$, $p < 0.05$). The p-value of 0.000, is less than the significant value of 0.05 meaning that H2 is supported. The findings point to the fact that as enterprise risk management is applied in the organization, the level of risk performance positively increased by 0.225.

Table 4.6: Regression 2: Enterprise Risk Management (ERM) and Risk Performance

Variables Entered/Removed ^a				
Model	Variables Entered	Variables Removed	Method	
1	Enterprise Risk Management		Enter	
a. Dependent Variable: Risk Performance				
b. All requested variables entered.				
Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.225 ^a	.051	.048	.819
a. Predictors: (Constant), Risk assessments are conducted frequently in the organization				

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13.854	1	13.854	20.677	.000 ^b
	Residual	259.981	388	.670		
	Total	273.836	389			
a. Dependent Variable: Employees have an understanding of the organization's risk environment						
b. Predictors: (Constant), Risk assessments are conducted frequently in the organization						

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.394	.135		25.070	.000
	Risk assessments are conducted frequently in the organization	.164	.036	.225	4.547	.000
a. Dependent Variable: Employees have an understanding of the organization's risk environment						

H3: There is a positive relationship between the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA

The third regression analysis focused on the measurement of risk management culture and risk performance in the organization. The organization's culture of understanding and prioritizing risks is critical in ensuring that they are managed effectively,

as they arise. The management needs to show a good approach that underscores the overall culture of the organization in terms of risk management. From the table 4.7 below, regression analysis findings showed that is 0.000 ($\beta = .321$, $p < 0.05$). The p-value of 0.000, is less than the significant value of 0.05 meaning that H3 is supported. In line with these findings, it can be concluded that when the risk management culture is set up and implemented in the organization, risk performance in the organization positively increases by .321.

Table 4.7: Regression 3: Risk Management Culture and Risk Performance

Variables Entered/Removed ^a					
Model	Variables Entered	Variables Removed	Method		
1	Risk Management Culture		Enter		
a. Dependent Variable: Risk Performance					
b. All requested variables entered.					
Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.321 ^a	.103	.101	.796	
a. Predictors: (Constant), The management 'walks the talk' on risk management					
ANOVA ^a					
Model	Sum of Squares	Df	Mean Square	F	Sig.

1	Regression	28.163	1	28.163	44.479	.000 ^b
	Residual	245.673	388	.633		
	Total	273.836	389			

a. Dependent Variable: Employees have an understanding of the organization's risk environment

b. Predictors: (Constant), The management 'walks the talk' on risk management

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.980	.155		19.210	.000
	The management 'walks the talk' on risk management	.269	.040	.321	6.669	.000

a. Dependent Variable: Employees have an understanding of the organization's risk environment

H4: Adopting risk management recommendations positively improves the optimization of risk management leading to more effectiveness

The fourth regression analysis focused on the relationship between the adoption of recommendations for risk optimization and the performance of the organization in regard to risk management. Having in place measures to facilitate better performance in terms of managing the risk plays a vital role in mitigating adverse effects associated with the occurrence of the risk. From the findings in Table 4.8, the p-value of the analysis is 0.000 ($\beta=.646$, $p<0.05$). This value is less than the significant value of 0.05. In this case, the

meaning is that H4 is supported. It could be concluded that the adoption of risk management recommendations helps with risk optimization and contributes positively to risk performance by 0.646.

Based on the open-ended question, one of the notable themes that emerged in regard to improving risk optimization is the need to put in place enterprise risk management. In this case, the organization is expected to effectively plan, direct, and control activities in the organization with the view of reducing the negative consequences related to the occurrence of risk in the organization. Another theme that emerged in terms of risk optimization recommendations was that organizations should focus to leverage the power of technology. Technology is a powerful tool that would ensure risks are easily identified, prioritized, and managed appropriately in the organization. The third theme in regard to recommendations for risk optimization is that organizations should work on the identification of circumstances for the occurrence of risks. These circumstances will help in risk anticipation, as well as sealing potential loopholes for increased risks in the organization. The last recommendation is that organizations must develop a risk management culture. A risk management culture ensures that there is consistency and positivity towards anticipating and managing risks in the organization.

Table 4.8: Regression 4: Risk Optimization and Risk Performance

Variables Entered/Removed ^a						
Model	Variables Entered	Variables Removed	Method			
1	Risk Optimization		Enter			
a. Dependent Variable: Risk Performance						
b. All requested variables entered.						
Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.646 ^a	.417	.416	.641		
a. Predictors: (Constant), Risk management accountabilities are included in an employees' performance objectives						
ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.193	1	114.193	277.539	.000 ^b
	Residual	159.642	388	.411		
	Total	273.836	389			
a. Dependent Variable: Employees have an understanding of the organization's risk environment						
b. Predictors: (Constant), Risk management accountabilities are included in an employees' performance objectives						

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.469	.154		9.534	.000
	Risk management accountabilities are included in an employees' performance objectives	.619	.037	.646	16.660	.000

a. Dependent Variable: Employees have an understanding of the organization's risk environment

4.4 Discussion

The key findings of the study were related to the analysis of the quality of the risk management documentation applied at the TAQA and the assessment of the basic principles of the risk management processes organization in the energy distribution system of the UAE. The main principles of effective organization of the risk management processes at TAQA as one of the leading players in the energy distribution sector of the UAE are summarized and compared to the existing literature. The discussions emerging from the analysis of the data in the results section above, are used to answer each of the research questions that were developed. The research questions are explored in light of the findings, and this is linked to existing literature.

RQ1: What is the relationship between risk management methods and the risk performance of TAQA in the electricity distribution system in the UAE?

As per Table 4.5 above, it was established that there is a positive and significant relationship between risk management methods and risk management performance in the organization. The relationship between risk management and risk performance has been explored by multiple researchers and publications, with the results being useful in the investigation of the risk performance of TAQA in the electricity distribution system in the UAE. The bulk of the research points to there being a positive relationship between risk management and risk performance. To understand this relationship, it is important to outline the meanings of risk performance and risk management. According to Day et al. (2024), risk performance is the extent to which an organization achieves its objectives of performance while simultaneously addressing uncertainties in its environment. The measurement of risk performance can help improve decision-making, optimize resources and enhance levels of stakeholder confidence. Risk performance is measured after the definition of risk appetite, the alignment of risk metrics with overall objectives and the eventual collection and analysis of risk data (Day et al., 2024). The relationship between risk management and these various aspects and steps of risk performance measures have been found to be positive. For instance, Bourne and Mura (2018) note that performance and risk management are seen by many as two sides of the same coin. Risk performance measurement and management are both perceived as the best approaches to steer companies towards profitability and sustainable performance. Risk management, on the other hand, is seen as a way of avoiding the pitfalls that might eventually put an enterprise out of business (Bourne and Mura, 2018). Ultimately, they both focus on the avoidance of risk within a business and the fostering of successful outcomes in an uncertain business environment.

Mayer et al. (2019) also point to a multidirectional relationship between the two, alluding to the two sides of the same coin analogy that has been mentioned by Bourne and Mura (2018). According to Mayer et al. (2019), when risk management systems implemented by a company function properly, there is always an opportunity to realize successful outcomes in the process of risk management. Ghazieh and Chebana (2021) in their assessment of risk management mainly focused on the financial sector and the aftermath of the recession in 2008. Based on the study by Ghazieh and Chebana (2021), the agreement is that companies experience an improvement in their risk performance in cases where they develop stronger risk management tools. For instance, in a survey of up to 711 companies operating in the Austrian financial sector, Ghazieh and Chebana (2021) found that there was a correlation between such risk management practices as the formation of a risk and remuneration committees and the risk performance of the organization in general. Issues like information asymmetry, which result in poor risk performance, had a reduced effect for the company in general when there were risk management initiatives in place.

Risk management being a positive for risk performance is also highlighted by Hillary et al. (2023) when looking at the impact of risk management on the risk performance of the banking sector. The banking sector is one of the riskiest sectors, given that it is constantly affected by different market conditions and the associated changes. Hillary et al. (2023) explain that there are three types of risk that would likely be considered in such a scenario. These include preventable risk, external risks and strategic risks. Preventable risks are internal risks that the company can eliminate cost-effectively, typically using internal audits and methods that are rule-based. External risks are typically not preventable, and the focus is to reduce their impact on the outcomes of the company. Some of the techniques hen

managing these risks include reduction of impact through lobbying, the transfer of risks to insurance and the development of business continuity plans (Hillary et al., 2023). The strategy risks are those that are taken consciously with the aim of improving the firm performance. The risky nature of these risks depends on the eventual consideration and thought about risk within the ranks of the firm. Karami et al. (2020) further explain the importance of risk management on firm risk performance, with the focus this time being in the oil and gas sector. Like Hillary et al. (2023); Karami et al. (2020) also note that the firm risk performance is stronger when the firm engages in risk management practices. Ultimately, risk management improves the performance of the company in risky situations. However, there are several notable reservations which make further investigations into the link between risk management and risk performance important, especially when it comes to such situations as the TAQA electricity distribution system in the UAE. Hillary et al. (2023), for instance, note that the relationship between risk performance and risk management in some instances is still relatively limited given the difficulty in explaining the relationship between management and risk performance in some settings.

There has been a stronger understanding of the link between risk management and risk performance in the UAE when it comes to electricity distribution. Since the pandemic, there has been a growing realization of the need for risk management in electricity distribution. Al Marzooqi (2020) note that the electricity distribution system faces significant risks in the form of economic, regulatory, environmental, vulnerability, quality and reputational risks. They, however, found that there has been some investment in risk management focusing on real-time, mid-term and long-term circumstances (Al Marzooqi, 2020). In a news report, Bungane (2020) note that there has been significant investment in

risk management in the energy distribution in the UAE. This report focuses on Dubai and the actions of the Dubai Electricity and Water Authority (DEWA). The authority launched the first enterprise risk and resilience management system for utilities in collaboration with the EDF from France, the RWE from Germany and the National Grid from the UK (Bungane, 2020). This points to a growing recognition of the relationship between risk management and risk performance in the electricity distribution sector, particularly in the context of TAQA and the UAE.

RQ2: What is the impact of enterprise risk management (ERM) on risk performance in the UAE electricity distribution system, based on the case of TAQA?

In line with Table 4.7, ERM was established to have a positive and significant impact on risk performance in the organization. Enterprise risk management has emerged as an important part of the operations of modern-day businesses. Enterprise risk management goes further than the traditional risk management in two important ways. First, it integrates itself in many types of risks in an organizational setting. Secondly, the range of tools and techniques that are used in the identification and management of these risks is wide-ranging (Anton and Nucu, 2020). Finally, the scope of the risk management is wider, and focuses on the larger enterprise, looking beyond what the traditional risk management would cover multiple business lines and business levels. Anton and Nucu (2020) describe it as a paradigm that supports organizations in their efforts to identify, evaluate and manage risks at enterprise level, essentially enabling them to develop a competitive advantage in the process. On paper, the main focus of enterprise risk management (ERM) is to ensure that organizations are equipped with the knowledge and wherewithal to be able to deal with risks in a way that

provides them with superior performance and a competitive advantage. The relationship between ERM and risk performance is therefore an important line of research.

The link between ERM and risk performance has generally been regarded as positive. Saeidi et al. (2020) note that ERM has been found to have a positive correlation with risk performance outcomes in an organizational setting. Through the agency theory, the implementation of ERM has been found to increase risk performance in many organizational domains (Saeidi et al., 2021). The rationale is that ERM makes use of a constant tactical process or method in the management of risks and in so doing, enables the management of all the risks that meet a company. This then leads to the reduction of the total risk failure that the company faces, which is one of the major objectives of risk performance as outlined by Day et al. (2024). In exploring the relationship between ERM and risk performance in Spanish listed organizations, González et al. (2020) also highlight the all-inclusive nature of ERM as an advantage in this regard. They note that traditional risk management has always looked at risks in silos, given that companies have always organized their activities into smaller, exclusive functional groups to improve the chances of success and enable better and more specialized decision-making. ERM was the corporate world's response to the deficiencies of silo-based approach to risk management, offering a way to holistically manage risk in an entire enterprise or portfolio (González et al., 2020). However, are relatively few studies that look into the relationship between ERM and risk performance directly. Instead, many studies use proxies of ERM and risk performance in outlining the relationship between the two. These studies have, however, resulted in mixed results when it comes to the relationship between ERM and risk performance.

From a theoretical perspective, the implementation of ERM has been found to have a positive correlation with risk management, with multiple reasons outlined by González et al. (2020). First, ERM enables a holistic view of risk and risk management, which then enables companies to be able to absorb a higher level of risk, leverage their diversification and reduce the inefficiencies that would otherwise have resulted from the dispersion of risks in situations where the risk is managed in silos. There are many examples of how this happens with ERM. González et al. (2020) note that it improves internal communication levels and improves the understanding of risk at an aggregate level. Furthermore, it helps companies understand their risk appetite. When integrated into the company strategy, this not only improves the risk performance when faced with the strategic risks outlined by Hillary et al. (2023) but also improves the management of unavoidable external risks and the preventable risks.

In terms of investments and strategic direction, ERM has been found to improve risk performance by reducing the costs of hedging risks. ERM reduces the costs associated with individual risk treatment, enabling a natural hedging process between the various risk activities. The idea here is that the risk of an aggregate portfolio is often less than the sum of the individual risks associated with. However, González et al. (2020) also point out that while the bulk of papers point to a positive correlation between ERM and risk performance, many have also pointed to the fact that there might either be a negative correlation or a negligible link between the two. However, it is important to note that where a relationship cannot be found, it does not necessarily mean that engagement in ERM is disadvantageous, or that companies should not engage in ERM. Instead, the focus should be on longer studies to enhance the quality of outcomes. Furthermore, it is important to note that the link between

ERM and risk performance is not necessarily direct and can be mediated by various elements including environmental uncertainty, the levels of industrial competition, the size of the company, the levels of complexity of the company operations and the levels of oversight that are conducted by the board of directors. Furthermore, the definitions of ERM vary from one study to the next. For instance, the mere presence of a chief risk officer (CRO) does not necessarily imply that there is a focus on enterprise risk management in the company ranks. Generally, there is no specific guideline to define ERM, despite the growth in popularity. There are no specific parameters that might be used to measure it and many researchers often end up relying on different definitions and proxies (Horvey and Odei-Mensah, 2023). This results in a high risk of results likely being inconsistent with one another.

Within the context of this research, there is not much in the way of research into the relationship between ERM and risk performance in the specific area of electricity distribution based on the case of TAQA. This is especially important given the fact that electricity distribution offers important risks, including policy and management-related risks, the risks associated with silos with management of electricity distribution in the various emirates with their unique challenges, and environmental and social issues that have emerged over the past few years, especially given the events of the COVID-19 pandemic and the recent environmental disasters and events. Still, there are many different instances where ERM has been found to be useful in risk performance in adjacent or comparable industries. For instance, Aljnebi et al. (2022) describe the relationship between ERM and risk performance within the Abu Dhabi National Oil Company (ADNOC) in the UEA. The research focused on the relationship between ERM and employee performance in the company, offering useful results in establishing a theoretical positive relationship between

ERM and risk performance in industrial settings in the UAE (Aljneibi et al., 2022). Such research can and should be expanded to enable the leveraging of results.

RQ3: What is the impact of the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA?

In line with the regression analysis in Table 4.7, risk culture is critical for the success of risk management in the organization. Culture in general, and risk management culture in particular, play an important role in risk performance outcomes. . Kumar and Anbanandam (2020) have looked into the impact of risk management culture on risk performance, within the UAE in ways that would relate to the TAQA example, and outside. Theoretically, the link between risk management culture and risk performance has been established through research into different paradigms of research. This is especially given how much riskier the modern business environment has become. Kumar and Anbanandam (2020) explicated the effects of risk management culture on risk performance in the supply chain, investigating the effects of culture on supply chain resilience. The rationale is that supply chain disruptions are becoming more common, in terms of frequency, severity and the scope. Disruptions in the recent supply chain and the associated costs emphasized the need for resiliency in these supply chains, which would be an important outcome factor when it comes to risk performance. The research found that organizations can improve their risk performance, in this case presented as a proxy through supply chain resilience, by improving their risk management culture. The risk management culture improves the levels of risk awareness among the employees, and improves the levels of familiarity through the conduction of periodic risk assessment practices (Kumar and Anbanandam, 2020). This theoretical relationship is further reinforced by the research done by Al Marzooqi (2020), which is

especially useful for this research topic given that it focuses on risk management cultures within the electricity distribution systems in the UAE. The UAE electricity distribution sector is placed under the energy sector, and is rated as one of the fastest growing markets in the world. The energy distribution has been a key part of the rapid social and economic growth of the UAE (Al Marzooqi, 2020). However, recent changes in the nature of the electricity distribution sectors across the world, including the UAE, have resulted in the sector evolving from being a highly protected industry to one that is subject to many basic efficiency requirements. This exposes the sector to a wide range of risks, which fall under the three categories of risk outlined by Hillary et al. (2023), preventable, external and strategic risks. According to Al Marzooqi (2020), a risk management culture that focuses in techniques that are simplified, model-based and standard, will tend to improve the risk performance metrics in the electricity distribution sector in the UAE. This relates to the study by Kumar and Anbanandam (2020), who noted that a model-based approach to the development of a risk management culture, one that is supported by technological advancements, can easily lead to improvements in risk performance.

The relationship between risk performance and risk management culture has also been discussed by Bockius and Gatzert (2023). According to Bockius and Gatzert (2023), the risk culture that an organization displays plays an important mitigating role in the management of major business threats, including the management of business scandals and the reduction of the likelihood of insolvency. The importance of risk management culture on risk performance outcomes is so important that regulators have ended up placing requirements on firms to develop a risk management culture in a bid to improve their

consideration of risks (Bockius and Gatzert, 2023). Ultimately, the relationship between a risk management culture and risk performance in literature is generally a positive one.

RQ4: What practical recommendations could be adopted for the optimization of the quality and effectiveness of risk management methods to improve risk performance of the UAE electricity distribution system in organizations such as TAQA?

As per Table 4.8, using practical recommendations plays a critical role in risk optimization and efficiency in organizations. From the research, there are several possible recommendations that would be useful for the improvement of risk performance in the UAE electricity distribution. The first recommendation would be to embrace the benefits of enterprise risk management. Generally, corporate management divided operations into business units. This has traditionally been useful in enabling management of smaller units and improving the chances of specialized knowledge being used successfully for the company. However, this also raises important issues with regard to risk management, where risk silos exist that prevent the company from not only understanding the nature and scope of the risks they face, but also reduces the chances of the company leveraging the power of the collective understanding of risk. For the UAE electricity distribution system, this means that risks in one operational side of the organization would not be well-understood by another. This is especially important given the idea that the aggregate portfolio of risks is often less than the sum of the individual risks associated with operations in the company (González et al., 2020). To avoid this, it is important to focus on enterprise risk management. ERM, for the UAE electricity distribution system enables the understanding and visualization of individual risks, understanding how these risks correlate with each other, and eventually noting how the overall risk landscape of the organization is affected by the

interaction between these individual risks. This goes beyond the traditional risk management to a more robust and inclusive risk management.

The second recommendation would be the development of a risk management culture. Risk management, especially given the risky modern-day business environment, has become more complex than ever. It is not enough to simply have a top-down approach to risk-management given how fast things evolve, and how detrimental a failure to understand and react to risks as quickly as possible is. Risk management must start from the very bottom and has to be part of the organization's operations and cultures. This calls for the development of a strong risk management culture that is espoused in the implementation of the mission and vision of the organization. An organizational risk management culture enables the optimization of the quality and effectiveness of risk management methods to improve risk performance in the UAE. Furthermore, risk management culture improves the awareness among employees of risks and how they affect the organization in general, improving resilience and eventually benefitting the company's risk performance (Kumar and Anbanandam, 2020). Companies might improve their risk management culture by leveraging the power of technology to enable the visibility and communication of risks, their impact and the various steps that might be used to improve risk performance outcomes.

The third recommendation is to be able to understand the circumstances in which risks happen. There are several categories of risks as highlighted by Hillary et al., (2023), including preventable, external and strategic risks. The implication here is that despite the general business and operational environment being riskier, different organizations face different risks. It is important to understand the risk landscape and how it is likely to change going forward given policy changes and other issues such as social, economic and

environmental issues. For electricity distribution in the UAE, risk management should involve the understanding of such elements of risk as environmental risks, which are external and difficult to control, and on account of such trends as the climate change, are now more different than ever. Other risks include those associated with policy issues adopted by the country and the region, including the recent push towards reduced reliance on oil and gas. With energy distribution organizations now moving from organizations that are protected by the state to ones that operate on the free market, new risk categories emerge, including those associated with the changes in demographics and the plans the UAE has in the future. The management of risk for the UAE's electricity distribution calls for an understanding of the risks that the organization will likely face, and the scope of changes that might occur going into the future.

The final recommendation would be to leverage the power of technology in the understanding and the management of risk. Technology has become an incredibly important tool in the management of risk. The modern fast-paced and interconnected world means organizations face a wide range of risks that can affect the performance and outcomes. Improving risk performance outcomes calls for the use of technology as a risk-management tool. This is especially important given how technology has increasingly been integrated in management and operations, and the extent to which technology itself has become a source of risk. Potential areas where technology might be used include data-driven risk assessment, where analytics, machine learning and artificial intelligence can easily be used to analyze vast amounts of information and provide insights that might be useful in risk management. Technology can also be useful in improving the levels of cyber security and real-time

monitoring. It also improves the speed and efficiency of risk communication, enabling proper monitoring.

4.5 Discussion on the Risk Management Approach in the Company

The discussion of the risk management approach of the company was done using content analysis of the sources and the themes below emerged;

4.5.1 Organizational Development Strategy

The discussion of the risk management documentation of the TAQA started with the analysis of the strategic development plans published by the organization. In the context of risk management processes analysis, it is sensible to consider strategic development priorities of the organization to understand whether the optimization of risk management procedures plays a specific role in this context. The first important document assessed in this context was the TAQA 2014–2018 Strategic Plan. This official document declared the importance of the development and implementation of the risk management framework in the organization until the end of 2015 (TAQA, 2014, p.28). No reports or other official releases could be found for description of the risk management strategy at TAQA for earlier periods. In addition, the presented strategy aimed to provide a new approach for the management of asset-caused risks for the organization.

Similar initiatives and ideas were declared in another publication made during this period - Five Year Planning Statement 2015–2019 (TAQA, 2014 b). As a part of the strategic initiative oriented on the improvement of asset management quality in the organization, the senior management focused on the creation of the risk management policy, which would be

estimated in the following subsections of this chapter. It is also sensible to consider the documents concerning the strategic development priorities of the organization from the point of definition of the key sources and categories of risks that were identified in the context of the future development strategy. From this perspective, the Supply and Demand Strategy of the TAQA (2018 b) highlighted the specific role of the following categories of risks that could be faced by the organization: asset failure risk, demand risk, delivery risk, and supply dependency risks. Taken together, the management demonstrated that the organization operates in of a highly unpredictable environment.

Specific attention should also be devoted to the discussion of the role of strategic initiatives of the TAQA for the engagement of stakeholders in the sphere of risk management. A key source of information in this aspect is the Stakeholders Management Strategy document (TAQA, 2018 a). Sustainability initiatives that were proposed with the active support of all engaged stakeholders included the development of the technical risk management framework at the TAQA (2018 a). From this perspective, the management of the organization demonstrated readiness and motivation to engage a wide range of internal and external stakeholders in the process of the risk management procedures optimization. The company management provided information about the potential stakeholders that might contribute to the realization of this objective.

The management of the TAQA also directed specific attention to the opportunities of the benchmark analysis instrument application for the improvement of risk management processes inside the company. The intention to use benchmark analysis outcomes for the optimization of the internal risk management processes was declared officially in the TAQA benchmarking strategy document (TAQA, 2018 c). Taken together, different aspects of the

company's strategy integrated separate aspects of risk management practices. It is important to understand whether specific initiatives were effectively integrated into a single system of risk management.

4.5.2 Risk Management Strategy

To address the question about the logic of risk management processes development at the TAQA, it is important to rely on the basic documents delivered by the company's management in this sphere. In particular, the following publications should be considered: Risk Management Strategy (2014 c), Risk Management Policy, and Risk Management Guideline (2003). In addition, a set of regulatory documents was issued to provide guidelines for the organization of the risk management procedures in the company. It was important to consider the basic documents that regulate the field of risk management in the organization before analyzing concrete regulatory tools.

The risk management strategy, risk management policy, and related guidelines should be considered together to form a complete picture of the risk management procedures and instruments for the target organization. The first document issued among the mentioned regulatory acts was the Risk Management Guidelines document. It is sensible to analyze its key provisions and compare them with the principles presented in the documents that were issued in later periods. Finally, a basis for the development of risk acceptance criteria in the target organization was presented. Risk acceptance parameter for this document was grounded on the concept of cost-benefit balance achievement (ADWEA, 2003). From this perspective, at the beginning of the twenty-first century, the management of the TAQA was mainly oriented on the regulation of the risk management processes with the aim to guarantee

optimal cost-benefit outcomes for the organization. It is difficult to state whether the management considered only short-term benefits and costs of the specific decision about risk management or also long-term implications of the proposed solutions.

The following basic document that should be assessed in the analysis section of the study is the Risk Management Strategy of the organization. It was assessed based on the key principles of effective risk management stated in the previous sections of the thesis. A similar set of basic functions of the risk management process was fixed in the Risk Management Strategy of the TAQA published in 2014. The document summarized the methods that could be applied to address all the stated functions of the risk management process. Similarly, the recommendations of this document supported an idea about the significant role of stakeholders for risk management at the TAQA. It was stated that the management and employees of the TAQA should cooperate with the external partners in the sphere of risk management (TAQA, 2014 c). Unfortunately, the cooperation between the author and the management of the TAQA did not allow reaching earlier versions of the risk management documentation for the organization. That is why it is impossible to compare the relevant risk management priorities fixed in documents with earlier conceptual schemes of risk management vision in the organization. In addition, the key categories of risks together with the means of risk category identification in real-life conditions were considered.

Specific attention should also be paid to the discussion of the risk management framework and the distribution of roles in the risk management team, which were identified in the Risk Management Strategy document. According to the information presented in this document, the following categories of actors engaged in the realization of risk management processes were identified: board of directors, senior management, functional departments,

advisory groups, and all employees of the company (TAQA, 2014 c). Such format of identification of the engaged parties lacked the discussion of the role of the project manager as a party engaged in specific risk management procedures. The risk management process was also considered in the context of this document, demonstrating general compliance with the key principles of effective risk management, which were identified earlier in the literature review.

The discussion of the general principles of risk management applied at the TAQA based on the relevant documents provided by the management of the organization demonstrated quite sufficient results in the sphere of successful organization of risk management procedures in the organization. From the point of the earlier stated criteria of risk management practices assessment, which was defined based on the literature review outcomes, it was found that the management of the TAQA achieved sufficient results in the terms of the effective management of the key categories of risks.

However, some questions., such as the issues of the documentation structure and risk management methods, remained unaddressed. As for the general set of risk management methods applied in the organization, the Risk Management Strategy of the organization delivered solely a basic description of such methods, without providing a detailed description of specific tools and approaches that could be applied by the responsible actors to reach success in this sphere. Such limitations should be addressed in the future to guarantee a better understanding of the required risk management practices that should be implemented by each stakeholder inside or outside the organization.

4.5.3 Risk Management Documentation

The final aspect addressed in the context of the study of the research questions was related to the analysis of the general structure of the risk management documents present in the target organization. It was important to analyze the full scope of documents existing in the organization and compare them with the optimal list of risk management documentation defined during the literature review. It included the following documents: risk appetite statement, risk management framework, risk materiality, risk register, risk taxonomy, risk charters and mandates, risk management policy and procedures, methodologies, risk escalation process, risk metrics, risk communications, and risk training courses (Thackeray, 2018). This study had to rely on the most relevant and valid risk management documentation, while older versions of the risk management documents were not available – the organizational management did not share them with the scholar. The collection of fully reliable and relevant data from the management of the TAQA led to the formation of the following list of documents: Incident Reporting Procedures, Assets Risk Management Procedure, Integrated Management System Manual, Power System Emergency Management and Response Plan, Emergency Management Procedure, and Emergency Media Communications Response Plan.

The analysis and comparison of the stated elements of risk management documentation at the TAQA demonstrated that the organization lacks a clear risk appetite statement, risk register, and risk training courses. All other aspects of risk management documentation are adequately represented in the structure of the risk management procedures of the company. Nevertheless, neglect of these specific aspects could lead to severe negative outcomes for

the organization in the future. Therefore, it is important to address them to guarantee the sustainable operations of the company in the future.

4.6 Implications of Findings

The importance of the study findings is explained by their theoretical and practical significance for the potential improvement of the risk management processes in the energy distribution sector of the UAE. Analysis of the performance of the TAQA based quantitative survey analysis led to the full description and understanding of the current situation in the organization. The participation of the company's employees and management team in the survey allowed the researcher to collect different opinions on study questions and problems, leading to objective outcomes of the study.

In the context of the theoretical importance of the study findings, it summarized the results of the previous studies to define the key characteristics of the effective risk management process. The complex definition of risk as a social phenomenon taking place in a business environment was provided. The discussion of the main categories of risk management processes and methods demonstrates useful knowledge that could be applied in the UAE business organizations in the future. Additionally, the key requirements to the organization of the risk management documentation in modern business organizations were summarized as a useful basis for the improvement of this aspect of risk management procedures in the UAE business in the future.

The practical importance of the study findings was related to the careful study of the present situation in the sphere of risk management in the energy distribution sector of the UAE. The performance of the TAQA as one of the leading players in this sector was

assessed. In addition, the role of the specific elements of the risk management process that were considered as the key parameters in the context of regression analysis of quantitative data was defined. Based on the findings of the study, it was possible to obtain specific practical insights and put forward recommendations for the management of the TAQA and other organizations facing similar conditions in the UAE and other countries.

4.7 Summary

The key findings of the presented study reflect the relationship between the variables that were investigated in this study. It was found that having a risk culture in the organization plays a critical role in ensuring better performance of the organization in terms of risk management. More so, risk management methods are helpful in improving risk performance in the organization. The findings also indicated that the adoption of recommendations for risk optimization is vital in improving the organization's risk performance. It is fundamental that the risk management process is adaptive and responsive to emerging risks in the industry.

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CHAPTER 5

CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

5.1 Introduction

The final chapter of the thesis is aimed to summarize the ideas and arguments stated in the thesis. In this chapter, there are notable aspects that include the discussion of if the objectives of the study were achieved and how. More so, the chapter entails the presentation of a summary of the hypotheses and if they were supported or rejected in the study. Other critical components of the chapter are the contribution of the study in regard to the energy industry, the field, as well as contribution of the literature. There are also limitations of the study and recommendations for future research.

The main findings of the study included the analysis of the theoretical question about the risk management processes in business and the assessment of the practical problem of effective risk management processes in the energy distribution sector of the UAE. The presented result of the study was achieved by means of analysis of the risk management processes taking place at the TAQA. The results of the literature review contributed to a deeper understanding and consolidation of the previously existing knowledge in the field of risk and risk management. The role of risk management as a method of opportunities realization rather than loss prevention was justified. The key sources of risk for business, the methods of its prevention, and risk management process were discussed in the study.

The practical implications of the study were related to the definition of useful recommendations that could be applied in the energy distribution sector to comply with the

challenges of the risk management processes organization. In the conditions of the TAQA, specific limitations of the risk management process organization were defined, and reliable solutions were proposed. In addition, the key factors impacting the development of the risk management practice in any type of business organization were summarized based on the case of the TAQA.

5.2 Attainment of Study Objectives

In this study, there were four objectives and each of them was achieved. An explanation of how each of the objectives was achieved is summarized as follows:

Objective 1: To evaluate the relationship between risk management methods and the risk performance of TAQA in the electricity distribution system in the UAE.

In regard to this objective, the focus was to evaluate relationship between the research management methods and the risk performance at TAQA in the electricity distribution system. The objective was fulfilled, as the findings, through regression analysis revealed that risk management methods are significantly related to risk performance in electricity distribution companies such as TAQA. It was particularly found that, as the organization undertakes steps to promote risk management in the course of its electricity distribution, it experiences an increase in risk performance.

Objective 2: To investigate the impact of ERM on risk performance in the UAE electricity distribution system, based on the case of TAQA.

On this objective, it was necessary to investigate the manner in which ERM impacts risk performance in the UAE electricity distribution system and particularly TAQA. Through

regression analysis, it was found that there is a significant relationship between ERM presence and the performance of the risk management function in the organization. This objective was fully achieved based on the result of the regression analysis. In line with the attainment of this objective, it could be concluded that ERM is at the center of the organization in the electricity distribution sector, especially when it comes to effective risk management in the organization.

Objective 3: To examine the impact of the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA.

In line with this objective, the focus was to establish the relationship between risk management culture in the organization and risk performance. This objective was fully met in the study when the findings indicated that there is a significant relationship between the risk management culture and risk performance in the organization. The organization, in this case, TAQA, has been focused on consistently identifying risks and managing the risks as required. It can be concluded that the attainment of a risk culture safeguards the company against adverse effects that arise from the risks along the electricity distribution networks.

Objective 4: To provide practical recommendations for the optimization of the quality and effectiveness of risk management methods to improve risk performance of the UAE electricity distribution system in organizations such as TAQA.

Objective 4 was also fully attained in this study. The attainment of the objective is underscored by the results of the regression analysis which showed a significant relationship between risk optimization recommendations and risk performance in the organization.

Organizations, such as TAQA are expected to be aware of the required strategies to perform at the highest level possible. In this case, several recommendations were provided that include; the need to adhere to a risk management culture, the adoption and implementation of enterprise risk management, incorporation of technology in risk management, as well as the identification of the circumstances surrounding the risks in the organization.

5.3 Summary on Hypotheses

In the Table 5.1 below, there is a summary of the hypotheses and whether they were supported or rejected.

Table 5.1: Hypothesis Supported/Rejected

Hypothesis	Supported/Rejected
H1: There is a positive relationship between risk management methods and risk performance at TAQA in the electricity distribution system of the UAE	Supported
H2: There is a positive relationship between enterprise risk management (ERM) and risk performance in the UAE electricity distribution system, based on the case of TAQA	Supported
H3: There is a positive relationship between the existing risk management culture on risk performance in the electricity distribution system in the UAE, based on the example of TAQA	Supported
H4: Adopting risk management recommendations positively improves the optimization of risk management leading to more effectiveness	Supported

In summary, as per the table above, all the four hypotheses in the study were supported. The reason is that the p-values of the regression analyses for all the hypotheses were 0.000, which is less than the significance value of 0.05. The implication in this case is that there is a significant relationship between the independent variables and the dependent variable.

5.4 Contribution towards the UAE Energy Industry

The contribution of the study towards the industry is mainly associated with the clear image of factors that could contribute to the effective realization of the risk management process inside modern organizations, including the TAQA. In addition, the discussion of the current situation at the TAQA led to the definition of reliable solutions that should be implemented currently to help the organization improve the quality of risk management procedures. At the current stage, management of TAQA should pay attention to the development of the risk management documentation: risk appetite statement, risk register, and risk training courses and materials. While risk appetite statement was too general by contents, the specific training procedures were not properly described.

In the aspect of key risk management factors, the study results highlighted the following parameters: the level of leadership experience and level of its interest in high-quality risk management, decision-making dependency on the mission and objectives of the company, decision-making flexibility, the existing culture of risk management, and the complexity of procedural requirements. Each of these aspects should be targeted, and the management of TAQA should not stop at the current progress level.

Similar recommendations could be applied to other organizations working in the industry and dealing with similar challenges. The results of the literature review also contributed to the definition of the set of criteria that could be applied to guarantee adequate assessment of the quality of risk management procedures applied in the specific organization. The management of any type of company could apply these recommendations to perform an audit of their risk management practices.

5.5 Contribution towards Policy Makers of the UAE

From the point of the contribution of the study outcomes towards policymakers, it is important to mention specific findings in the sphere of risk management documentation. The results of the literature review defined a specific list of risk management documents that should contribute to the effective organization of the risk management processes in modern business. Policymakers are interested in the development of risk management practices and standards among domestic and foreign businesses entering the market, to minimize the potential losses and public dissatisfaction.

From this perspective, it is sensible to consider opportunities for the development of strict regulatory requirements for businesses based on the list of required risk management documents. The same rules of risk management documentation organization should support companies that lack experience in this sphere and enable them to develop risk management procedures that will bring indirect benefits to the business. Policymakers should control the performance of TAQA and similar companies to guarantee their compliance with the best risk management practices.

5.6 Contribution Towards a Knowledge

Specific contributions of the study outcomes towards different spheres of human activity should be presented. First, contribution towards knowledge must be summarized. In this respect, the outcomes of the study led to a better understanding of the phenomena of risk and the risk management process. The author of the thesis summarized the findings of the previous studies to demonstrate the complex nature of risk, which could be considered not only as a source of losses for individuals or organizations but also as a source of opportunities and benefits. In such interpretation, the role of risk management could be considered as a search of solutions for the maximization of benefits for business.

Moreover, specific findings on the risk management phenomenon were provided. The key methods of risk management were summarized based on the prior studies, and the risk management process was described from the points of interpretations. Furthermore, the role of different factors in the effective risk management process was considered, both in the literature review and quantitative data collection and analysis. The findings of the study could extend the existing knowledge of the aspects of risk management practice.

5.7 Limitations of the Present Study

Limitations of the present study were mainly related to the sample bias and the subjectivity bias of the researcher and the management of the TAQA. Sample bias could be caused by the imbalanced characteristics of the study sample, which was demonstrated in the section about frequency analysis outcomes. For example, the final study sample included a considerably higher share of male respondents compared to female ones. Such a situation could be an objective representation of the existing gender policies in the energy distribution

sector of the UAE, but it could also be a result of mistakes in the organization of the data collection process. Nevertheless, the existence of certain misbalance in the survey sample caused concerns about the related limitations.

Subjectivity bias could be caused both by the impacts of the researcher and the representatives of the TAQA who delivered official risk management documents to the researcher. On the one hand, the model of qualitative data results in interpretation could be highly impacted by personal views and beliefs of the researcher, while the quantitative study is more objective and abstract. On the other hand, a high role in the context of qualitative data collection and analysis could be played by the employees of the TAQA responsible for the delivery of the required documents for the qualitative study. Even though the management of the TAQA provided a high scope of documents and materials for analysis, they might have hidden the most useful and relevant regulations in the sphere of risk management for the aims of their intellectual property collection. From this perspective, the researcher cannot find an objective argument for or against such a scenario, supposing its potential realization.

5.8 Directions for Future Study

The final aspect of the discussion chapter was the discussion of the opportunities for further study, which were identified based on the stated outcomes of the study. The results of the research formed a reliable basis for the development of practical recommendations that could be implemented by the management of the TAQA and other organizations operating in the energy distribution sector of the UAE or any other country of the world. In

addition, the findings of the study raised a high number of new questions that could serve as a basis for further study.

A set of perspective research questions could be developed based on the key criteria of successful risk management identified in the study. For example, the requirement about the effective engagement of stakeholders in the process of risk management could form a sensible question about the definition of the optimal means of engaging stakeholders in the process of risk management for different types of modern organizations. Similarly, based on the requirement for the clear identification of risk appetites for business scholars could formulate a question about the identification of the most promising methodology of risk appetite identification for the concrete organization. Other criteria of successful risk management could be transformed into similar questions for further study.

In addition, the outcomes of hypotheses analysis in the context of quantitative data analysis could also raise a set of useful research questions. For example, the finding of the high importance of the decision-making flexibility as a means of risk management outcomes improvement could motivate researchers to seek a balanced strategy of decision-making flexibility skills and competencies development among employees and the management. A balanced approach should be implemented about all the stated hypotheses of the study. Without the provision of science-based recommendations and solutions for the business, the management and employees might interpret the findings of the study improperly, leading to serious mistakes in the process of risk management.

In the context of the conclusion chapter, it is sensible to repeat an argument about the presence of a large number of research opportunities generated by the outcomes of the

presented thesis. First, the researcher made a specific contribution to the field of knowledge, and in the future, scholars could focus on the analysis of the definitions of risk, mechanisms of risk management, and optimization of this process. Second, practical findings of the study could be applied by the management of large organizations similar to the TAQA. In the conditions of the active practical application of the proposed solutions, it will be important to move from the definition of the basic parameters that could impact the effectiveness of the risk management process to the identification of the practical strategies that would allow the management to manipulate these parameters.



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APPENDICES

Appendix A

Optimization of Risk Management in the Electricity Distribution System of the UAE

Dear Participant,

My name is Ahmed Husain Abdulla Mohamed AlMarzooqi, and I am a student of University Teknikal Malaysia Melaka. I am working on the research project that is devoted to the subject of the optimization of risk management in the electricity distribution system of the United Arab Emirates. Since you are working in the industry of the electricity distribution in the UAE, I would like to invite you to participate in my research by completing the following questionnaire.

The following questionnaire will take approximately 10-15 minutes to complete. There is no compensation for completing the survey as well as there are no potential risks that you can encounter. I would like to ask you not to include your name to ensure that all data is confidential and private. The copies of your responses will be accessed by my supervisors Dr. Hyreil Anuar bin Kasdirin and Dr. Nusaibah Binti Mansor at University Teknikal Malaysia Melaka. In case you decide to take part in the questionnaire, please, respond with the maximal honesty you can grant for answering the following questions and return the completed questionnaire as soon as you have completed it. I need to place the emphasis on the fact that participation is voluntary, so you may quit the survey at any time you prefer.

Thank you very much for your attention and helping me with completing this academic research. The data collected will make a significant contribution to understanding the way how risk management practices can be optimized in the UAE's electricity distribution system. If you would like to see the summary copy of this research, do not hesitate to contact me. Completion and return of this questionnaire will confirm your consent to participate in the research. In case you have any questions, please reach by via the contact left below.

Sincerely,

The researcher

Ahmed AlMarzooqi

P081810046@student.utm.edu.my

*indicates required question

Appendix B

Survey

Part 1: Demographic Data

1. What is your gender?

- Male
- Female

2. What is your position in the organization?

- Senior Manager
- Middle-level manager
- Supervisor
- Employee



3. How many years have you worked in the organization?

- Less than 5 years

5-10 years

More than 10 years

4. My organization considers risk management important

- Yes
- No

In the subsequent sections, a Likert Scale is used to measure your level of agreement where;

1 – strongly disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree. Tick appropriately based on your level of agreement.

Part 2: Risk Management Methods

5. Risk management is considered important in achieving the organization’s objectives

1	2	3	4	5
---	---	---	---	---

6. The organization has an active program for monitoring and reporting risks

1	2	3	4	5
---	---	---	---	---

7. Communication is critical in facilitating risk management in the organization

1	2	3	4	5
---	---	---	---	---

8. The management has put in place contingency and continuity planning for risk management

1	2	3	4	5
---	---	---	---	---

9. The overall risk appetite of the company is manageable

1	2	3	4	5
---	---	---	---	---

Part 3: Enterprise Risk Management (ERM)

10. The organization has a working enterprise risk management (ERM) in place

1	2	3	4	5
---	---	---	---	---

11. Risk assessments are conducted frequently in the organization

1	2	3	4	5
---	---	---	---	---

12. ERM is an interdepartmental practice at the organization

1	2	3	4	5
---	---	---	---	---

13. Risks are prioritized differently more in the organization

1	2	3	4	5
---	---	---	---	---

14. Risk appetite is clearly defined and communicated in the organization

1	2	3	4	5
---	---	---	---	---

Part 4: Risk Management Culture

15. The management ‘walks the talk’ on risk management

1	2	3	4	5
---	---	---	---	---

16. Risk tolerance is aligned with the organization’s strategy in electricity distribution

1	2	3	4	5
---	---	---	---	---

17. Risk management is regularly considered and reflected as a core part of decision-making

1	2	3	4	5
---	---	---	---	---

18. In the organization, risk management expectations are frequently communicated

1	2	3	4	5
---	---	---	---	---

19. Risk management responsibilities of employees are clearly communicated

1	2	3	4	5
---	---	---	---	---

Part 5: Risk Optimization

20. Risk management accountabilities are included in an employees' performance objectives

1	2	3	4	5
---	---	---	---	---

21. There is a clear understanding of emerging risks in the organization

1	2	3	4	5
---	---	---	---	---

22. Risk management duties are shared across departments

1	2	3	4	5
---	---	---	---	---

23. There is regular monitoring of the organization

1	2	3	4	5
---	---	---	---	---

24. In the organization, there is a clear understanding of the need to improve risk management

1	2	3	4	5
---	---	---	---	---

Part 6: Risk Performance

25. The organization has documented all the potential risks it faces

1	2	3	4	5
---	---	---	---	---

26. Employees have an understanding of the organization's risk environment

1	2	3	4	5
---	---	---	---	---

27. Risks are immediately prioritized and managed when they emerge in the organization

1	2	3	4	5
---	---	---	---	---

28. The organization continues to invest in risk management performance

1	2	3	4	5
---	---	---	---	---

29. The level of risk tolerance has improved in the organization

1	2	3	4	5
---	---	---	---	---

Part 7: Open-ended question

In what ways can risk management be optimized in the organization to improve efficiency?