A STUDY ON THE IMPACT OF THE RELATIONSHIP BETWEEN RISK MANAGEMENT AND THE DEVELOPMENT OF CONSTRUCTION PROJECTS IN THE KINGDOM OF SAUDI ARABIA

Submitted by

Fahd Ahmad Boustani

Dissertation Submitted in Partial Fulfillment of the Requirements

For the Award of Degree of Master in Business Administration

ASIA METROPOLITAN UNIVERSITY

2021

Programme	: Master in Business Administration
Programme Leader	: Prof. Mohamed Salah Eldien M. Ali
Dissertation Topic	: A Study On The Impact Of The Relationship Between Risk Management And The Development Of Construction Projects In The Kingdom Of Saudi Arabia
Students Name	: Fahd Ahmad Boustani
Student ID	: T/MBAF-202002-00256
Date of Completion	: 15 July 2021
Number of Words	: 21442

ABSTRACT

The main objective of this research is to study the effect of the relationship between risk management and the development of construction projects in the Kingdom of Saudi Arabia. The questionnaire that was directed to the participants was developed according to the research design, methodology and data. This survey includes two main sections. The first section inquired about the organization's risk management procedure. In the second section, the survey tries to determine whether the project they went through met the success criteria, according to 7 criteria factors that were identified for the success of the construction project included in the questionnaire. The number of distributed questionnaires reached 230, and 200 respondents were retrieved, at 87.4%. The results of the present study indicate that there is an effect between both risk identification and risk assessment on the development and success of the project, the time limit, the planned budget, and the ability to comply with the technical specifications. While there is no influence between assessing risk and avoiding lawsuits or claims. The study also indicated an impact of responding to risks on the success of the project, meeting the scope of work, the time specified, and achieving quality standards.

Key words: project; Effect; Risk Management; Building projects; Success and development; Personnel perspective

DECLARATION

Asia Metropolitan University

Copyright and Declaration of Original Authorship

A STUDY ON THE IMPACT OF THE RELATIONSHIP BETWEEN RISK MANAGEMENT AND THE DEVELOPMENT OF CONSTRUCTION PROJECTS IN THE KINGDOM OF SAUDI ARABIA

Personal declaration: This thesis for the master degree is the result of independent research under the supervision of my supervisor. Any views expressed in this thesis are those of personal work, except where the thesis specifically states them to be the views of other people's outstanding work. All the significant contributors for the research have been clearly stated in the thesis already. I totally realized that the legal result of this declaration which will be taken on behalf of myself.

Students Name	: Fahd Ahmad Boustani
Student ID	: T/MBAF-202002-00256
Date of Completion	: 15 July 2021

ACKNOWLEDGEMENTS

For my instructors and supervisors and classmates in the MBA Program of Business Administration College in Asia Metropolitan University.

Thanks to my tutor from the heart.

Thanks for dedicated efforts and support that made me able to complete this research, without your help, nothing could be achieved.

Special thanks to my family for what they did for me and their empowerment and support which enabled me to complete this work and success.

Thanks to my friends and colleagues for the support and encouragement.

Thank you all again

TABLE OF CONTENTS

Table of Contents

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1 – INTRODUCTION

1.1 Introduction:

Saudi Arabia is an attractive country for investment, such as construction projects. This is because of its strategic location, political stability and cultural peculiarities. All this is necessary for a successful experience. Due to the reasons mentioned above, construction projects are increasing rapidly in Saudi Arabia in addition to other investments. In addition, the construction industry has changed rapidly over the past ten years; Customers expect more, and most importantly, they don't want surprises, and are likely to get involved in litigation when things go wrong, these things make project managers in Saudi Arabia and around the world think more about the relationship between these new risks and uncertainty, the development and success of the project they are running and force them to wonder whether risk management contributes to the success of the project?

Risk management has become an important part of the management process of any project. In fact, risk management has been at the forefront of commercial literature during the last two decades of the 20th century (Loosemore et al., 2006). In fact, Akintoi et al. (2003) Conditions within the construction industry are believed to have led to the adoption and analysis of risk management in practice. Risk is one of the key factors that can positively affect business within the company if exercised in the right way. By doing so, such an organization can achieve the capital value of scarcity and capital value to reduce the constraints through which a company can build a stronger competitive advantage by developing the maintenance and retention of core competencies, which in turn can increase the enterprise's market share, increase reputation of shareholders' equity and stakeholder objectives, and maintain maturity in the company's life cycle during which it can maintain the peak stage of all its activities by recognizing and encouraging the peak. And keep them performing.

The effective use of project management techniques such as risk and value management is a key supporting process to add quality, cost, time and change control (Fewings, 2005), all of which together generate an integrated approach to project success.

While project risk management is a scalable activity and must be proportional to the size and complexity of the project under consideration, however, simpler projects mean the use of simple qualitative analysis such as an online project management guide in the risk management

plan spreadsheet, in the same context, larger projects may want to use more powerful analysis techniques across Monte Carlo simulation models. Risk management requires high-level administrative support, an acknowledgement that risks is facts, and a commitment to identify and manage them. One advantage of a successful organization or project is to use risk management to anticipate potential negative circumstances, problems and realities. Inactive projects have to respond to problems;

The main challenges facing management are to assess the level of risk by the owner of the center, as well as to assess whether management is aware of the risks and whether it indicates its knowledge of risk avoidance. Senior management should investigate the different types of risks they face at work, how to manage risks through education or previous experience and other sources, as we can figure out how the risks can affect the degree of development and success of projects. Accordingly, this research focuses on providing the impact of risk management on the development and success of construction projects from the point of view of owners and employees.

1.2 Research objectives:

The main objective of this research is to study the impact of the relationship between risk management and construction development in Saudi Arabia. The study also aims to:

- Study and determine the nature of the relationship between the implementation of effective risk management and the development of construction projects.
- Identify key risk factors that can stand in the way of construction processes by reviewing the literature.
- Assess the severity and allocation of each specific risk factor
- Investigate management awareness of risk management, and apply their knowledge while managing these projects.
- Identify the development and success criteria achieved in construction projects.

1.3 Problem Statement:

The world is growing very rapidly and with the continuous increase of population, it is difficult to keep pace with the increasing population of people who need basic necessities such as education, health and food. Without civil engineers and project managers who can successfully manage construction projects, these needs will never be met.

The largest and fastest growing cities are located in developing countries, due to the fact that the world is growing rapidly, and this has resulted in less developed countries. According to Smith (2002), the construction industry in developing countries is significantly different from that in developed countries. Acknowledgment of differences in climate, materials, finance, economics, human resources and cultural factors will lead to successful project management in developing countries,

Successful project management refers to the task of completing all project activities on time, within budget and in accordance with required specifications, (Robbins and Decenzo, 2002).

The Gulf countries are classified within the developing countries. The construction industry plays an important role in the Gulf region, where oil production has increased and revenues have risen sharply; This resulted in the availability of tremendous funds that the Gulf rulers invested in mega projects such as the construction industry (Al-Zayani, 2012).

The number of disputes and lawsuits due to project delays has increased with the revolution in the construction industry in the Gulf region - especially in construction projects. According to (MOP, 2011), in most of the Gulf countries, 21.2% of the total project budget is allocated to pending claims and cost increase (18% for pending claims and 3.2% for cost increase). The loss of funds resulting from the number of disputes and court cases due to project delays shows that there is a need to effectively manage construction risks.

There are several stages to designing a standardized risk management model. The first is to examine the building environment, design the conceptual model, test it in the market, modify it with feasible or desirable changes, and then test it in the market again.

For this reason, there is a need to study the construction environment in the Gulf region, and this will form the basis of a standard risk management model for the region with the aim of saving money on projects, reducing the proportion of disputes and claims, and protecting foreign investors.

1.4 **Research Aim:**

The research can be summarized in an overall goal and measurable goals. The objective is: the impact of the relationship between risk management and the development of construction projects in the Kingdom of Saudi Arabia.

1.5 Research importance:

The importance of this research stems from the essence of risk management itself, as risk management has been identified as one of the most important tools in determining the success of any project. However, there are few studies investigating the nature of this relationship (Fewings, 2005). As a result, this research will draw attention to the importance of having a high level of awareness of risk management problems. In addition, studying the relationship between risk management, project development and project success is important because most projects operate in a very dynamic and rapidly changing environment that are not always static conditions and uncertainty factors surrounding the company, and in such an environment, changes are adopted very quickly. The project must generally grow or even survive. It is not possible to apply comprehensive changes to the project without the ability of the management to adapt the model in managing risks and make the new changes. Accordingly, the results of this research may help managers to better assess the risks surrounding them and better respond to these risks, and to introduce approaches that may enhance risk management of their projects.

1.6 Research Methodology:

This phase included a comprehensive review of relevant studies on risk identification and assessment and investigation of published work related to Construction Risks Management (RM), specifically important information related to the objective and objectives identified in this paper. The literature review was an ongoing process in order to include current and updated studies. Furthermore, a review of the literature helped define an appropriate research methodology - a vital component in the development of this research. Primary sources of literature cited in the research included: the university library system, press articles, conference proceedings, books, and engineering databases. The databases used are Science Direct and Elsevier. The keywords used were project management, risk management, risk identification, risk assessment, impact of risk, risk allocation and construction project delay.

The purpose of the review is to distinguish between what has been accomplished and what is required to be done in this area, to discover important variables of the topic and to determine the methodologies and research techniques that have been used (Hart, 2003). The literature review chapter has been divided into three parts. The first part provides general information about the Gulf region in general, and the Kingdom of Saudi Arabia in particular, to guide the reader. The second part provides an overview of the project management and risk management

process, in particular information related to the research objective and objectives. Part 3 introduces the literature on construction risk and causes for delays, along with their major classifications and categories.

1.7 Research Model:

The model for this research consists of two types of variables, the independent variable and the dependent variable, as shown in the following form:

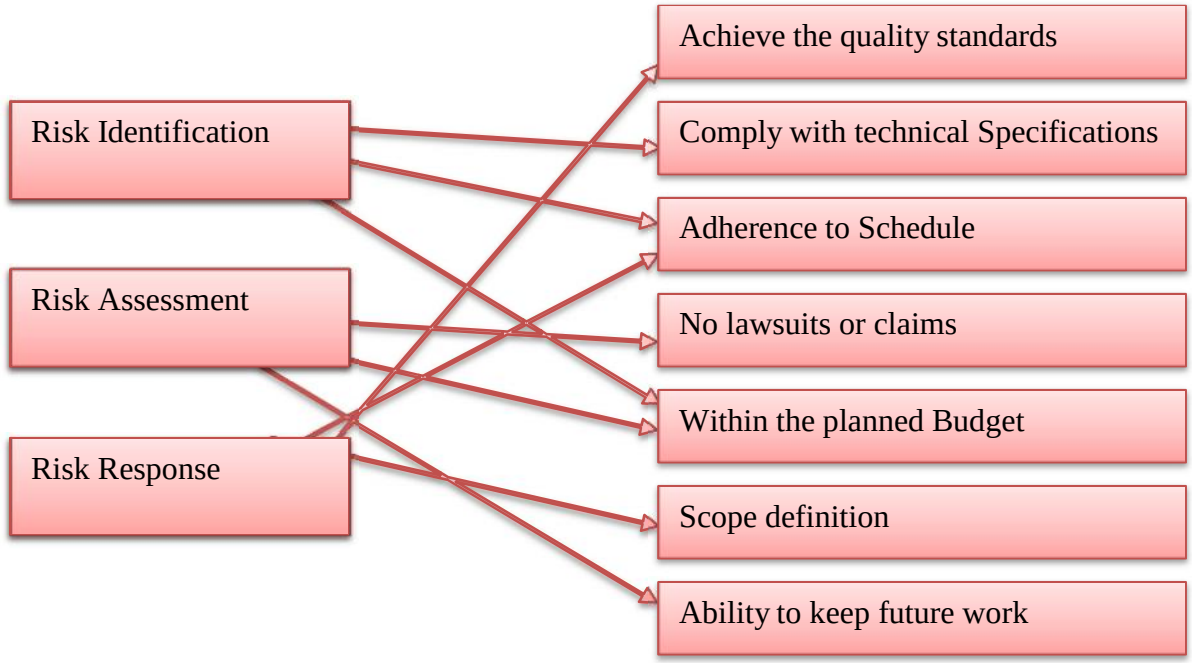

Figure 1 - Theoretical Research Model

1.8 Study limitations:

1.8.1 Human limits:

The study population was restricted to managers, supervisors and employees of some contracting and construction companies and real estate developers in the Kingdom of Saudi Arabia.

1.8.2 Place Limitation:

This study was applied to some contracting and construction companies and real estate developers in the Kingdom of Saudi Arabia.

1.8.3 Time Limitation:

The researcher prepared this study during the 2021 academic year.

1.8.4 Delimitations:

The study used only one activity, which limits its generalizability to other activities. The study was conducted in the Kingdom of Saudi Arabia, and therefore the ability to generalize this study to other countries of the same activity or other activities can be questioned. Additionally, similar industry studies have not been conducted in Saudi Arabia in abundance and are completely reliable. The study examined the effect of the relationship between risk management and the development and success of construction projects in the Kingdom of Saudi Arabia, as there are more other elements of success and development management that were not addressed in this study.

Data access restrictions refer to the fact that data collection through questionnaires and annual reports is controlled for the duration of these questionnaires, which may limit the quality and quantity of data collected and the absence of similar studies in Saudi Arabia..

CHAPTER 2 - LITERATURE REVIEW

2.1 Overview:

2.1.1 KSA Construction Market:

The Kingdom of Saudi Arabia is one of the fastest growing economies in the Middle East. Both urban and rural areas in the Kingdom of Saudi Arabia are witnessing a rapid growth in infrastructure development. The public construction sector in the Kingdom of Saudi Arabia is the largest in the Gulf countries, with $ 575 billion spent on public construction projects in the Kingdom of Saudi Arabia between 2008 and 2013. The construction market was expected to reach $ 610 billion from 2015 to 2020. Researchers define risks as something unexpected or the result of unforeseen causes that negatively deviate from project time and cost expectations. Project delays and time overruns are measures and consequences of the occurrence of risk.

During the past three decades, several studies in Saudi Arabia have pointed to the critical issue of the construction industry with poor performance, inefficiency, time and cost overruns. One of the most frequent and dangerous problems in construction projects in the Kingdom of Saudi Arabia is over time. Four studies identified that between 60% and 70% of public construction projects in Saudi Arabia encountered delays at the time of completion. The results of the survey showed that the average delay percentage differs from the original contract period by between 10% and 30%. In a recent research, 49 case studies were investigated in the western region of Saudi Arabia and it was found that the average delay in these cases was 39% of the estimated project schedules. According to Abdel Ghafou, 2015, the total value of overdue public projects is estimated at $ 147 billion. Moreover, the issue of ongoing cost overruns in the Saudi construction industry has been studied by many researchers. Turkey Company surveyed 300 project managers from various sectors and stated that 80% of Saudi construction projects were subject to cost overrun.

The lack of effective risk management practices in the Kingdom of Saudi Arabia was verified by researchers. A study was conducted by Ikidichi to identify and analyze the factors behind the failure of infrastructure projects in the Kingdom of Saudi Arabia. This study found that poor risk management practice is the most important reason for project failure. Moreover, Al-Baghami and Daoud found that there is a distinct lack of risk management practices in the Kingdom of Saudi Arabia that determine the impact of risk factors due to the participation of

clients and customer agents in the construction process. Clients in traditional practices do not take responsibility for the risks and they automatically transfer them to third parties. In the practices of the Saudi construction industry, most of the risks are assigned to the sellers, not to the customers. However, in a survey conducted by Al-Baghami and Daoud, it was determined that most of the critical risks in the early stages of projects resulted from clients. These types of risks are associated with inadequate decision making from clients who lack knowledge and experience. In a study of the causes of change orders in the Saudi construction industry, Ibn Hamid concluded that owners are the main source of risk based on project scope changes and change orders that can cause an average increase of 11.3% of projects. cost. In a recent study of the Saudi construction industry, Kashiwagi, Allawi, Sullivan and Al-Qahtani found that the majority of delays are caused by landlords. This study analyzed the causes of delays in 49 case studies and found that owners are responsible for 53% of the risks that lead to time overrun. Moreover, this study did quantitative analysis of the literature on the main causes of delays in Saudi Arabia and found a similar result with owners causing nearly 50% of delays.

The construction market in Saudi Arabia reached more than $ 34 billion in 2019 and is registering a compound annual growth rate of over 5% during the forecast period, due to large investments in infrastructure development and housing projects. Southern Arabia is the largest and largest country in the Middle East. More than 5,200 construction projects have been launched in the country, with an estimated value of $ 819 billion, representing more than 35% of the total value of active projects in the countries of the Gulf Cooperation Council (Gulf Cooperation Council). Under Vision 2030, Saudi Arabia is working to increase investments in technology and infrastructure development for economic diversification, which is expected to have a positive impact on the country's construction market during the forecast period.

The construction market in Saudi Arabia is divided according to the type of industry and the region. Depending on the type of industry, the market is divided into industrial, commercial, infrastructure and residential sectors. The industrial sector is also categorized by energy, resources, and industries. This industrial sector confirms its dominance over the market in historical years and is expected to behave similarly in the next five years. Industrial sectors like energy, resources and other industries are always being invested in technology development and thus it is always booming which makes the market grow with its steady growth. Moreover, foreign investments and contracts are driving the market to the expected growth.

Regionally, the construction market in Saudi Arabia has been divided into West, East, Central, and the rest of Saudi Arabia. The central region dominated the construction market in the country in 2021 and is expected to capture the largest market share in the coming years, due to large-scale projects in the region. Construction projects such as Al Faisaliah City, Al Forsan Suburb, and Al Ruwaid redevelopment are among some of the mega construction projects in Saudi Arabia.

2.1.1.1 Back recovery:

The report identified 4 factors that contributed to reviving the construction sector in the Kingdom, including economic diversification, social reforms, general population demand, in addition to government projects.

He pointed out that the projects in the Kingdom raise optimism at the regional level for the construction sector, as it strives to improve the infrastructure of railways, airports, ports and other transportation facilities, in addition to increasing the supply of housing, health care, recreational and tourist facilities. Adding that the Kingdom remains the most active construction market in the region, which bodes well for more activity in the construction sector in the coming years, as the Kingdom is overseeing a major cultural and social transformation since 2017, including the establishment of cinemas and concerts.

2.1.1.2 Notable projects:

The report indicated that the most ambitious project in the Kingdom is the $ 500 billion NEOM project, on an area of 26,500 square kilometers, along 468 kilometers of the Saudi Red Sea coast near Egypt and Jordan, where the first phase of the project was. He was set to be Neom. In addition to more than 150 development projects for the Tabuk region, worth 3.27 billion dollars, which were announced in November of last year, the Kingdom also launched more than 600 projects in Al-Qassim, worth 4.36 billion dollars, and about 200 new projects. Projects in Hail worth $ 1.14 billion, in addition to the Zakher mixed-use city project worth $ 4 billion in Makkah Al-Mukarramah and the Al-Faisaliah neighborhood development project in Riyadh, which includes the development of the Khuzama complex, retail, hospitality and commercial development.

2.1.1.3 Infrastructure and Energy:

In contrast to the previous report, a report by Ventures ONSITE, which specializes in research in the construction industry in the region, predicted that the value of construction projects in the Gulf region would reach $ 140 billion (about $ 525 billion). SAR) in 2019, the size of the construction, infrastructure and energy sectors was also estimated. About $ 3.6 trillion (13.5 trillion riyals), the report pointed out that the Gulf Cooperation Council countries are among the most consuming countries in the world of building materials compared to the number of inhabitants. Rising oil prices, robust prosperity and economic growth in the GCC countries are expected to foster renewed growth in the construction sector in the region.

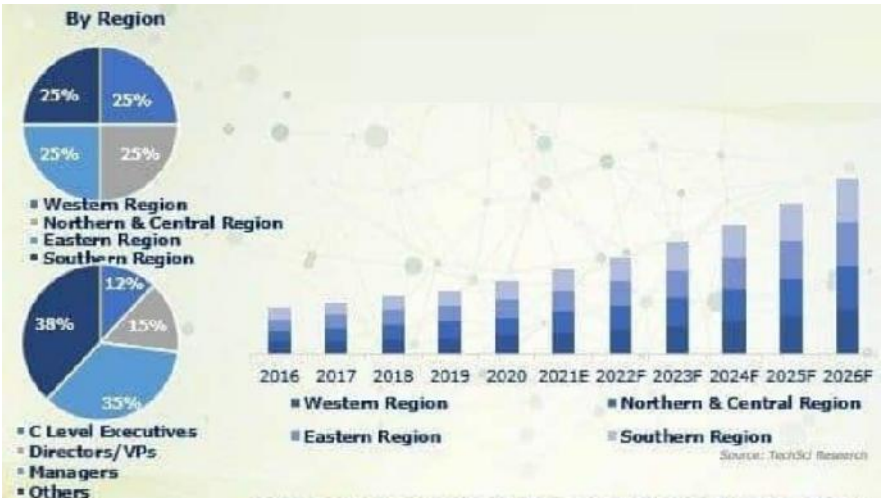

Figure 2 - KSA Construction Market Size

2.1.2 Gulf construction sector:

A report published by MEED under the title "Gulf Construction Sector Prospects for 2019" indicated that the decrease in government spending in the Gulf Cooperation Council countries led to a decline in project market activity, but the stability of oil prices and the start. One of the new mega projects is among the reasons that raise optimism once again in these markets.

The report indicated that the high expectations of capital spending in Saudi Arabia will lead to an increase in spending on construction and transportation projects in the GCC countries during 2019. He added that in the first half of the year, about $ 22.4 billion of construction and transportation project contracts were awarded in the GCC in the first six months to June 30, 2019. Reductions in capital spending by project owners in the public and lower oil prices in the private sectors. Since 2014, project activity has been restricted for 4 years in the construction sector in the Gulf, which has shown few signs of recovery in 2019.

2.1.3 Reasons for reviving the contracting sector in the Kingdom:

- Economic diversification
- Social reforms
- General demand of the population
- Governmental projects

2.1.4 The most prominent projects of the Kingdom:

The NEOM project, which has a cost of $ 500 billion (1.8 trillion riyals), - 150 development projects in Tabuk, worth 3.27 billion dollars (12.2 billion riyals), and - 600 projects in Qassim with a value of 4.36 billion dollars (16.3 billion riyals). And - 200 projects in Hail with a value of $ 1.14 billion (4.2 billion riyals), and the Al-Zakher city project in Makkah Al-Mukarramah, which has a cost of $ 4 billion (15 billion riyals).

2.2 Project management process:

A project can be defined as a “temporary endeavor undertaken to create a unique service or product outcome” and has key characteristics such as, specific goal, specific time, cost and performance requirements, as well as the participation of different sectors and specialists, (Larson & Gray, 2011). Smith (2008) and Kerzner (2001) define a project as a series of activities with a specified start and end date that have a specific goal to be achieved within limited time, cost, and resources.

Project management, on the other hand, has many definitions, but the meaning hardly differs. Project management (PM) is defined as planning, organizing and managing resources to successfully present the project goals and objectives (PMBOK, 2004). However, the Project Management Institute (PMI) defines project management as "the art of directing and coordinating human and resource resources throughout the life of a project using modern management techniques to achieve pre-set goals of scope, cost, time, quality and participants' satisfaction". On the other hand, the UK Project Managers Association defines project management as “planning, organizing, controlling and controlling all aspects of a project, motivating all involved to achieve project objectives safely and within time, cost and performance standards” as stated in (Smith, 2008).

Each project has triple constraints of time, budget, amount and quality (scope) work to be completed, as shown in the figure (below).

Figure 3 - Project management process

The goal of most projects can be simplified into three components, namely; Time, budget and quality. Lock (2001) stated that time and cost have a positive relationship, as the original cost is likely to be exceeded if the planned schedule is exceeded.

According to Kerzner (2001), project management includes the project planning stage which consists of identifying the work required, the quantity and quality of work, and the resources needed to implement the project. This is followed by the monitoring phase, which consists of tracking progress, comparing actual and expected outcome, impact analysis, and making adjustments. Achieving project goal within the allotted time period and budget cost is defined as successful project management.

A successful project manager is required to successfully achieve the project goal. A project manager is defined as the person responsible for managing the project to achieve specific goals (Fewings, 2005) and (Larson and Gray, 2011). On the other hand, the executive project manager will manage the project on behalf of the client from start to finish (Fewings, 2005).

The project manager is responsible for coordinating and integrating activities. For this reason, the project manager must have general knowledge, and require both communicative and interpersonal skills (Kerzner, 2001). According to Nicholas (2004), the role of the project manager is central, as he is the focus of communication, decision maker as well as entrepreneur.

Although the project manager must balance the three objectives (time, cost, and quality), there are more aspects to consider. This includes the project environment, health and safety, where the project team is located in a broader system that includes clients, contractors, subcontractors and suppliers who are all affected by cultural, social, legal, economic and technological factors (Fewings, 2005).

2.2.1 Project Environment:

According to Walker (2000), the complexity of the construction process may depend on the type of environment in which it is found. Environmental forces act directly or indirectly on the building process. Environmental impacts acting indirectly on the client's activities and thus will carry over into the construction process. On the other hand, it can work directly on the construction process. So project managers have to overcome this kind of problem by conducting a project survey. Project survey refers to the process of analyzing the project environment for any potential problems and determining the degree of their occurrence. On the other hand, a procedure for anticipating and interpreting changes in the environment by observing large amounts of information to create a set of scenarios is defined as an environmental survey (Robbins and Decenzo, 2002). Many issues are related to the construction environment such as noise, dust, waste, emissions, and health issues. For adjacent construction sites, dust and noise are an ongoing problem (Fewings, 2005). However, environmental forces can be classified into four groups (Walker, 2000):

- Political, legal and institutional
- Cultural and social
- Technological
- Economic and competitive

Political forces refer to the influence of government policy on construction projects. For example, reducing the level of investment and availability of financing that may affect the labor market. Moreover, political relations between states may influence international projects. Legal forces refer to the legislation that can affect clients' activities. For example, legislation that affects construction projects directly (safety regulation and planning) or that has an effect on the motive for construction (land control). However, corporate forces refer to the professional institutions such as the head office, the principal company, and the stakeholders who influence its members.

Cultural and social factors are referred to the tolerance of local residents and the general public for specific activities. On the other hand, technological forces include the influence of technologies on the process. Economic and competitive forces refer to the availability of finance, labor, materials, equipment, and level of demand (Walker, 2000).

International projects have complex environments; It can be seen in developing countries. Despite the contribution of European and American companies in modernizing Arab countries, international companies find it very difficult to work on construction projects in Arab countries. For example, cultural factors play a large role in the implementation of business in the Kingdom of Saudi Arabia; Communication is essential in running a business (Larson and Gray, 2011).

2.2.2 Project health and safety:

Health and safety legislation is mostly enforced by the Health and Safety Administration (HSE) or local authorities (LAs). The overall responsibility of the Health and Safety Committee (HSC) is to oversee health and safety at work. For example, they are responsible for policy development, standard setting, and enforcement (Appleby and Forlin, 2007).

The Department of Health and Safety at Work Regulations 1999 (MHSWR) defined risk as the risk of the possibility of potential harm or any harm caused by something. The extent of the risk depends on the likelihood of occurrence, the potential severity of risks such as health impact, and the population that could be affected. The Management Health and Safety at Work Regulations 1999 (MHSWR) requires risk assessment through hazard identification and risk assessment. For example, the assessment process looks at the likelihood of accidents, and the severity of potential harm (Appleby and Forlin, 2007).

In construction work, it is essential to maintain a safe working environment (Levy, 2000). Human errors play an important role in the accident causing process. It contributes up to 90% while the rest represents technical errors in addition to uncontrollable circumstances (Appleby and Forlin, 2007). According to (Walker, 2000), health and safety regulations in construction work are compelled to reduce accidents. Most large contractors need evidence of minimal safety training for managers and personnel.

2.2.3 Project management knowledge areas:

There are several potential benefits from project management (Kerzner, 2001), for example:

- Define analysis tools and techniques.
- Early identification of problems.
- Improving estimation skills for future projects.
- Recognize whether goals cannot be achieved or will be exceeded.
- Evaluate time and accomplishments against timelines and plans.

The project management process encompasses twelve knowledge domains which are; Project integration management, project scope management, project time management, project cost management, project quality management, project human resource management, project communication management, project risk management and project procurement management (PMBOK, 2004).

Project integration management refers to bringing together a project aspect in a coordinated manner. Project scope management is a written statement of what will be included and excluded in the project, in order to verify what has been agreed upon. The main scope is implemented in the second phase of the project life cycle. Project time management involves identifying all activities, sequencing them, and then allocating time to each activity. This will result in a timeline showing when each activity starts and ends in order to ensure that the project ends on time. Project cost management is similar to a time management process except that each activity is associated with its cost, which will form the project budget (Maylor, 2003). Project quality management refers to planning a systematic action to ensure that the project outcome will meet established quality specifications (Smith, 2008).

Project HRM refers to planning the personnel who will work on the project, identifying the skills required, developing the team and documenting their roles. Project Communications Management consists of four areas which are communication planning, information exchange, performance reporting, and administrative closing. Project risk management refers to the process of identifying, measuring, and responding (PMBOK, 2004) and (Maylor, 2003).

2.3 Project lifecycle:

In 2011, (Larson & Gray, 2011) explained four phases of the project life cycle, which include:

- The identification stage
- The planning stage

- The implementation phase
- The final stage

Larson and Gray merged the monitoring and control phase with the implementation phase. (PMBOK, 2004) and (OIT, 2005) separate them and present the project life cycle in five main phases:

- The initiative
- Planning and design
- Implementation of
- Monitor and control
- Close

The figure below shows the stages of the construction project life cycle.

Figure 4 - project lifecycle

2.3.1 Initiation:

The initiation phase defines the initial scope of the project by minimizing the project environment and including all the resources required in the project by developing the initial scope statement. It should include an organization plan that covers contracting, equipment and budget requirements, as well as costs, tasks and schedule (PMBOK, 2018).

2.3.2 Planning and design:

The purpose of the planning and design phase is to show how the project is managed during the implementation, monitoring and control processes. In this stage, activities are grouped

together by defining tasks and their sequence, as well as their resources. It must ensure that the project satisfies the end user and is achievable within time and budget limits (PMBOK, 2018).

2.3.3 Execution:

The implementation stage is the stage in which the activities specified in the project management plan (PMP) are carried out in order to achieve the project objectives. Moreover, it involves the coordination of personnel and resources, as well as the integration of activities, in order to achieve the end result specified in the Project Management Plan (PMP), (PMBOK, 2018).

2.3.4 Monitoring and controlling:

The Monitoring and Control phase includes monitoring the project implementation phase to identify difficulties and take action to correct the problems. The Monitoring and Control phase includes ongoing activities, as well as monitoring the actual cost, time and effort expended against the Project Management Plan (PMP). Moreover, it involves monitoring the baseline of project performance, addressing risks and taking actions (PMBOK, 2018).

2.3.5 Closing:

The closing stage is the period during which the construction project is handed over to the end user with formal approval. It consists of two phases: the project closing phase, in which all activities across the project are completed, and the contract closing phase, in which each project related contract is completed and closed (PMBOK, 2018).

2.4 Theoretical Framework:

Definition of the construction industry: Construction projects can be defined as the industry that creates the infrastructure for cities, towns and industries, and is considered one of the largest industries in the world. This industry consists of many types of buildings in addition to civil engineering jobs. This industry includes carpentry, road construction, bridge development and home design.

2.4.1 Construction projects:

Organization and coordination of manpower, materials and equipment is required to successfully complete projects within the timeframe and budget and with the quality and performance standards specified by the designer (Donald and Boyd, 1992).

A construction project is defined as the physical structures that transform from designers' drawings after following a set of procedures and processes (Levy, 2000) and (Woodward, 1997).

Construction project implementation is defined as an infrastructure assembly process. For the successful implementation of such a project, effective planning is essential. Once the design is completed and the cost and time schedules are approved, the actual construction process begins (Clough, 1979).

According to Levy (2000), some criteria are essential to the success of construction projects and they are:

- Project completed on time.
- Final cost within the project budget.
- There are no claims or disputes pending during or after project completion.
- Contractors enjoy a good relationship with the parties to the construction (client, consultant, and subcontractors).
- Achieving the level of quality.

Many people are involved in the construction industry. However, the main building parties are:

- **Clients** - They invest in and finance construction projects. They can be users, developers, or a bank. The customer's goal is to receive the project on time and within the allocated budget.
- **Consultants** - have the professional skills and experience to protect the client's interests. They are project managers, designers and professional engineers (civil, structural, mechanical, electrical, etc.). The role of the consultant is to advise the client on all aspects of the project, such as design, budget and contracts; at the same time, they have to manage their own risks to protect themselves from any potential disputes or lawsuits resulting from incorrect advice or any malfunction in the business.
- **Contractors** - they carry out the work necessary to produce a building or any form of building block, and they are contractors, subcontractors, suppliers, manufacturers, etc. The goal of the contractor is to make a profit from the project.

Failure to properly manage the construction project may result in failure to complete the project within the budget and timeframe, failure to meet contract specifications (Flanagan, 1993) and the main source of claims and disputes in the construction industry are related to disruptions

and delays in the progress of contractors (Braimah and Ndekugri, 2008). There are different types of construction projects, which are grouped (Gloud, 1997) and (PMBOK, 2004) into four categories:

- Residential construction
- Construction for companies
- Heavy infrastructure and construction
- Industrial construction projects

This paper focuses on construction projects, whether they are residential or commercial buildings. Residential construction projects include apartment buildings and apartment buildings, while corporate construction projects include office buildings and shopping centers. It is worth noting that some construction projects are more technically advanced than others, and client preferences determine the responsibility of the construction management field (Jallood, 1997). This means that clients choose whether a consulting firm or a contracting firm is responsible for managing construction projects:

2.4.2 Types of construction projects:

There are different types of construction projects according to Grace F.M (2010):

- **Residential:** This type of construction project includes different types of buildings such as houses, townhouses, apartments, and divisions. The home design process is generally done by architects, engineers, and builders (or they may employ subcontractors) who do structural, electrical, mechanical, and other specialized work in the process of building these homes. Local building authority laws and regulations must be applied in these buildings. The market for this type of building is very competitive, high risk as well as high profitability.

- **Building:** The most popular type of construction project is building construction. It can be defined as - is the process of adding structure to real property (Grace F.M, 2010). Construction projects in most cases are adding a new room and making small renovations. Most new building construction projects construct sheltered enclosures to house people, equipment, or machines. Installation of facilities and equipment is included.

- **Institutions and Commercial:** A large variety of institutional and commercial buildings are available in this industry of various types and sizes such as schools, universities, hospitals, clinics, sports facilities, stadiums, large shopping centers, retail stores, light manufacturing factories, warehouses, and skyscrapers for offices and hotels. This building should be designed by professional architects and engineers who are often hired to design such buildings. Few competitors compete in this market for

these types of buildings due to the high capital requirement in addition to that this type is developed compared to residential construction projects.

- **Industrial:** This type represents a small percentage of the entire industrial building while it is a very important part of the industry. The owners of such projects are usually large, for-profit and industrial firms and institutions such as manufacturing, power generation, medicine, and petroleum etc., highly specialized expertise processes in planning, cost estimating, design and construction are required for these industries.

- **Specialized industrial constructions:** Very large projects represent this type of construction project and involve a high degree of technological complexity, such as nuclear power plants, chemical processing plants, steel plants and oil refineries.

- **Highway construction:** Highway construction includes the construction, modification, or repair of roads, highways, streets, alleys, driveways, paths, parking lots, etc. (Grace F. M., 2010).

- **Heavy Construction:** All projects that are not properly classified as "building" or "highways" are heavy construction projects such as water and sewage projects, dams, dredging projects, control projects, wastewater treatment plants and facilities. And water treatment plants and facilities.

2.4.3 Construction processes:

- **Design Team:** The main purpose of the design team is to compile and plan procedures, and to integrate those procedures with other parts. Designers prepare drawings and specifications that represent the design contents. A design team that includes surveyors, civil engineers, cost engineers (or quantity surveyors), mechanical engineers, electrical engineers, structural engineers and fire protection engineers, depending on the size of the building.

- **Financial Advisors:** Financial advisors can be defined as one or a group of professionals / professionals who can provide advice on project investment. Investment advice includes the planning process created by mortgage bankers, accountants, cost engineers, and financial advisors.

- **Legal considerations:** It can be defined as a set of laws that address all building construction issues and address all its components. In every country, there are zoning requirements and building code, and zoning and building code is determined by the government in that country. Therefore, the construction project must follow these zoning and building codes.

- **Interaction of different parties:** The design prepared by the designers must take into account that the design is applicable. This means that it must be suitable for use and location, meet the legal considerations of the country in which it is built and the construction must be financially feasible in order to be economically visible to the owners.

- **Procurement:** different types of procurement in construction projects, and these types according to the concession building, 2004 are traditional or design-bid-build, two-stage tender, design-build.

2.5 Risk Management overview:

The Royal Society (1991) defined risk as the probability of a specific adverse event occurring over a specified period of time. Akintoye et al (2003) emphasized this definition because the probability of an adverse effect and the duration of exposure were included in his study.

The source of the risk could not be identified. Sometimes, it comes from limited knowledge of employees and managers, limited experience, and information that gives rise to risks. The source of risk may be changes in the parties included in the construction process. Sometimes risks come from financial markets, project failures, legal liabilities, credit risk, accidents, natural causes and disasters and from competitors.

Sources of risk: Many studies around the world aim to identify the sources of studies. The International Research Week 2005 conference classified the sources of risk into two groups: internal sources and external sources. Internal (controllable) sources are client system, consultants, contractors, subcontractors, and suppliers. Whereas external sources are the dynamics of the economy and globalization, unforeseen circumstances, governmental / legal / political controls, environmental restrictions, health and safety issues beyond the control of the project team and social and cultural issues

Risk management was in place when people needed to store their harvest for future use at the beginning of civilization, and when people built forts and ramparts to protect their villages and properties. Another example is when a merchant manages his risk when transporting goods from one place to another by making the buyer pay the seller a security deposit to be returned as soon as the buyer receives the goods in good condition, so if the merchant encounters any disasters during his journey, he receives compensation. From Babylonian times until the Enlightenment, risks were not systematically managed, but relied in one way or another on "gut feeling". However, a more systematic methodology was seen after statisticians and theorists developed quantitative techniques for assessing risk (Douglas, 2009).

Risk management is an important part of the decision-making process in construction project management (Tang et al., 2007), particularly with regard to project integrity, scope, time, cost, quality, human resources, communications and procurement. Risk management (RM) improves the future prospects of the project as it identifies uncertainties and possibilities (Borg, 2001); It is defined as “a system aimed at identifying and assessing all risks to which the project

is exposed so that an informed decision can be made on how to manage risks" (Zou et al., 2007).

Effective risk management in construction requires a comparison of potential risks and potential return or future profits on the project (Flanagan, 1993). According to (Walker, 2000), construction project management is defined as:

"Planning, coordinating and controlling the project from concept to completion (including commissioning) on behalf of the client which requires defining customer objectives in terms of utility, function, quality, time and cost, establishing relationships between resources, integrating, monitoring and controlling project collaborators and their outputs, evaluating and selecting alternatives in pursuit of satisfaction The customer reports the results of the project."

In construction projects, risk and uncertainty may have positive or negative consequences. A threat is the result of a negative risk and the opportunity is an outcome of a positive risk. Therefore, risk does not indicate a bad thing, but rather that things are uncertain (Cretu et al., 2011).

Risk is defined as a threat that has an impact on the development and success of a project (Barber, 2005). On the other hand, uncertainty is defined as the chance of an event occurring in which the probability is unknown (Smith et al., 2014). Simply put, uncertainty describes a situation that is being considered by decision makers and that does not contain past data to determine the likelihood of its occurrence (Flanagan, 1993).

Risk and uncertainty change the actual outcome of the activity from the planned outcome if it is negative. Both have two trends, either a positive or negative deviation from the time frame or the construction project budget. Risk and uncertainty are associated with every construction activity and construction parties, such as clients, consultants, contractors, subcontractors, and suppliers. There are differences between risk and uncertainty. The word risk originated from France, and it began to be used in insurance transactions around 1830 in England. Risks are classified under three categories, which are; Known, unknown, and unknown risks. Known risks include minor changes to the project, known unknown risks are the expected event either through its likelihood or through potential impact, and unknown risks are those events with unknown probability associated with it and the unknown potential impact (Smith et al., 2014).

Some researchers prefer to differentiate risk and uncertainty, while others believe the words are synonymous (Flanagan, 1993). All projects are subject to risk and uncertainty, and they can have a positive or negative impact on the success of the project. Risk factors can be initiated internally or externally throughout the project life cycle, and in order to achieve success and achieve project goals and objectives, it is necessary to identify potential risks and develop a plan for managing them (Smith, 2002).

Risk management (RM) is a form of decision-making within Project Management (PM) and is an important part of the Project Management Plan (PMP); It describes the types, sources and impacts of potential risks in the project, as well as the tools and techniques that will be used in identifying and assessing risks. Moreover, Lister defines risk as “a combination of the likelihood of an event occurring and its consequences” (Leicester, 2007).

The Institute for Risk Management (IRM) states that risk management (RM) is a rapidly developing discipline with no clear views or consensus about what the risks entail. IRM defines risk as having two dimensions: positive and negative. Positive risks are those that can have a positive impact on the development and success of the project, and negative risks are associated with the potential failure of the project (IRM, 2002).

2.5.1 Risk Management Process:

Most construction projects face cost and / or time overrun. According to Cretu et el. (2011), a cost analysis study was conducted on public works projects in Europe and North America. The study resulted in an incidence and the severity of cost overruns were significantly high. An 86% round of 258 projects experienced cost overrun with the actual cost 28% higher than the estimated cost. The main factors responsible for cost overruns are improper risk analysis. This is where during the early stage of the project, the scope of work was poorly described and defined at the time of developing the project budget, or affected by political pressure as the project was intentionally delayed to serve political agendas.

The concept of risk management is completely different from that of risk assessment, although some may use the term risk management to describe the risk assessment process (Kaplan and Garrick, 1981). Westland (2007) defines risk management as "the process by which project risks are identified, quantified, and managed".

In the planning and construction stage, the identification, evaluation and analysis of different types of risks can be initiated using the probability theory or the index of materiality theory in order to assess the risks and control their impact on the construction project (Pike, 2009).

Risk management helps reduce delays, thus reducing contractual disputes. According to Braimah and Ndekugri (2009), one of the main results of existing methodologies for analyzing delays in construction projects from the perception of clients and consultants has been the use of simple methodologies rather than complex methodology in delay analysis although it is known for its less reliable.

The general classification of risks in construction projects is divided into internal and external risks. Other classifications are more detailed and consist of more specific categories, such as political, financial, market risk, intellectual property, social risk, and safety risk (Songer et al., 1997) and (Al-Sayegh, 2008).

In general, risks can be identified at any stage of the project by recording the details of the risks in the risk register; However, risk in the construction industry can be determined by the probability of an event or an actual event occurring during the construction process (Faber, 1997).

Risks can also occur due to the unpredictability of organized outcomes or consequences in decision or planning setting (Hertz and Thomas, 1983). The outcome of an estimate based on the uncertainty associated with different outcomes could be better or worse than expected (Lifson and Shaifer, 1982). This research will adopt the most general and broad definitions of risk management as presented by (Larson and Gray, 2011) and (Westland, 2007) where risk management is the process by which the risks to which the project is exposed are formally identified, quantified (assessed) and managed (responses). .

Financial risk is one of the main sources of uncertainty for multinational companies investing in the Gulf region, which is the main cause of claims and disputes between parties in the region, as financial excesses delay project completion dates (Hahn et al., 2005). Companies in the region are beginning to realize the importance of risk management as a project management tool and an integrated process in any project. Figure 2.8 illustrates the risk management (RM) process.

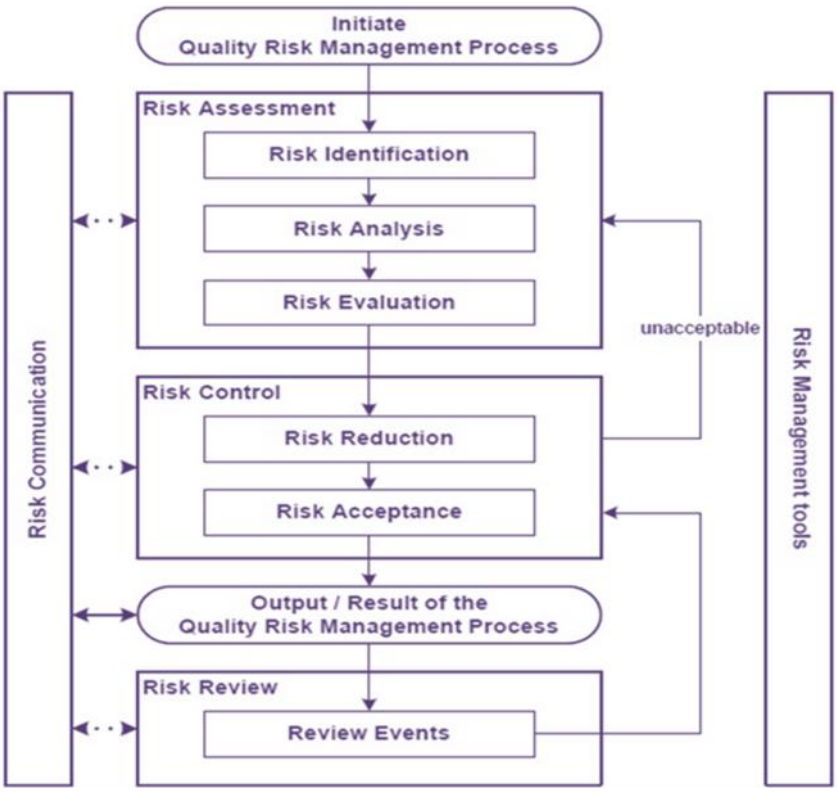

Figure 5 - Process of risk management

Figure (above) illustrates the three stages in the initiation of the risk management process tool. The initiation process starts with the risk assessment phase, proceeds to risk control and ends with a risk review. It is worth mentioning that there are several types of risk, for example controllable and uncontrollable, dependent and independent risks.

2.5.2 Risk assessment:

Managing the changes has led to the introduction of risk assessment techniques as a major part of the planning process. Risk assessment focuses on the quantification of identified risks using statistical analysis, since in most cases the identified risks can be either quantitatively or subjectively assessed factors (Lockyer and Gordon, 1996).

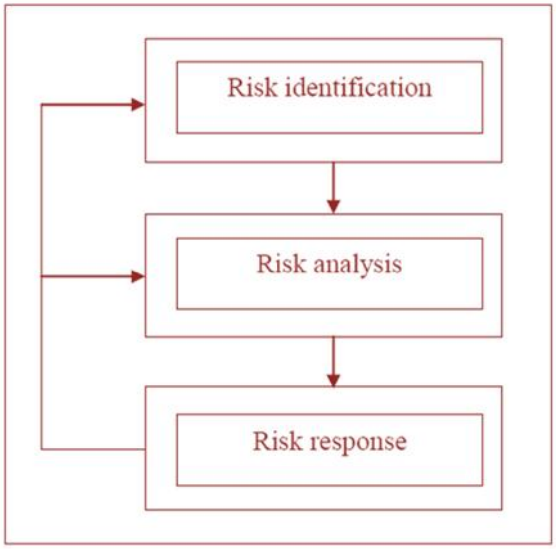

Figure 6 - Risk assessments

The risk management cycle (risk assessment phase) can be presented in three phases (Smith, 2008), (Maylor, 2003) and (Zayed et al. 2008): risk identification, risk analysis and risk response. Figure 2.9 (below) illustrates the risk management cycle.

Risk management aims to identify the unwanted event to estimate the risk, and it aims to like the unwanted event that will happen. Risk assessment assists in managing risks through quantitative and qualitative measurement and procedure in order to estimate the level of importance of industrial risk factors for the project and then estimate the risks of potential factors for the success of the project. The outcome of this step determines the inputs for making the optimal decision.

Qualitative	Quantitative
a. Direct judgment	e. Probability analysis
b. Ranking options	f. Sensitivity analysis
c. Comparing options	g. Scenario analysis
d. Descriptive analysis	h. Simulation analysis

Table 1 - Various risk assessment techniques

After identifying the risks, they can be evaluated in terms of their impact on projects and their likelihood of occurrence. This step is very crucial to assess and anticipate the likelihood of risk

occurrence and the impact and impact of this hazard on the various components of construction projects.

2.5.2.1 Risk identification:

Risk identification is the first step in the risk assessment process, as potential risk factors (RF) associated with construction projects are identified and classified (Zou et al., 2007).

William (1995) suggests that a strategy for identifying, controlling, and distributing risk must be shaped in the early stages of the construction project life cycle. It is helpful to consider the potential internal and external risks to the client, contractor and project team, from the standpoint of different contractors, and to anticipate the sources of claims or disputes. In the risk identification stage, it is important to determine the source and impact of the risk (Raftery, 1999).

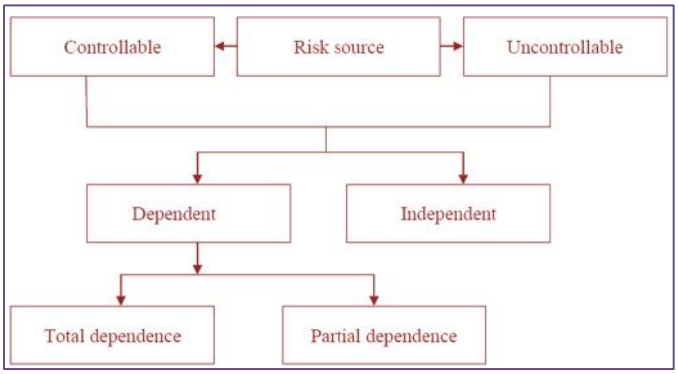

Figure 7 - Risk classifications

Controllable risks are those whose consequences are within the control and influence of decision makers. Uncontrollable risks are those in which decision makers have no control or influence over them, and usually stem from outside sources (Flanagan, 1993) and (Chapman, 2001). One effective tool for identifying potential risk is a work breakdown structure (WBS) that minimizes the chance of losing a risk event (Gray and Larson, 2003).

A work breakdown structure (WBS) refers to identifying the activities required to present the design required to create the project, as well as the resources that would be required to carry out the work (Smith, 2008) and (Maylor, 2003).

It is useful to search for an answer to the three basic questions at the risk identification stage which are; What could go wrong? How likely is it to happen? (Probability) How will it affect the project? (Effect). The project manager and team can use the experience and lessons learned

from the past, and use a simulation model to present potential risks in addition to brainstorming in order to identify potential risk factors (Lockyer and Gordon, 1996).

2.5.2.2 Risk analysis:

Risk analysis is an intermediary process between identifying risk and responding to risk. Hazard analysis techniques are grouped into quantitative and qualitative methods (Oztas and Okmen, 2004). Potential risks are analyzed using a qualitative or quantitative method to assess their potential effects (Zou et al., 2007). Another way to define risk analysis is to estimate what would happen if an alternative action or response was chosen (Smith, 1999).

According to Gray and Larson (2003), risk analysis can be qualitative or quantitative. Qualitative analysis represented in expert opinion and can carry serious errors based on respondents or judgment skills of the decision maker. On the other hand, the qualitative method is more reliable and requires serious data collection and more detailed analysis.

To identify potential risk factors (RF) and investigate their impact on the completion of construction projects, a classification is needed that covers all types of potential risk factors presented (Tchankova, 2002).

2.5.2.3 Risk response:

The process of identifying and analyzing risks helps decision-makers make judgments before problems arise. There are many forms of interaction with identified risks, such as risk avoidance, risk reduction, or risk transfer (Raftery, 1999).

All projects are exposed to the risk of potential problems in the form of events or factors called risks, and they are known to affect the timeframe, budget and quality of projects (Santoso et al., 2003), however, all risks involve both threats and opportunities (Chapman and Stephen, 2002).

As mentioned earlier, few researchers and decision-makers like to distinguish between uncertainty and risk. Uncertainty is not insurable and is found in situations where a probability cannot be associated with the possibility of a problem (Raftery, 1999), or where uncertainty can lead to risky events, threats, and opportunities (Chapman and Stephen, 2002). Kartam and Kartam (2001) define risk as the prediction of project development and success based on the likelihood of uncertainties occurring. Project risk increases with the level of uncertainty;

According to (Kindrick, 2003), any work-related event can present a risk. The risks can be positive, which means that the result is better than expected, or negative, where the outcome is worse (Raftery, 1999). Several options are available for responding to risks, such as avoidance, participation, diversion, mitigation, insurance, compliance, mitigation, and acceptance (Staveren, 2006).

Thus, the field of risk management (RM) has evolved to analyze and manage these uncertainties and risks (William, 1995). Although risk and opportunity assessment can be influenced by uncertainty, it is important to know that both have different mindsets and different data (Smith , 2008). According to Sayegh (2008), there is a need for risk management processes to be used in managing construction risks. The impact of risks can be reduced in a number of ways such as obtaining more information, conducting more testing, allocating more resources, improving communications, and spreading the risks to the parties who can control them (Smith, 2008).

Depending on the severity, different pathways can be taken to respond to risk. To avoid obstacles the project objectives can be modified if the difficulties are severe enough, look for alternative ways to manage the project, increase the strength of management, reduce dependence on one task on another, increase resources or increase flexibility (Lockyer and Gordon, 1996).

Larson and Gray (2011) stated that decisions should be made after identifying and assessing risks by selecting the appropriate solution to the risk event. **The classification for risk response is:**

- loosening
- Avoid
- Transformation
- Involved
- keep

2.5.2.4 Mitigating risk:

There two strategies for mitigating risk:

- Reducing the likelihood of an event

- Reducing the impact of risks on the project

Risk teams usually prefer to reduce the likelihood that the risk will occur to reducing the impact of it on the project as reducing the impact is costly (Larson and Gray, 2011)

2.5.2.5 Avoiding risk:

Although not all risks can be avoided, some risks can be avoided before the project is launched and others can be avoided or eliminated by changing the project plan (Larson and Gray, 2011).

Jannadi (2008) describes the risk aversion strategy as an ongoing decision process to completely avoid certain risks. According to (Nicholas, 2004), risks can be avoided by reducing the complexity of the project, reducing the quality requirements for the final items, or eliminating the risk-taking activity.

2.5.2.6 Transferring risk:

Transferring the risk to another party does not change the risk, but the risk needs to be transferred to the party who can better control it. One method of transferring risk is insurance, which can be very costly for large projects. Another way to transfer risk is to add financial risk factors to the contract bid price (Larson and Gray, 2011).

2.5.2.7 Sharing risk

Contractors and customers may decide to divide the risks between themselves through a contractual agreement. For example, all of them can better manage the risks they can handle. There are different types of contractual agreements **to share responsibilities towards risk (Nicholas, 2004), which are:**

- Fixed rate: Contractors are responsible for almost all risks.
- Fixed rate with incentive fees: Contractors accept up to 60% of the risk and the remainder of customer responsibilities.
- Cost plus incentive fee: Contractors accept up to 40% of risk and clients accept the remaining 60%.
- Cost plus fixed fees: all risks are borne by customers.

2.5.2.8 Retaining risk:

Risks can be kept in situations that cannot be avoided or moved, for example earthquakes or floods. However, risks can be kept in check by implementing a contingency plan. A

contingency plan is defined as an alternative plan that will be implemented in the event the risk becomes a reality. It is considered as a measure to reduce the negative impact on the project if the risks are realized (Larson and Gray, 2011). It also indicates the statutory waiver of the cost of the potential risk from one party to the other as in the case of insurance (Jannadi, 2008).

2.5.3 Risk control:

The risk control phase follows the risk assessment phase. The main business of risk control is either to reduce or accept the risk. **The activities included in the risk control phase (Cretu et al., 2011) are:**

- Track risks in the risk register
- Identify new risks
- Adjusting responses to risks or developing new response strategies
- Monitor implementation and effectiveness of response strategies.

To control risk, defining a specific strategic response will help in controlling risk. For example, in the case of negative risks (threats), the risk is better to accept, avoid, mitigate or transfer, however, if the risks are positive (opportunity), the risks are better to enhance, exploit or share. Identifying risk responses will provide the best solution (Cretu et al., 2011).

According to Smith (2002), all construction parties carry risks at some point, and since each project combines risk and uncertainty, contracts between the parties must establish responsibility for the risks during the life of the project.

To summarize, risk management is one of nine areas of focus in the Project Management Body of Knowledge (PMBOK). It has many advantages, such as knowing the best procedure for a situation, reducing uncertainty, increasing confidence that project goals and objectives will be achieved, and reaching accurate estimates that will lead to development and success (KarimiAzari et al., 2011).

The general objective of this study is the effect of the relationship between risk management and the development of construction projects in the Kingdom of Saudi Arabia. For this reason, the research will focus on the risk assessment phase.

2.5.4 Identification of risks factors in construction projects:

Available resources, such as the library search system for journals, conference papers, and books, as well as internet resources, were used to review and examine information on the topic.

Several researchers have studied the potential risks in construction projects in developed and developing countries, and have looked at a range of projects from small to large. Various studies have examined the risks associated with the three main players in the construction industry - clients, consultants and contractors. Others used subcategories of related factors, grouping the risks together based on their nature.

No	Author & Title	Case study	Risk factors
1	"Risk assessment and allocation in the UAE construction industry", (El-Sayegh, 2008).	UAE	42
2	"Learning from risks: A tool for post-project risk assessment", (Dikmen et al., 2008).	Turkey	73
3	"Risks associated with trenching works in Saudi Arabia", (Jannadi, 2008).	KSA	7
4	"An evaluation of risk factors impacting construction cash flow forecast", (Odeyinka et al., 2008).	UK	26
5	"Risk Management in the Chinese Construction Industry", (Tang et al., 2007).	China	32
6	"Understanding the key risks in construction projects in China", (Zou et al., 2007)	China	85
7	" Risk analysis in "fixed-price design–build construction projects", (Oztas and Okmen, 2004).	Turkey	14
8	"Assessment of risks in high rise building construction in Jakarta", (Santoso et al., 2003).	Jakarta	130
9	"The controlling influences on effective risk identification and assessment for construction design management", (Chapman, 2001)	UK	85
10	Kartam et al. (2001): "Risk and its management in the Kuwait construction industry: a contractors perspective"	Kuwait	26

Table 2 - presents recent relevant studies related to the identification of risk in construction projects.

2.6 Literature Review:

2.6.1 Al-Sayegh (2008):

Identified forty-two significant literature review risk to be evaluated by local and international company experts in the construction industry in the United Arab Emirates (UAE) Risk factors were assessed with a questionnaire completed by construction experts. The questionnaire consisted of two parts: the first section was concerned with the personal information of the

respondents, and the second part was concerned with assessing their perception of the likelihood of events occurring, and allocating each risks to the construction parties (clients, consultants). And contractors). The Risk Breakdown Structure (RBS) was used to classify the risks, according to their sources, into external and internal groups where each group had five classes with related risk factors. The internal group consisted of clients, designers, contractors, subcontractors and supplier classes, and the external group consisted of political, social, cultural, economic, natural and other categories.

As a result of the study, the top ten risks in the construction industry in the UAE were identified based on the risk rating. In addition, experts 'perceptions of local and international companies were compared, and both agreed that "inflation and sudden price changes "pose the greatest risk.

2.6.2 Janadi (2008):

Contractors must take all risks into consideration to minimize and avoid delays. The author used a mixed method from questionnaire and interviews to gauge contractors' perceptions of seven risk factors associated with trench construction in Saudi Arabia, and identified potential risks from their responses. Risks related to soil condition, equipment, material handling, and site condition ranked first in the study.

2.6.3 Tang et al. (2007):

Examined the risk management system and barriers to the application of risk management techniques in China from the perspective of different groups in the construction industry from 6 different cities across China, Questionnaires and interviews were published as survey tools to study the thirty-two risks identified from the literature review. The results of their study showed that there were no significant differences between groups of respondents in the ranking of twenty-six of the thirty-two risk factors. However, there were different perceptions about 6 factors: Premature failure of the facility. Safety claims and disputes; Insufficient technology and regulatory interface and poor coordination.

2.6.4 Zoe et al. (2007):

Identify and classify the main risks in order of their importance, and devise a plan to manage those risks in Chinese construction projects. The questionnaire was used as a survey tool to collect data on twenty-five risks grouped into 6 categories: customers; Designers. External

issues; Subcontractors and suppliers; Government agencies; and contractors, The results showed that all parties involved in the construction project must take responsibility for managing risks and working together from an early stage to address potential risks in a timely manner. Moreover, contractors and subcontractors should use a risk management plan to reduce or avoid risks in order to ensure that construction activities are of high quality and are conducted in a safe and efficient environment.

2.6.5 Ahmed and others (1999):

Comparing the views of contractors and customers on construction projects in Hong Kong on the importance of identifying and assigning risks to assist professionals in improving contractual documentation, a questionnaire that included twenty-six risks was used to collect data from contractors and customers. The study results showed that contractors and clients showed strong agreement on the importance of the risk factors presented, even though contractors assigned more risk liability to themselves than clients.

2.6.6 Shin (1997):

Examines the high risks and their role in delaying construction projects in Hong Kong, A questionnaire was used as a survey method to assess contractors' perceptions of the importance of 8 risk factors and their relative contribution to project delay. These risk factors were: insufficient design information; Poor coordination with subcontractors; Poor accuracy of the project program; Lack of labor for subcontractors; Changes in land and weather conditions; Unsuccessful business due to poor workmanship; Lack of skills or techniques; Lack of material resources. The material weighting method adopted in the study gave the greatest contribution to the risk in delaying the project the largest weight in the ranking. On the other hand, the results related to the risk management procedure showed the different levels of effectiveness of the different prevention methods that were applied in the construction industry, and the most effective way to manage risks was the experience and judgment of the practitioner.

2.6.7 Santoso et al. (2003):

Potential risk in high-rise construction projects that are important to contractors in Jakarta have been identified, classified and classified. The quantitative approach, which used a questionnaire survey tool, was used to assess 130 risks grouped into 9 categories and 12 subcategories based on their frequency of occurrence and degree of impact. The results of the study showed that

risk factors related to management and design ranked as the most important in the high-rise building construction projects in Jakarta.

2.6.8 Odeyinka et al. (2008):

Identified and assessed the impact and frequency of occurrence of twenty-six potential risk factors (RF) responsible for the differences between expected and actual cash flows. A structured questionnaire was used to assess UK contractors' perceptions of the impact of these factors on cash flow projections. The results of the study showed that 11 of the twenty-six risk factors had a significant impact. These factors were grouped into 3 categories: "changes in design or specifications", "project complexity" and "natural inhibition." The author suggests that Delphi technology is one of the best tools in interviews for gathering data, and that analysis of variance (ANOVA) is the best way to examine the differences in perception between contractor groups (SMEs, and large businesses).

2.6.9 Chapman (2001):

Focused on examining the steps involved in the risk identification process, as it influences the risk analysis and management process that directly contributes to the overall management of a construction project, the eighty-five risks identified were grouped into 4 categories with subgroups. One technique used to collect the data was the semi-structured face-to-face interview. The assessment process began with coding to measure the impact and likelihood of a risk in order to identify the risks and their impact on the success of the project.

2.6.10 Mills (2001):

Developed a systematic risk management approach to identifying and distributing risks in an orderly manner, Use a small project affected by the economic crisis as a case study to demonstrate the effectiveness of the approach. The case study measured twenty-nine risks grouped into 4 categories: planning risks, design and construction risks, site risks, and market risks. As a result, the researcher has verified that the risk management tools cannot remove all risks from the project but will ensure that the risks can be managed. It also concluded that the party responsible for each risk must undertake the risk management process.

2.6.11 Dikmen et al. (2008):

A tool that stores information on risk and risk assessment information throughout the project life cycle (pre-project, during and post-project phases), The tool was tested in a real

construction project where the author identified seventeen risk factors that were grouped into fifteen categories under 3 types of risk (external, project, and country).

2.6.12 Oztas and Okman (2004):

Studied the techniques used for project risk identification, risk analysis and cost risk analysis in the DB contract system used in Turkey. The aim of the study was to demonstrate the effect of non-application of risk identification and analysis on fixed-price design and construction projects during an economically difficult time in Turkey from the perspective of the designer contractor companies. Fourteen risk factors (RF) were identified from project documents, interviews, and contract clauses. Inflation, exchange rate and bureaucracy problems were categorized as the most important potential risk factors.

2.6.13 Modao. Pretorius (2009):

Aims in their study: Project Monitoring and Risk Management for Project Success: A case study from South Africa to assess the extent to which project control and risk management contribute, and how they can be used effectively in ensuring project development and success and identifying factors that contribute to project success. The survey results were processed and analyzed using a spreadsheet application. The main results indicated that project control and risk management have a significant impact on project performance and thus on the company's development and success. It is also found that the effective management of the earned value contributes positively to the success of the project. By strengthening and focusing more on the methods and processes of project control and risk management, project performance must be improved.

2.6.14 Ewer (2008):

Explains in their study the impact of risk management on the development and success of information systems projects in Syria, the impact of risk management on information systems projects in Syria, The questionnaire is used to obtain information from IS managers and developers in Syria. The conclusion of this research shows that many companies Syrian information systems do not have a formal method for risk, and the use of risk management will increase the rate of development and success of the information systems project Bakker and Wortmann (2010) present in their paper Does risk management contribute to the success of an IT project? A meta-analysis of empirical evidence Meta-analysis of the empirical evidence that Supports or opposes the claim that risk management contributes to the success of an IT project.

In addition, this paper also examines the validity of the assumptions on which risk management is based. The analysis leads to remarkable conclusions. Over the past ten years, much has become known about why projects fail. Information technology however, there is still little empirical evidence that this knowledge is actually used in risk management projects in IT projects. This paper is made with reference to new directions of research into the relationship between risk management and project success. Key elements are stakeholder perception of risk, development, success, and stakeholder behavior in the risk management process.

2.6.15 Luu et al. (2009):

Due to delays in construction projects in developing countries causing financial losses, described the Bayesian Belief Network (BBN) in their paper schedule risk measurement in construction projects using Bayesian belief networks and has been applied to identify delays in prospects for construction projects in developing countries. The research identified sixteen factors delaying such projects. These 16 factors were identified through a survey of 166 professionals. The study found that more than half of first responders were functional managers and senior managers (48%) and 10% were functional managers. From this ratio, we can be sure that the data collected is real and can be used to determine the factors affecting construction delay.

2.6.16 Zoe et al. (2007):

In their paper "Understanding the main risks in construction projects in China aims to investigate the major risks in construction projects in China in order to develop strategies for managing them. The researcher classifies the risks according to their importance to the impacts of the typical project objective in terms of time, quality, safety and environmental sustainability, and then investigates" From a stakeholder perspective. The researcher achieved his goal and collected data through the questionnaire and a total of 25 major risk were ascertained. Then the researchers compared these risks that were found with the same survey in construction projects in Australia to find unique risks in construction projects in China. Responsibility must be borne by clients, designers and the government in order to manage their risks and address potential risks in a timely manner. Risks must be minimized in construction projects that are executed safely, effectively and in quality by contractors and sub-contractors with solid knowledge in construction and management.

2.6.17 In this study Karimi, Azari et al. (2011):

Obtaining decision criteria from the nominal group technique (NGT), the proposed method can successfully and clearly distinguish between risk assessment methods. This study concluded that identifying and assessing project risks are the critical procedures for anticipating success, and this study concluded that there must be in the construction project between disparate, but contractually integrated parties, owners, designers, contractors, subcontractors, suppliers, manufacturers, And others.

2.6.18 Bates (2009):

Analyzed and predicted in his paper “The role of owners in project development and the success of project development and success by providing an effective method for the success of the project. The aim of the research is to investigate the impact of owner's decisions and actions that occur during the construction project. The research investigated two models; one of them is: The classic statistical method - multiple regression, the other is the modern artificial intelligence technique - neural networks. Both traditional regression analysis and artificial neural networks were useful for analysis of development and success. This study shows that the combination of using a statistical and artificial neural network gives the best results, while both are suitable For different types of problems because each has unique advantages and disadvantages The study concluded that most landlords should focus during the implementation of the capital facilities project on the following three phrases:

1 - Exercise the most appropriate level of "owner involvement" throughout the project.

2- Owners must exercise a focus on safety in every aspect of the project.

3- Defining goals and objectives, feeling urgency, and emphasizing safety.

2.6.19 Koller (2009):

Identified in his thesis the degree of relationship between critical factors of development and success and studying the performance of an IT project was to determine the relationships between the ten critical development and success factors and the performance of an IT project. Current research data supported the correlations between 10 critical development and success factors and IT project performance.” Current research data confirmed that there is a relationship between 10 critical development and success factors and IT project performance. This research examined more deeply the impact of project demographics on the relationships between 10

critical development and success factors and IT project performance. This research found that data analysis examination failed to support significant influence by project demographics on the relationships between 10 critical success factors and IT project performance.

2.7 Classification of risk factors (RF):

Risks can be classified in different ways depending on the purpose. For example, some risks are generally classified into internal and external risks, while others are classified in more detail such as client risk, financial risk, design risk, contractor risk, physical risk, etc. (Raftery, 1999) (Al-Sayegh , 2008)). The classification of risk factors included in the previous 14 related studies is presented in the table:

Categories	Rank
External factors related.	1
Materials related.	2
Labors and equipment's related.	3
Design – related	4
Financial/economical	5
Management/administrative	5
Project –related	7
Construction-related	7
Project attributes –related	9
Engineer –related	9
Environmental –related	9
Sub-contractor related	9
Supplier- related	9

Table 3 - Categories Classifications of Risk Factors

By comparing the categories included in all the reviewed literature that related to the identification of risk factors, the results (Table 3) show that the external category was included in every study, and the leading six categories included in the reviewed literature were external, materials, labour and equipment, design, financial, and management.

Table 4 (below) shows the categories included in the reviewed studies of causes of delay. Most authors included the external category followed by material, labour and equipment, design, and finance in their studies.

Categories	Rank
External factors related.	1
Materials related.	2
Labors and equipment's related.	2
Design – related	4

Financial/economical	4
Project –related	6
Construction-related	6
Engineer –related	8
Environmental –related	8
Sub-contractor related	10
Supplier- related	11

Table 4 - Categories classification of causes of delay

In this research, the main categories were chosen based on the comparison between table 3 and table 4 and the identification of the categories included most often in previous studies. The final categorizations are as follows:

- Management-related factors
- Design-related factors
- Financial/economic-related factors
- Materials-related factors
- Labour- and equipment-related factors
- External – related factors

The selection of categories was based on those most included in the relevant literature. These categories are presented to practitioners for evaluation. They agree to the categories. However, there were some minor changes to the arrangement.

2.7.1 Management category:

In project management there are two main aspects: the art and science of the project. Art deals with the people involved in the project, while science deals with defining and coordinating the work to be done; For example, it includes the knowledge, understanding, and skillful application of the project management process (Heerkens, 2001).

2.7.2 Design category

One of the most important requirements for minimizing time lag and cost overrun is to allocate sufficient time and money at the design stage (Koushki et al., 2005). Design is one of the most important categories because associated factors have been identified as major risks in construction projects (Fereig and Kartam, 2006).

2.7.3 Finance category

This category includes all factors related to potential financial difficulties on the project, such as delayed payments, cash flow problems, and external economic issues (Al-Aghbry et al., 2007). Most studies show that the main risk factor related to funding is late payment of work done (Sweis et al. 2008) and (Aibinu and Odeyinka, 2006).

2.7.4 Material category

Project activities can be directly affected by material factors, and the effect may be on the total cost of any large project (Manavazhi and Adhikari, 2002). Risk factors related to materials include time of selection, type of materials, availability in the local market, and all causes related to the class of materials. This category can have a significant impact on delays and cost increases.

2.7.5 Labour and equipment category

Labor risk factors are related to workforce problems, such as lack of available workforce and presence of unskilled labor; while the equipment related factors refer to the availability, reliability and quality of the equipment (Sweis et al., 2008)

2.7.6 External category

External risks are usually rated low and do not plays a major role in project delay (Sugiharto and Keith, 2003). Most studies show that external risks, including weather conditions and location, have the least impact on project completion (Alaghbari et al., 2007).

CHAPTER 3 - RESEARCH METHODOLOGY

3.1 Research Design and Approach:

This study examines the impact of the relationship between risk management and the development of construction projects in the Kingdom of Saudi Arabia. Likert scale survey was used to measure the variable dependent on project development and success and the independent variable of risk management. The participants were employees of consulting and contracting firms who had undergone a previous project.

Questionnaire response options are coded as 1 (Strongly Agree), 2 (Agree), 3 (Neutral), 4 (Disagree) and 5. (Strongly Disagree).

3.2 Sampling techniques:

The questionnaire that was directed to the participants was developed according to the research design, methodology and data. This survey includes two main sections:

The first section: about the procedure followed in the organization to manage risks, and the investigation of whether their organization practices effective risk management.

In the second section: The survey tries to determine whether the project they went through achieved the criteria for development and success, according to seven factors identified for the development and success of the construction project listed in the questionnaire. These questions were analyzed to determine the impact of risk management on the development and success of the construction project. The survey was directed at employees working in companies that worked on construction projects in Riyadh, the Kingdom of Saudi Arabia. These companies were consulting firms, construction firms, and real estate developers.

3.3 Research Population:

The scope of this research includes construction projects in the Kingdom of Saudi Arabia. It was necessary to sample this research because it is impossible to conduct all contracting companies and real estate developers, and the population consists of 4 leading consulting, contracting and property developers in Riyadh including 21 construction projects in the Kingdom of Saudi Arabia..

3.4 Research sample:

The sample consists of personnel associated with risk management, in order to ensure the quality of the data collected. The sample consisted of two hundred and thirty questionnaires that were dealt with for various employees with different educational levels, positions and experiences. To ensure the maximum level of participation of the research sample, the questionnaire has been translated from English to Arabic which can help employees of different levels and backgrounds to better understand the phrases in the survey which can lead to an increase in their participation. The number of distributed questionnaires reached 230, and 200 respondents were retrieved, at 87.4%.

3.5 Data Collection Method:

Data for this research were collected from primary and secondary sources. The primary data was developed through a questionnaire directed at the group of employees working in the contracting companies with the aim of collecting data for statistical analysis of the research to test the hypothesis. Secondary sources may be obtained from international books and

magazines, publications and the World Wide Web; the researcher can also benefit from what has been written in literature in similar fields.

3.6 Research Hypothesis:

The following hypotheses were tested:

- **Ha1:** There is an influence between identifying risk and project success.
  - Ha1-1: There is an influence between determining the risk and the set time.
  - Ha1-2: There is an influence between setting risk and planned budget.
  - Ha1-3: There is an influence between the identification of risk and the ability to comply with technical specifications.
- **H a2:** There is an influence between risk assessment and project success.
  - Ha2-1: There is an effect between risk assessment and planned budget.
  - Ha2-2: There is an effect between assessing risk and avoiding litigation or claims.
  - Ha2-3: An influence between risk assessment and the ability to maintain future work with other entities involved in this project was important
- **H a3:** There is an effect between the response to risk and the success of the project.
  - Ha3-1: There is an effect between responding to risks and achieving the quality standards originally defined in the specification
  - Ha3-2: There is an effect between responding to risk and meeting scope.
  - Ha3-3: There is an influence between risk response, time limit, theoretical model and variables

Three independent variables and seven dependent variables in this research, the independent variables are:

- Risk identification
- Risk assessment and risk response for construction companies

- **The dependent variable is:**
  - Achieving quality standards
  - Compliance with technical specifications

- Stick to the schedule
- Suits within the planned budget
- Definition of scope and ability to sustain future work

CHAPTER 4 - DATA ANALYSIS AND FINDINGS

1.1 Introduction:

The study aims to get acquainted with the opinions of the study sample individuals on "the impact of the relationship between risk management and the development of construction projects in the Kingdom of Saudi Arabia." To this end, we developed a questionnaire to review the opinions of the study sample. After re-coding the answers to the questionnaires in the SPSS program, we adopted the appropriate statistical analysis to test the hypotheses of the study. Cronbach's Alpha is used for reliability testing; reaching 96.5% for all statements which is very good considering it exceeds the excluded value by 60%.

4.1 Statistical Analysis:

The characteristics of the study subjects were described using repetition, means, and distribution. Categorical variables are described by frequencies and percentages. Demographic characteristics:

4.1.1 Gender:

Gender	*Frequency*	*Percent*
Male	143	71.5
Female	57	28.5
Total	200	%100

Table 5 – Gender

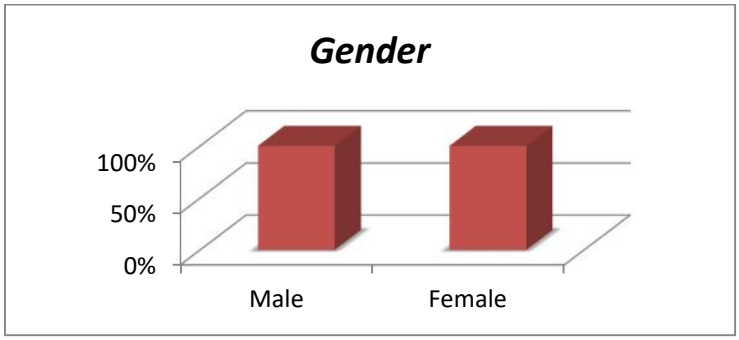

Figure 8 - Gender

The table shows that males were more than females. They were (143) with a (%71.5).Females were (57) with a (%28.5).

4.1.2 Age:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than-30 years	102	50.5	50.5	50.5
	30-39 years	67	33.5	33.5	84.0
	. 40-49 years	21	10.5	10.5	94.5
	50-59	11	5.5	5.5	100.0
	Total	201	100.0	100.0	

Table 6 – Age

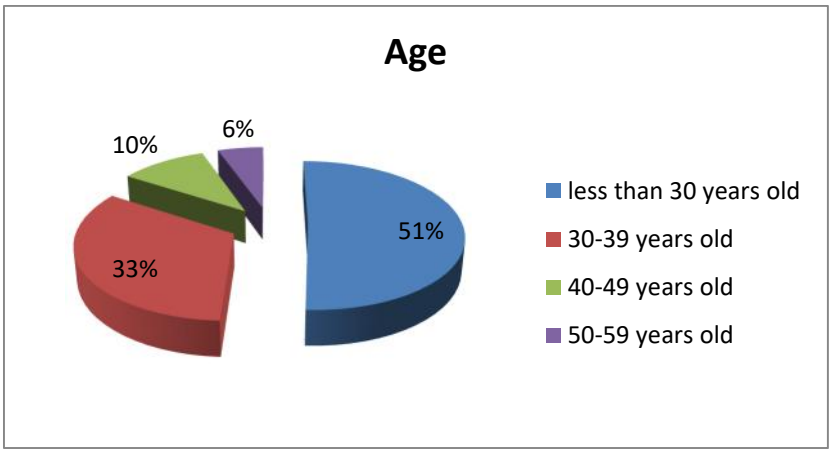

Figure 9 - Age

The table shows disruption of the sample according to Age.The above table shows that:

- 50.5% of the sample less than 30 years old.
- 33.5% of the sample 30-39 years old.
- 10.5% of the sample 40-49 years old.
- 5.5% of the sample 50-59 years old.

4.1.3 Level of education:

	Frequency	*Percent*	*Valid Percent*	*Cumulative e Percent*
Valid Master	14	7.0	7.0	7.0
High Diploma	5	2.5	2.5	9.5
Bachelors	142	71.0	71.0	80.5
Diploma	39	19.5	19.5	100.0
Total	**200**	**100.0**	**100.0**	

Table 7 - Level of education

The table shows disruption of the sample according to Level of education.

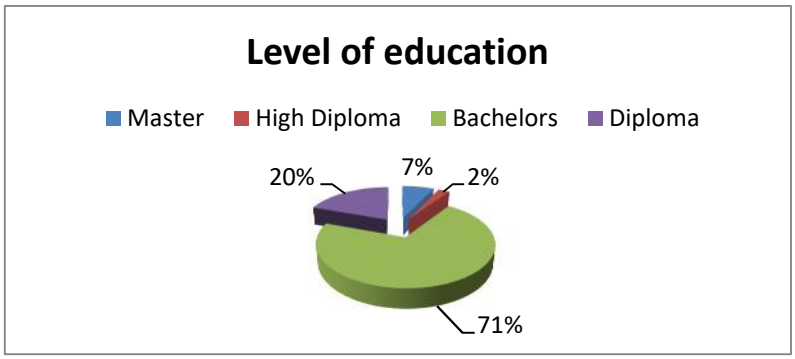

Figure 10 - Level of education

- 7% of the sample has Master.
- 2.5% of the sample has High Diploma.
- 71% of the sample has Bachelors.
- 19.5% of the sample has Diploma.

4.1.4 Job Title:

Job Title	Frequency	Percent
manager	12	6
Head of department	25	12.5
Head of section	6	3
Administrative clerk	48	24
Other	110	54.5
Total	**200**	**100**

Table 8 - Level of education

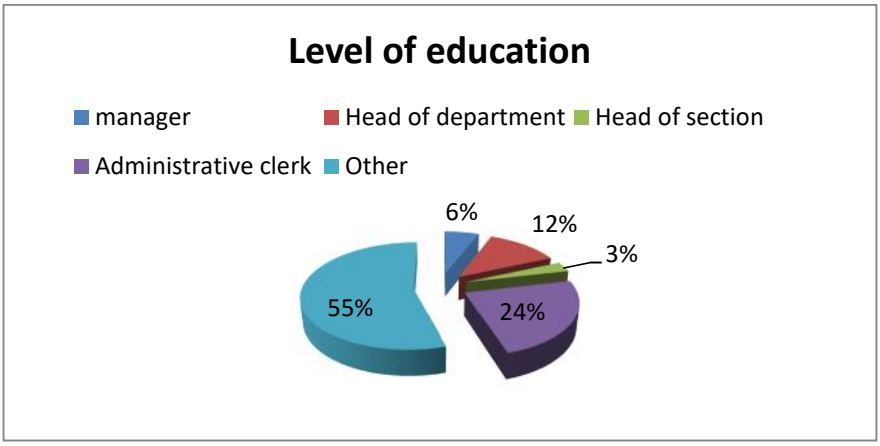

Figure 11 - Level of education

Table shows disruption of the sample according to Job Title.The above table shows that:

- 6% of the samples are managers.
- 12.5% of the samples are Head of department.
- 3% of the samples are Head of section.
- 24% of the samples are Administrative clerk.
- 54.5% of the samples have other Job title.

4.1.5 Experience:

Experience	Frequency	Percent
5-9	11	5.5
10-14	41	20.5
15-19	85	42.5
20-24	63	31.5
Total	**200**	**100.0**

Table 9 – Experience

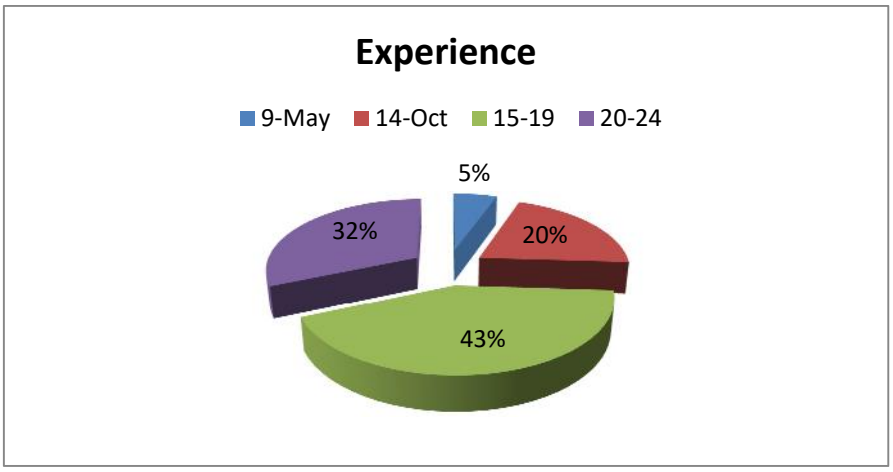

Figure 12 - Experience

The table shows the perturbation of the sample by experiment. The table shows that (5.5%) of the samples had 5 - less than 10 years' experience in the current job, (20.5%) had 10 - less than 15 years, (42.5%) had 15 - less than 20 years' experience in the current position, (31.5%) have 20 - less than 25 years of experience in the current position.

4.1.6 Total experience including the current position:

experience	*Frequency*	*Percent*
less than 5	5	2.5
5-9	10	5
10-14	48	24

15-19	79	39.5
20-24	58	29
Total	**200**	**100.0**

Table 10 - Total experience including the current position

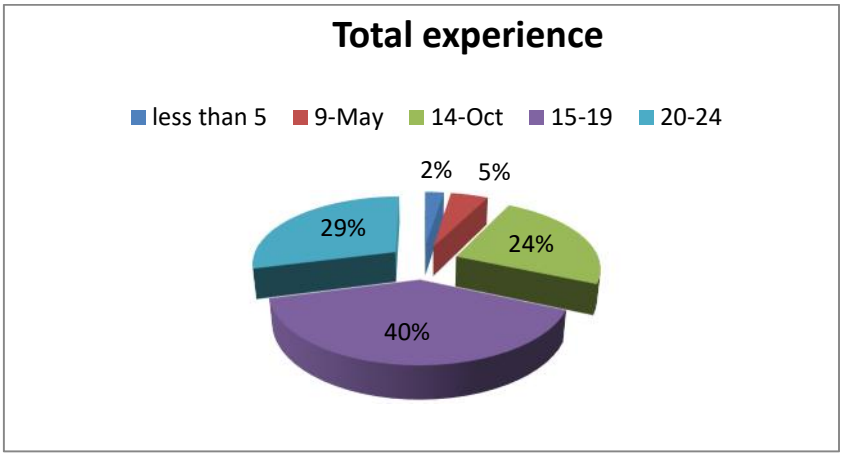

Figure 13 - Total experience

he table shows sample disturbance by experience including current position. The table shows that (27.3%) of the samples had less than 5 years' experience including the current job, (26.4%) had (30.7%) 10-14 years' experience including the current job..

4.2 Descriptive Statistics:

Mean & St. Deviation were calculated & Arranged by the most important statementto the less, Depending on means aims to investigate the Risk Management:

4.2.1 Risk Identification:

Statements Risk Identification	*mean*	*St. Deviation*	*Importance*
Your organization has identified and applied procedures for the systematic identification ofopportunities	4.23	0.854841	High
The management tends to identify the losses of risk	4.16	0.864951	High
The management tends to identify how and why risks arise?	4.154364	0.874648	High
The management used the experience of organization to identify the risk.	4.147963	0.881597	High
The management used analyzing process to identify the risk.	4.134464	0.854741	High
The management used scenario analysis to identify the risk.	4.1	0.808249	High
The management tends to identify the area of risk's	3.918036	0.924213	High

impact			
The management used physical inspection to identify the risk.	3.9	1.012485	High
The management tends to identify the risk's source	3.898036	0.922211	High
The management used questionnaires to identify the risk.	3.8375	0.882817	High
The management used interview to identify the risk.	3.767273	0.862663	High
The management used brainstorming to identify the risk	3.52625	1.085436	High
The management used SWOT Analysis to identify the risk	3.484444	1.077533	Medium
The management used examination of local/overseas experience to identify the risk	3.43963	1.197862	Medium
Total	**3.906997**	**0.936018**	**High**

Table 11 - Risk Identification

The above table indicates that there is a high rate of Risk Identification mean was (3.906) which is less than the agree line (3.50).

4.2.2 Risk Assessment:

Question	mean	St. Deviation	Importance
analyses and evaluates opportunities it has to achieve objectives	4.448182	0.691473	High
Your organization tries to identify the strengths and weaknesses of the risk management systems of other organizations it works with	4.252778	0.829757	High
Your Organization collates risks in order to develop decision making on appropriate actions`	4.172963	0.820708	High
The risk is analyzed according to likelihood	4.164821	0.725424	High
The risk is analyzed according to consequence	4.081	0.791574	High
Your organization assess the risk by quantitative analysis methods	4.048214	0.80063	High
The risk is analyzed according to reputation impact	3.947909	1.019391	High
The risk is analyzed according to achievement of objectives	3.925	1.051142	High
The risk is analyzed according to financial impact	3.898529	0.9822	High
Your organization assess the risk by qualitative analysis methods	3.87	0.963192	High
Total	**4.08094**	**0.867549**	**High**

Table 12 - Mean & St. Deviation of Risk Assessment Arranged by the most important statement to the less, Depending on means

The above table indicates that there is a high rate of Risk Assessmentmean was (4.08) which is more than the agree line (3.50).

4.2.3 Risk Response:

Statement	mean	St. Deviation	Importance
Your organization identified risk management plan	4.21	0.780349	High
Your organization takes into consideration the limits to achieve risk management objective.	4.148	0.693233	High
To evaluate the costs and benefits of identifying risks	4.075444	0.637543	High
Finding out the effectiveness of available controls and risk management responses	4.018039	0.792385	High
Your management prioritize of risks that cause a great losses	3.981852	0.764066	High
Your organization identified up to date business continuity plan	3.613	0.984036	High
Total	**4.007723**	**0.775269**	**High**

Table 13 - Mean & St. Deviation of Risk Response Arranged by the most important statement to the less, Depending on means

The above table indicates that there is a high rate of Risk Responsemean was (4.00) which is more than the agree line (3.50).

4.2.4 To what extent does organization use the risk treatment option?

Statement	mean	St. Deviation	Importance
The responsible managers must understand the risks faced by the organization	4.362143	0.654243	High
Senior management are responsible regarding communications about risk	4.345	0.830314	High
Your Organization support the effective management of risk between staff and management	4.294018	0.753017	High
The organization provides appropriate level of control regarding risks that it faces	4.211321	0.965474	High
transferring the risk	4.13	0.869991	High
Reducing the risk?	4.106339	0.926312	High

Monitoring the effectiveness of risk management is an integral part of routine management reporting.	4.08	1.029026	High
Avoiding the risk?	3.965	0.931727	High
accepting/retaining the risk	3.568	1.143753	High
Total	**4.11798**	**0.900429**	**High**

Table 14 - Mean & St. Deviation Arranged by the most important statement to the less, depending on means

The above table shows what extent does organization uses the risktreatment option:

- The First option was the responsible managers must understand therisks faced by the organization.
- Secondoption senior management is responsible regarding communications about risk.
- Third Your Organization supports the effective management of riskbetween staff and management.
- Forth the organization provides appropriate level of control regardingrisks that it faces.
- Fifth option transferring the risk.
- Sixth option monitoring the effectiveness of risk management is anintegral part of routine management reporting.
- Seventh option avoiding the risk.
- Eighth option: accepting/retaining the risk.

4.3 Development and success Criteria:

Degree	Statement	mean	St. Deviation	Importance
1	Scope definition/management well defined and maintained (no changes)	4.3	0.832747	High
2	Comply with technical Specifications	4.274911	0.786436	High
3	The project is within the planned Budget	4.208571	0.643489	High
4	Achieve the quality standards which was originally specified in the specifications	4.187679	0.736734	High
5	Adherence to Schedule –Bring the project on or ahead of schedule.	4.116339	0.757898	High

6	Future work with other entities involved with this project was important	4.04	0.735599	
7	No lawsuits or claims.	4.025	0.746432	High
	Total	**4.164643**	**0.748476**	**High**

Table 15 - Mean & St. Deviation of Development and success Criteria Arranged by the most important to the less, Depending on means

The above table shows degree each of the critical success factorsapplied and achieved.

4.4 Hypothesis:

Ha1: There is an impact exists between Risk identification and project success.

To test this hypothesis, Regression was used to find out if there is impactexists between Risk identification and project success.

sig	f	R Square	R
0.000	15.126	0.071	0.266

Table 16 – Regression - Ha1

The Examined (F) value was equal to (15.126) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk identification and project success.

So we accept the hypothesis:

There is an impact exists between Risk identification and project success.

$H_{a1\text{-}1}$: There is an impact exists between Risk Identification and the scheduled time.

To test this hypothesis, Regression was used to find out if there is impactexists between Risk Identification and the scheduled time.

sig	f	R Square	R
0.000	19.889	0.091	0.302

Table 17 – Regression - Ha1-1

The Examined (F) value was equal to (19.889) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Identification and the scheduled time.So we accept the hypothesis:

There is an impact exists between Risk Identification and the scheduled time.

H_{a1-2}: There is an impact exists between Risk Identification and the planned budget.

To test this hypothesis, Regression was used to find out if there is impact exists between Risk Identification and the planned budget.

sig	f	R Square	R
0.000	29.884	0.131	0.362

Table 18 – Regression - Ha1-2

The Examined (F) value was equal to (29.884) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Identification and the planned budget.

So we accept the hypothesis:

There is an impact exists between Risk Identification and the planned budget.

Ha_{1-3}: There is an impact exists between Risk Identification and the ability to comply with technical Specifications

To test this hypothesis, Regression was used to find out if there is impact exists between Risk Identification and the ability to comply with technical Specifications.

sig	f	R Square	R
0.000	19.228	0.089	0.298

Table 19 – Regression - Ha1-3

The Examined (F) value was equal to (19.228) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Identification and the ability to comply with technical Specifications.

So we accept the hypothesis:

There is an impact exists between Risk Identification and the ability to comply with technical Specifications.

H_{a2}: There is an impact exists between Risk Assessment and project success.

To test this hypothesis, Regression was used to find out if there is impact exists between Risk Assessment and project success.

sig	f	R Square	R
0.000	17.859	0.083	0.288

Table 20 – Regression - H a2

The Examined (F) value was equal to (17.859) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Assessment and project success.

So we accept the hypothesis:

There is an impact exists between Risk Assessment and project success.

$H_{a2\text{-}1}$: There is an impact exists between Risk Assessment and planned budget.

To test this hypothesis, Regression was used to find out if there is impact exists between Risk Assessment and planned budget.

sig	f	R Square	R
0.000	28.975	0.128	0.357

Table 21 – Regression - Ha2-1

The Examined (F) value was equal to (28.975) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Assessment and planned budget.

So we accept the hypothesis:

There is an impact exists between Risk Assessment and planned budget.

$H_{a2\text{-}2}$: There is an impact exists between Risk Assessment and avoiding lawsuits or claims. To test this hypothesis, Regression was used to find out if there is impact exists between Risk Assessment and avoiding lawsuits or claims.

sig	f	R Square	R
0.100	2.736	0.014	0.117

Table 22 – Regression - Ha2-2

The Examined (F) value was equal to (2.736) with possibility value (0.100) and it is higher than the specific value (0.05), and that shows that there is no significant impact exists between Risk Assessment and avoiding lawsuits or claims.

So we refuse the hypothesis:

There is no impact exists between Risk Assessment and avoiding lawsuits or claims.

$H_{a2\text{-}3}$: There is an impact exists between Risk Assessment and the ability to keep future work with other entities involved with this project was important

To test this hypothesis, Regression was used to find out if there is impact exists between Risk Assessment and the ability to keep future work with other entities involved with this project was important

sig	f	R Square	R
0.717	0.131	0.001	0.026

Table 23 – Regression - Ha2-3

The Examined (F) value was equal to (0.131) with possibility value (0.717) and it is higher than the specific value (0.05), and that shows that there is no significant impact exists between Risk Assessment and the ability to keep future work with other entities involved with this project was important

So we refuse the hypothesis:

There is no impact exists between Risk Assessment and the ability to keep future work with other entities involved with this project was important.

H_{a3}: There is an impact exists between Risk Response and project success.

To test this hypothesis, Regression was used to find out if there is an impact exists between Risk Response and project success.

sig	f	R Square	R
0.000	41.753	0.174	0.417

Table 24 – Regression - Ha3

The Examined (F) value was equal to (41.753) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Response and project success.

So we accept the hypothesis:

There is an impact exists between Risk Response and project success.

$H_{a3\text{-}1}$: There is an impact exists between Risk Response and achieving the quality standardswhich was originally specified in the specifications

To test this hypothesis, Regression was used to find out if there is an impact exists between Risk Response and achieving the quality standards which was originally specified in the specifications.

sig	f	R Square	R
0.000	27.725	0.123	0.350

Table 25 – Regression Ha3-1

The Examined (F) value was equal to (27.725) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Response and achieving the quality standards which was originally specified in the specifications.

So we accept the hypothesis:

There is an impact exists between Risk Response and achieving the quality standards which was originally specified in the specifications.

H_{a3-2}: There is an impact exists between Risk Response and meeting the scope of work.

To test this hypothesis, Regression was used to find out if there is an impact exists between Risk Response and meeting the scope of work.

sig	f	R Square	R
0.046	4.026	0.020	0.141

Table 26 – Regression - Ha3-2

The Examined (F) value was equal to (4.026) with possibility value (0.046) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Response and meeting the scope of work.

So we accept the hypothesis:

There is an impact exists between Risk Response and meeting the scope of work.H_{a3-3}: There is an impact exists between Risk Response and the scheduled time

To test this hypothesis, Regression was used to find out if there is an impact exists between Risk Response and the scheduled time.

sig	f	R Square	R
0.000	21.196	0.097	0.311

Table 27 – Regression - Risk Response and the scheduled time

The Examined (F) value was equal to (21.196) with possibility value (0.000) and it is lower than the specific value (0.05), and that shows that there is a significant impact exists between Risk Response and the scheduled time.

So we accept the hypothesis:

There is an impact exists between Risk Response and the scheduled time.

CHAPTER 5 - DISCUSSION AND CONCLUSION

5.1 Introduction:

Construction projects in the Gulf region and in the Kingdom of Saudi Arabia in particular face many challenges during the construction phase. Because of the cooperation between the Gulf States and their strategy to encourage foreign investment in the region, it is easy to establish business between countries. The overall objective of the research arose due to the high percentage of projects not being completed on time and within budget.

This chapter presents survey results as described in previous chapters, provides answers to research objectives, and provides conclusion based on interviews, questionnaires, and literature review. Moreover, it exposes study boundaries, bias and errors, and the research contribution to knowledge additional recommendations for future research.

5.2 Conclusion:

The literature review revealed a lack of studies related to the construction environment for construction projects in the Gulf region specifically during the construction phase, and helped create a research gap that formed the goal and objectives of this research. She also assisted in the first phase of this investigation, which consisted in identifying the risk factors related to construction projects and classifying them into six categories based on interviews with professional practitioners. Moreover, the literature review aided in the design of the mathematically and statistically evaluated questionnaire to measure the research objectives and conclude the research objective.

The literature review provided evidence that the Gulf states support the construction sector and encourage foreign investment by adjusting the investment strategy for foreigners, and by providing a fixed percentage of annual GDP to boost construction activities (Ministry of Planning, 2012), (Economic Development Board, 2013) and (Al-Zayani, 2012)

Various surveys have reported that multinational companies investing in this region believe that financial risk is a major source of uncertainty, that financial excesses are related to disputes arising between parties, and that project completion times are affected by this (Han et al., 2005). This statement is supported by research findings, as Saudi Arabia has classified the financial

category as the leading risk area for construction projects. Moreover, Al-Sayegh (2008) reported that economic risks may pose a major threat to international and local companies.

Cartam et al (2001) stated that contractors bear 97% of the responsibility for the availability of materials, and the clients bear no liability, which is a joint liability between contractors and customers, which is supported by research results that categorized the risks of 'material delivery', and allocated 90% of the liability to the contractor, 10% for consultants and 0% for clients, which means that it is a shared responsibility between contractors and consultants who represent clients.

After analyzing the data and testing the hypotheses, the following results were reached:

- There was a partial disagreement about the impact of the risk categories on the completion of construction projects during the construction phase.
- Saudi clients, consultants and contractors' perceptions of the negative impact of risk factor (RF) classes showed that contractors have different views of clients and consultants on risk factors (RF).
- In the management category, there is a strong agreement between clients and consultants.
- In the management category, clients and contractors had different views on the impact of the presented risk factors.
- In the design category, there is a disagreement between clients and consultants
- The financing category has the greatest negative impact on construction projects during the construction phase.
- The external category has the least negative impact on construction projects during the construction phase.
- The category of labor and equipment is strongly positively correlated with the other categories.
- There is an effect between identifying the risks and the success of the project, where the tested value (F) was equal to (15.126) with the probability value (0.000) which is less than the specified value (0.05).
- There is an effect between determining the risk and the specified time. The tested value (F) was equal to (19.889) with the probability value (0.000) which is less than the specified value (0.05).

- There is an effect between determining the risk and the planned budget. The tested value (F) was equal to (29.884) with the probability of the value (0.000) which is less than the specified value (0.05)

- There is an effect between determining the risks and the ability to comply with the technical specifications, where the tested value (F) was equal to (19.228) with the probability value (0.000) which is less than the specified value (0.05)

- There is an effect between risk assessment and the success of the project, where the tested value (F) is equal to (41.753) with a probability of (0.000) which is less than the specified value (0.05).

- There is an effect between the risk assessment and the planned budget, the checked value (F) was equal to (28.975) with the probability of the value (0.000) which is less than the specified value (0.05)

- There is no effect between assessing risks and avoiding claims or claims, as the examination value (F) is equal to (2.736) with the probability value (0.100) higher than the specified value (0.05).

- There was no influence between risk assessment and the ability to maintain future work with other entities involved in this project was important.

- There is an effect between the response to the risks and the success of the project, where the tested value (F) was equal to (41.753) with the value of probability (0.000) which is less than the specified value (0.05).

- There is an effect between responding to risks and achieving the quality standards that were originally specified in the specifications, and the tested value (F) was equal to (27.725) with the probability value (0.000) which is less than the specified value (0.05).

- There is an effect between responding to risks and fulfilling the scope of work, and the tested value (F) was equal to (4.026) with the probability value (0.046) which is less than the specified value (0.05).

- There is an effect between the response to risk and the set time. The Examined

- Was equal to (21.196) with a probability value (0.000) which is less than the specified value (0.05).

5.3 Recommendations:

- Responsible managers must understand the risks faced by the organization.

- Senior managers are responsible for the risk and risk management communications between employees and management.

- The organization must provide an appropriate level of control in relation to the risks it faces, which include (risk transfer and risk reduction).

- Monitoring the effectiveness of risk management is an integral part of management reporting as a risk treatment option.

- To manage risks effectively and efficiently, the contractor must understand the responsibilities of the risk, the circumstances of the risk event, the risk preference and the risk management capabilities.

5.4 Limitation:

- The investigation of the study was conducted under several limitations. For example, the study was limited to a group of construction companies and real estate developers, and only a group of categories of risk factors were included in the study. Moreover, the investigation was conducted in the Kingdom of Saudi Arabia.

- Clients were nominated by consultants and contractors. Moreover, the study suffered from poor timing due to the Corona pandemic during fieldwork time.

- This research relied on the opinions of practitioners and participants rather than actual project events.

5.5 Contribute to knowledge and recommendations for further research:

- The research contributes to knowing the impact of the relationship between risk management and the development of construction projects in the Kingdom of Saudi Arabia. This is a pioneering research of its kind being studied in the Kingdom of Saudi Arabia taking into consideration the views of clients, consultants and contractors (CCCs) on the negative impact of risk factors presented (RF) during the project phase and its impact on the development and success of projects.

- The study of the class relationship and the relationship between risk factors (RF) formed a solid basis for designing a standardized enterprise risk management model and could assist in decision-making regarding risk management for multinational companies interested in operating in the Kingdom of Saudi Arabia or the Gulf region. Moreover, the study clarifies where the responsibilities lie when a problem arises. Moreover, to design a standardized risk management model, there is no need for further study into the relative weight of risk categories and their impact on completing projects in the Kingdom of Saudi Arabia or the Gulf region. The results of the research can be used to design a standardized risk management model. Further investigation can be undertaken in various stages

- The study reveals that the major risk factors in the Kingdom of Saudi Arabia during the project stage are represented in a very important point, which is "the accuracy of cost estimation."

- Moreover, the contracting and construction companies classified the risks related to financing as the main category of risks affecting the life of the project, which is consistent with the study of Al-Sayegh (2008).

- In general, a future researcher can benefit from the research outcome by launching it as a basic basis for designing a standardized conceptual risk management model for

managing risk factors related to the project construction phase in the Kingdom of Saudi Arabia.

- The researcher continued the research in the literature review and did not follow the contractual formula in the contracts. Future researchers could use the existing notation of classification schemes used in standard contract forms.

- There are statistically significant differences in the perceptions of clients, consultants and contractors regarding the negative impact of the risk factors presented on the completion of the project.

- With the limited data, it can be concluded that the risk factors that have a significant negative impact on **the completion of the project in the Kingdom of Saudi Arabia in the event that it occurs are:**

    - Accurate cost estimation.
    - Revising / approving design documents, shop drawings and sample materials.
    - Data collection and pre-design survey.
    - Delivery of materials.
    - Complete documentation and project drawings.
    - The main risk factors in Saudi Arabia are:
    - Contractor experience.
    - Accurate cost estimation.
    - Delivery of materials.
    - Availability of building materials in the market.
    - Decision-making process.

REFERENCE

Ahmed, n. U., fort, j. G., elzey, j. D. Et al., empowering factors in repeat mammography: insights from the Stories of underserved women. J ambul care manage, 2004, 27(4): 348 – 355.

Al-khalil, m. And al-ghafly, m. A., delay in public utility projects in saudi arabia, international journal of Project management, 1999, 17(2): 101 – 106.

Al-kharashi, a. And skitmore, m., causes of delays in saudi arabian public sector construction projects.Construction management and economics, 2009, 27(1): 3 – 23.

Arab news, projects worth sr550bn stalled, contractors ask govt to step in, gulf in the media, 23 december 2011

Assaf, s. A. And al-hejji, s., causes of delay in large construction projects, international journal of project Management, 2006. 24: 349 – 357.

Assaf, s. A., al-khalil, m. And al-hazmi, m., causes of delay in large building construction projects, journal of Management and engineering, 1995, 11(2): 45 – 50.

Cannon, m., the key issues the construction industry will face in 2009, construction news, 17 november 2008

Cordsman, a.h., saudi arabia enters the 21st century v: economic, demographic and social challenges. Working Paper 2000, centre for strategic and international studies, washington, dc.

Falqi, i., delays in project completion: a comparative study of construction delay factors in saudi arabia and the United kingdom, master thesis 2004, heriot-watt university.

Faridi a.s. And el-sayegh, s.m., significant factors causing delay in the uae construction industry. Construction Management economics, 2006, 24(11):1167 – 1176.

Frimpong, y. And oluwoye, j. And crawford, l., causes of delay and cost overruns in construction of ground water Projects in developing countries: ghana as a case study, international journal of project management, 2003, 21:321 – 326.

Razek, a., bassioni, h. A. And mobarak, a. M., causes of delay in building construction projects in egypt, journal Of construction engineering and management, 2008, 134(11): 831 – 841.

Statistical year books, department of statistics ministry of finance and national economy, 2000, riyadh, Saudi Arabia.

Sweis, g., abu-hammad, a., and shboul, a., delays in construction projects: the case of jordan, international Journal of project management, 2007, 26(6): 665-674.

Tucker, r. L., haas, c. T., glover, r. W., alemany, c., carley, l. A., rodriguez, a. M., shields, d., key Workforce challenges facing the american construction industry: an interim assessment, centre for construction Industry studies, 1999, austin: university of texas at austin.

Loosemore, m., raftery, j., reilly, c. & higgon, d., 2006. Risk management in projects. 2nd ed. Abengdon, oxon: taylor & francis.

Akintoye, a., beck, m. & hardcastle, c., 2003. Public private partnership: managing risks & opportunities. 1st ed. Oxford: blackwell.Fewings, p., 2005. Construction project management: an integrated approach.

Abingdon: taylor and francis. Loosemore, m., raftery, j., reilly, c. & higgon, d., 2006. Risk management in projects. 2nd ed. Abengdon, oxon: taylor & francis.

Mudau, r. And pretorius, l. (2009). Project control and risk management for project success: a south african case study. Proceeding of the portland international conference, 1409-1414, portland, or.

Ewer, y. Mustafa, m.m. (2008) the impact of risk management on is projects development and success in syria, proceeding in international conference on telecommunication technology and applications, 1-6, damascus.

Lee-anne perry and bed (hons) (2007). The impact of risk management on the changing nature of principal's work, ph.d. Thesis, queensland university of education.

Bakker, k.b. & wortmann, hans. (2010). Does risk management contribute to it project success? A meta-analysis of empirical evidence "international journal of project management, 28: 493-503.

Abu mousa, j. (2008). Risk management in construction projects from contractors and owners" perspectives, master thesis, islamic university of gaza

Luu v., kim s., tuan n., ogunlana s., 2009, quantifying schedule risk in construction projects using bayesian belief networks, international journal of project management, 29 (2): 209–219

Wang j, yuan h, 2011, factors affecting contractors' risk attitudes in construction projects: case study from china, international journal of project management 29(2): 209–219

Oztas, a. Okmen o., 2005, judgmental risk analysis process development in construction projects, building and environment, 40 (9): 1244–125

Zou p., zhang g., wang j., (2007), understanding the key risks in construction projects in china, international journal of project management, 25 (6): 601–614

Nieto-morote a., ruz-vila f., 2011, a fuzzy approach to construction project risk assessment international journal of project management, 29 (2): 220–231

Dikmen i., birgonul m.t., anac c., tah j, aouad g. 2008, learning from risks: a tool for post-project risk assessment, automation in construction, 18 (1): 42–50

karimi a., mousavi n., mousavi s., hosseini s. (2011), risk assessment model selection in construction industry, expert systems with applications, 38 (2): 9105–9111.

El-sayegh s., (2008), risk assessment and allocation in the uae construction industry, international journal of project management, 26 (4): 431–438

Pinto a., nunes i., ribeiro r., 2011, occupational risk assessment in construction industry – overview and reflection, safety science, 49 (5): 616– 624.

Bakker k., boonstra a., wortmann h., (2010), does risk management contribute to it project success? A meta-analysis of empirical evidence, international journal of project management, 28 (5): 493–503

Bryan scott canada the role of leadership and management skills in the development and success of construction project managers, degree master of science, arizona state university 2009.

Canada b., (2009), the role of leadership and management skills in the development and success of construction project managers master thesis, arizona state university

Boetti v., (2008), use of social network analysis as a tool to evaluate development and success on construction projects and team interactions. Master thesis, university of colorado.

Nwagbogwu d., (2011), the correlation between project management effectiveness and project success. Ph.d thesis, walden university

Andrew j. Bates, 2009, the owners role in project success, ph.d thesis, polytechnic university

Culler s.& watson e., (2009), the degree of relationship between critical development and success factors and information technology project performance. Ph.d thesis, university of phoenix february.

Alkhathami m., 2004, examination of the correlation of critical development and success and delay factors in construction projects in the kingdom of saudi arabia, ph.d thesis, university

Of pittsburghm

Zafar h., 2010, critical development and success factors for an effective security risk management program in an organization: an Exploratory case study. Ph.d thesis, the university of texas

G. Sweis, r. Sweis, a. Abu hammad, a. Shboul, 2008, delays in construction projects: the case of kingdom of saudi arabia, international journal of project management, 26 (6): 665–674.

Hillson d., 2006, integrated risk management as a framework for organisational success, pmi global congress proceedings, seattle washington

Aaron t., shenhar j., dvir d.2002, risk management, project success, and technological uncertainty, journal r&d management, vol. 32 (2): 101-109

Didenko i. & konovets i., 2008, development and success factors in construction projects: a study of housing projects in ukraine, master thesis. Umeå university

Amr a., el nemr h, el nemr w., 2008, claims management in the egyptian industrial construction sector: a contractor's perspective journal of engineering, construction and architectural management, 15 (5): 456-469

Massingham p., 2010, knowledge risk management: a framework, journal of knowledge management, 14 (3): 464-485

Holmes t., what is construction industry?, available online june, 4th 2011, from: http://www.wisegeek.com/what-is-the-construction-industry.htm.

The state of queensland (department of justice and attorney-general), 2009, what is construction industry?, available online june, 9th 2011,from: http://www.deir.qld.gov.au/workplace/business/construction/whatis/index.ht m

Sidwell a., 2005, "the regulation of superstores: the legality of zoning ordinances emerging from the skirmishes between wal-mart and the united food and commercial workers union", available online june, 15th 2011, from http://www.rics.org/site/download_feed.aspx?fileid=2870&fileextension=pd f.

Akintoye, a., beck, m. & hardcastle, c., 2003. Public private partnership: managing risks & opportunities. 1st ed. Oxford: blackwell. New south wales treasury, 2004, risk management guideline, available online june, 15th, 2011from: http://www.treasury.nsw.gov.au/ data/assets/pdf_file/0009/5103/risk_mana gement.pdf

Research week international conference, 2005, available online june, 15th 2011, from http://www.rics.org/site/download_feed.aspx?fileid=2870&fileextension=pd f

Dennenberg, h.s., eilers, r.d., hoffman, g.w., kline, c.a., melone, j.j., snider, H.w. (1964). Risk and insurance, prentice hall, inc., englewood cliffs, nj Vaughan, e.j. And vaughan, t.m. (2002), fundamentals of risk management and insurance, wiley, new york, ny.

Project management institute pmi, 1996, project management body of knowledge, pmi. Isaac i., 1995, training in risk management international journal of project management 13 (14): 225-229

Zeng, j., an, m., & smith, n. J. (2007). Application of a fuzzy based decision making methodology to construction project risk assessment. International journal of project management, 25(6): 589–600.

White, d. (1995). Application of systems thinking to risk management: a review of the literature. Management decision, 3(10), 35–45.

Huang, d., chen, t., & wang, m.-j. (2001). A fuzzy set approach for event tree analysis. Fuzzy sets and systems, 118 (1): 153–165.

Gelbard, r. & carmeli, a. (2009). The interactive effect of team dynamics and organizational support on ict project success. International journal of project management, 27(2), 464 -470. Doi:10.1016/j.ijproman.2008.07.005

Schachter, d. (2004). Managing your library's technology projects. Information outlook, 8(12), 10-12. Retrieved from business source complete database. (an 154519 06)

http://www.ehow.com/facts_4987709_define-budget-planning.html 51- robson, c., 1993. Real world research. Oxford: blackwell.

Bell, j. 1999. Doing your research project: a guide for first-time researchers in education and social science.

Belson, w. A. 1981. The design and understanding of survey questions, aldershot, hants, gower publishing co. Ltd.

Belson, w. A. 1986. Validity in survey research, aldershot, hants, gower publishing company limited.

Biemer, p. P. & lyberg, l. E. 2003. Introduction to survey quality. New york: john wiley & sons.Borge, d. 2001. The book of risk, new york (us), john wiley &sons, inc.

Bossdorf, m., engels, c. & weiler, s. 2013. Eu gcc invest report :'promotion of mutual investment opportunities and creation of a virtual european structure in the gcc'. Eu gcc invest.

Bradburn, n. M. & sudman, s. 1981. Improving interview method and questionnaire design, san francisco, jossey-bass inc.

Braimah, n. & ndekugri, i. 2008. Factors influencing the selection of delay analysis methodologies. International journal of project management, 26, 789–799.

Brancato, g. Year. Recommended practices for questionnaire development and testing in the european statistical system. In: proceedings of q2006 european conference on quality in survey statistics, 2006.

Cbc, c. B. O. B. 2012. Economic indicators [online]. Bahrain: financial stability directorate. [accessed may 2013].

Chapman, b. & stephen, w. 2002. Managing project risk and uncertainty: a constructively simple approach to decision making, chichester, new york, wiley &sons, ltd. (uk).

Chapman, r. J. 2001. The controlling influences on effective risk identification and assessment for construction design management. International journal of project management 19, 147-160. Cia. 2010. The world fact book

[online]. Available: <https://www.cia.gov/cia/publications/factbook/geos/ku.html>. [accessed]. Cia. 2013. The world fact book

[online]. Available: <https://www.cia.gov/cia/publications/factbook/geos/ku.html>. [accessed]