HAYTHAM ADNAN ALAGHA
A STUDY OF RISK MANAGEMENT IN CONSTRUCTION PROJECTS AND ITS REFLECTION ON THE PERFORMANCE MANAGEMENT IN ALGERIA
NEU 2018

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A THESIS SUBMITTED TO THE GRADUATE SCHOOL OF APPLIED SCIENCES OF NEAR EAST UNIVERSITY

By

HAYTHAM ADNAN KAMEL ALAGHA

In Partial Fulfilment of the Requirements for the Degree of Master of Science In Civil Engineering

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Approval of Director of Graduate School of Applied Sciences

Prof. Dr. Nadire Çavuş

We certify that this thesis is satisfactory for the award of the degree of Master of Science in Civil Engineering

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ACKNOWLEDGEMENTS

I would first like to thank my thesis Supervisor Assist. Prof. Dr. Fatemeh NOUBAN of the Civil Engineering Department at Near East University. The door to Assist. Prof. Dr. NOUBAN office was always open whenever I ran into a trouble spot or had a question about my research or writing. She consistently allowed this thesis to be my own work but steered me in the right direction whenever she thought I needed it.

I would also like to acknowledge Prof. Dr. Kabir SADEGHI of the Civil Engineering Department at Near East University as the second reader of this thesis, and I am gratefully indebted to him for his very valuable comments on this thesis.

I would like to thank the rest of my thesis committee Assist. Prof. Dr. Ali Erhan ÖZTEMİR of the Civil Engineering Department at Cyprus International University for his insightful comments that was helpful during the defence of this thesis.

Finally, I must express my very profound gratitude to my great father Dr. Adnan Alagha, my kind mother Dr. Abeer Alagha, my beloved sister Haya and her husband Abd Allah and their beautiful son baby Salah, and my two amazing brothers Kamel and Ahmed, for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

Eventually, there is a long list of friends that I would like to thank. I can't mention them all but I would like to thank them from all of my heart for their valuable help and support.

To Dad and Mom ...

ABSTRACT

This thesis is about the relationship between the risk management in construction projects and its reflection on the performance management in Algeria. The aim of the research is to analyse the roles of performance and risk management in the construction project and recommend the best practices to improve the efficacy of the processes of the construction project.

The research also tries to investigate the influence of both mitigated and preventive methods. Furthermore, to investigate the usage of the risk techniques in construction industry in the Algerian Republic.

The questionnaire used closed-ended and open-ended questions, and also the researcher made interviews with landlords to survey the participants to achieve the aim of the research. One hundred seventy-seven questionnaires were collected from the involved parties in the construction industry, including engineers, landlords, and other types of staff. SPSS and Minitab were used to examine the data. Participants' answers resolved that the five important risk factors are: Financial issues, Earthquakes, Lack of experience, education, awareness and efficiency of workers, The Bribes, Lack of project supervision and workflow by the project managers (No-Supervision).

The research unearthed that most of the landlords and the contractors have lack of awareness about the means of mitigation and prevention risks. Furthermore, they depend on the experience they have or developed through the project progress instead of using risk techniques.

The study recommended that the joint project tool should be used in the industry for the purpose of risk transfer, and explanation of the risks and other mitigating factors that should be followed to improve analysis should be provided.

Keywords: risk management; performance management; construction industry; risk methods; performance methods; Algeria

ÖZET

Bu tez, inşaat projelerinde risk yönetimi ile Cezayir'deki performans yönetimine yansıması arasındaki ilişki hakkındadır. Araştırmanın amacı, inşaat projesinde performans ve risk yönetiminin rollerini analiz etmek ve inşaat projesinin süreçlerinin etkinliğini artırmak için en iyi uygulamaları tavsiye etmektir.

Araştırma, hem hafifletilen hem de önleyici yöntemlerin etkisini araştırmaya çalışmaktadır. Ayrıca, Cezayir Cumhuriyetinde inşaat sektöründe risk tekniklerinin kullanımını araştırmak.

Anket, kapalı uçlu ve açık uçlu sorular kullandı ve ayrıca araştırmacı, araştırmanın amacına ulaşmak için katılımcıları araştırmak üzere arazi sahipleriyle görüşmeler yaptı. Mühendisler, ev sahipleri ve diğer personel türleri de dahil olmak üzere inşaat sektöründeki ilgili taraflardan yüz yetmiş yedi anket toplanmıştır. Verileri incelemek için SPSS ve Minitab kullanıldı. Katılımcıların cevapları beş önemli risk faktörünün: Finansal konular, Depremler, deneyim eksikliği, eğitim, çalışanların bilinç ve verimliliği, Rüşvet, Proje denetimi ve proje yöneticilerinin iş akışının olmaması (Denetimsiz).

Araştırma, toprak ağalarının ve yüklenicilerin çoğunun azaltma ve önleme riskleri konusunda farkındalık eksikliği olduğunu ortaya çıkarmıştır. Ayrıca, risk tekniklerinin kullanılması yerine proje ilerlemesi yoluyla sahip oldukları veya geliştirdikleri deneyime dayanır.

Çalışmada, ortak proje aracının endüstride risk aktarımı amacıyla kullanılması gerektiği ve analizin iyileştirilmesi için takip edilmesi gereken risklerin ve diğer hafifletici faktörlerin açıklanması önerilmiştir.

Anahtar Kelimeler: risk yönetimi; performans yönetimi; inşaat endüstrisi; risk yöntemleri; performans yöntemleri; Cezayir

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LIST OF ABBREVIATIONS

RM:	Risk Management
PM:	Performance Management
LDCs:	Less Developed Countries
RAF:	Risk Assessment Framework
IT:	Information Technology
CRO:	Chief Risk Officer
CRM:	Certified Risk Managers
RMB:	Risk Management Board
RMP:	Risk Management Process
MBOs:	Management by Objectives
BSC:	Balanced Scorecard
GE:	General Electric Co.
CEO:	Chief Executive Officer
SPSS:	Statistical Package for Social Sciences
DZD:	Algerian Dinar

CHAPTER 1
INTRODUCTION

1.1. Introduction

This chapter contains the problem of study, the importance of research, general objectives, hypothesis, main research questions, literature review, theoretical approach, methodology and the thesis structure.

1.2. Problem of the Study

Algeria's performance management is bad because companies have not adopted risk management in the past since the projects in Algeria were a bit small, but with the rapid development of the construction industry, there is a dire need for risk management in Algeria's construction projects.

For this purpose, this paper discusses the relationship between risk management and its impact on performance and attempts to increase awareness and knowledge about risk management techniques.

1.3. Importance of Research

The strategies of the effective risk management help in allowing to identifying the strengths, weaknesses, opportunities and the threats of the research. The planning and the identification of the unexpected events help in increasing the performance of the organization (Osipova and Eriksson, 2011). For the purpose of having the appropriate management of the risks, successful project managers must be organized for the betterment of the project and also it will enhance the preparation, planning and the evaluation of the project. Therefore the importance of the research is being analysed to show the management of the risks and the increment of the performance in the construction industry.

1.4. General objectives

The aim of the research is to analyse the roles of performance and risk management in the construction project and recommend the best practices to improve the efficacy of the processes of the construction project.

To accomplish the aim above, following objectives are taken for this particular research.

- To evaluate the importance of the performance management in construction project
- To evaluate the significance of the risk management in the construction project
- To evaluate how the performance management and risk management measures help in improving the efficiency of the construction project
- To evaluate how the performance management and risk management measures help in accomplishing the goals and objectives of a construction project

1.5. Hypothesis

The research study will be undertaken by the hypothesis, so that better result of the research can be achieved.

Hypothesis

Risk management effect on performance management in the construction industry.

1.6. Research Questions

The following are the main research questions that have prepared for the research study are as follows:-

Question 1: Are risk management effect on performance management in construction projects?

Question 2: Are efficient measure of performance management and risk management help in improving the efficiency of the construction projects?

Question 3: Are efficient measure of performance management and risk management help in improving the cost efficiency of the construction projects?

1.7. Literature Review

Project management is defined as an application which is used for the removal of the risks in the construction process and the improvement of the performance is also seen in this case. The enhancement of the project activities is made to meet the needs of the stakeholders and the thereby the processes seem to be identifying, responding and analysing the project risks. The risks are indicated as the environment rather than considering the fate. It is uncertainty that inherit the possibility regarding the plans and also considers the prospects of the achievement. Therefore the word risk indicates the risk that is involved in the business with making the damages to the continued business (Crouhy, Galai and Mark, 2014). The enhancement of the business simply defines the mitigation of the risks with implementing the suitable factors that are requisite for the performance. Therefore the appropriate enhancement of the risks can be depicted by the process of enhancing the international project assessment and the management will be responsible for the generation and the mitigation of the risks factors.

As per the construction industry with the construction activity is undertaken for the study, the enhancement of the project is very much vital for having the detailed view of the risk management and the performance management with measuring their individual levels. Therefore the structure of the study clearly enhances the mitigation factors that are responsible for the growth of the business. It thereby also includes the vital explanations regarding the research that the past researchers had made and also plays an important role with focusing on the enhancement of the project. Therefore the study clearly focuses on the views that provide the positive side and the negative side with explaining the particular risk factors (Jordão and Sousa, 2010). For this, the risk rating system had been developed in the Algeria for the purpose of having the appropriate structure for the purpose of mitigating the risk factors. Therefore the structure enables the enhancement of the processes that are requisite for the management of the risk factors with measuring the performance in the construction industry. It also helps the organization to measure the performance level of the organization and also enables the expansion of the system requisite for determining the growth and the quality of the project. This is the overall description regarding the literature review which is being provided in the part of the literature and also explains the appropriate structure for the study (Maddux, 2006).

1.8. Theoretical Approach

The rationale risk management in the case of the multinational organizations indicates the uncertainty in the collaborative approaches, and also the collaborative working performance is being depicted. For the purpose of enhancing the rationale risks, multi-management problems seem to be influencing the success in the projects of the construction industry. The theoretical explications regarding the fundamental nature are being depicted to be the rationale of risk management which is also indicated by e insufficient for capturing the potentials of the management approaches (Aguinis, 2014). The collaborations are depicted to be intense for the purpose of gaining the success in the construction management projects and also the grounded theory analysis will enable the generation of the appropriate analysis for the research undertaken for study. Therefore the enhancement or the progress in the construction industry become a vital part of keeping in view the performance measurement in this competitive market. For the purpose of recognizing the collaborative success in the future work, the possession must be appropriately made with building the innovative strategies to standby in the market. Thus the statement clearly explains the risks assessments and the performance enhancement with measurement and mitigating the problems for the enhancement of the industry (Charrel and Galarreta, 2007). It also clearly explains the pathway for developing the innovative ideas with depicting the growth of the business. The relational risks seem to be involved in reaching the goals with considering the specific aspects of the performance and thereby the project success can be easily indicated with the enhancement of the construction industry.

1.9. Methodology

The researcher will collect data and information from different sources with the help of different tools and techniques. The researcher will try its level best to determine the most appropriate techniques for research so that better quality can be derived from the findings. The researcher will collect data through survey questionnaire and conduct interviews which will help to analyse performance and risk management in construction projects (Spangenberg, 2009). The study of different methods and techniques is related to the research study. The research will follow a standardized process of research. The researcher will use the most suitable and appropriate techniques for evaluating the main objective of the research study.

The methodology adopted by the researcher in this project is as follows:

- Study of the literature related to the risk management and performance capabilities.
- Preparation of the questionnaire.
- Personal interviews and questionnaire survey will also be conducted.
- Quantitative and qualitative data analysis.
- Conclusion, and recommendations of the research study.

1.10. Structure of Chapters

The overall content of the research topic is divided into seven chapters that would assist to describe each section of the research study in an appropriate manner. The chapters will provide detailed information on the research topic and increase the quality of the research.

Chapter one

The major focus of the chapter is the importance on the research and the objectives, main research question that will use in the survey, the methodology of the research, the hypothesis, summary of the theoretical approach, and summary of the literature review.

Chapter two

The major focus of the chapter is on the historical background of performance and risk management in a construction project. With the help of this chapter, different sources and theories will be reviewed so that useful information can be gathered and better study of the research would take place. The critical approach towards the research study would allow gathering significant information.

Chapter three

In this chapter, the researcher will gather information on the usage of performance and risk management in the construction management. The performance management ensures quality performance of the construction project and risk management ensures minimum risk level within the project. The research will focus on different techniques and strategies used in the performance management and risk management approaches.

Chapter four

The following chapter explains the process that has been undertaken by the researcher during the research study. The use of different techniques and methods will be depicted in this chapter. The researcher will be able to analyse the research topic with the help of different tools and techniques. The most appropriate technique will be used to get the highest quality of the research. The framework of the research has been designed by the researcher for the research topic. The researcher will follow the standardized process in order synchronize all the processes.

Chapter five

The research will collect data and information to examine the research topic appropriately. The researcher will gather data from different sources. The analysis of data will show the significance of the research study. The performance and risk management ensures successful completion and quality of the project. The data analysis is vital to understand the current situation in a better way. The theories and models can be related to the help of data analysis (Pickett, 2005). The research will apply both qualitative and quantitative research methods. The collection of data will be based on the main objective of the research study. The researcher will be able to analyse the effect of the performance management risk management on the construction project. The opinions and views of the respondents will also be analysed in this project.

Chapter six

The last chapter of the research study is the concluding chapter that will give the overall view and concept of the research topic. The objectives of the research study will be linked to the analysis of the research study. By the nature of the project and issues arises in the study, the researcher will list all the recommendation for getting better results.

CHAPTER 2
LITERATURE REVIEW

2.1. Introduction

According to the per Lockett's concept (1992), "Performance Management is nothing but an objective, which aims to develop individual requirements, commitments, and competencies for working towards the meaning objectives of an organization".

The organizational framework in risk management heavily depends on the performance and risk management where it should be developed in this manner where organizations can design their own risk and performance management frameworks to fulfil their particular objective regarding the organizational objectives and performances. Feedback and employee's assistance are two crucial components in the matter of risk and performance management's importance and objectives.

The main objective of the risk and performance management frame is to maximize consultants to the supreme abilities of both staff and the Assembly, by describing desires with regard to the parts, duties, responsibilities, skills required and routine practices. The primary aim of risk management and performance is to guarantee that the Assembly acts as a framework and its subsidiary systems in an integrated way to achieve optimal results.

2.2. Related Studies

Through the search of references, books and the Internet, for the purpose of searching for research and studies that have topics close to this research topic, the following studies were found:

2.2.1. Management in Construction Projects

2.2.1.1 Rountos E., (2008): "Troubled Projects in Constructions Due To Inadequate Risk Management".

Risk Management benefits are not limited to large or risky projects. This process can be formalized under these circumstances but applies to all levels of project activities and

procurement. It can be applied throughout the project period, starting with the oldest evaluations of the policy for the supply, running, maintenance and disposal of singular objects, facilities or assets. It has many applications, from alternate budget assessment and business plans to manage cost overruns and delays in projects and programs. Risk management will also provide advantages to improve accountability and justify choices by providing a steady and robust manner that supports decision-making.

2.2.1.2. Tarek B., (2009): "A Hybrid Model of Communication and Information Management in Mega Construction Projects in Dubai Using a New Critical Success Factor Approach".

Big construction projects in Dubai are becoming more complex because most of the materials used in construction are imported by 80%. Uncertainty and interdependence affect project management in the construction phase where all problems happen. Understand the complexities and their interdependence and how to find the right solution for them is the way to ensure the success of the project well. Management is applicable in construction and must be applied to all individuals and this includes client, contractor/consultant and workers. The role of the client and individuals in the project is very important for establishing an effective connection between all the participating parties.

2.2.1.3. Atif A., (2010): "Investigating Project Management Practices in Public Sector Organisations of a Less Developed Country".

Implementing project management techniques in the early stages is very important for Less Developed Countries (LDCs). By using the materials ideally and using a control and planning system, all the desired goals will achieve in record time and low cost. Due to the shortage of materials, the fact that they are mainly imported, and the large increase in construction projects, the need for project management has become important to deal with the great responsibilities of management, undoubtedly, the public sector is considered the basis for project management, and the result is a good economic growth that may lead to a qualitative leap in construction.

This study explores project management in public and private sectors in LDCs such as Pakistan, which is one of the least LDCs. Planning, Construction and Consultant/Contractor,

these are the three domains of project management in Pakistan, and these three domains mostly involved in development projects.

2.2.2. Risk in Construction Management

2.2.2.1. Jaser AM., (2005): "Risk Management in Construction Projects from Contractors and Owners' perspectives".

The construction industry differs from other sectors due to different unique characteristics. The construction industry is extremely competitive due to the presence of many specialized companies in this field, this diversity is due to the easy access to this field. The identification of risk factors in the construction industry depends on studying the risks and their various effects on the project and finding the best way to manage and deal with them to prevent or avoid them. Identifying risk factors is the master mission before any project begins. Several sources of risk have been identified in Algeria and have been analysed to measure their influence on construction projects and find the best way to deal with them.

2.2.2.2 Jordão and Sousa, (2010): "Risk Management"

The enhancement of the business simply defines the mitigation of the risks with implementing the suitable factors that are requisite for the performance. Therefore the appropriate enhancement of the risks can be depicted by the process of enhancing the international project assessment and the management will be responsible for the generation and the mitigation of the risks factors. As per the construction industry with the construction activity is undertaken for the study, the enhancement of the project is very much vital for having the detailed view of the risk management and the performance management with measuring their individual levels. Therefore the structure of the study clearly enhances the mitigation factors that are responsible for the growth of the business. It thereby also includes the vital explanations regarding the research that the past researchers had made and also plays an important role with focusing on the enhancement of the project. Therefore the study clearly focuses on the views that provide the positive side and the negative side with explaining the particular risk factors.

2.2.2.3. Ewelina G. and Mikaela R., (2011): "Risk Management Practices in a Construction Project".

Risk management is a concept which becomes very popular in a number of businesses. Many companies often establish a risk management procedure in their projects for improving the performance and increase the profits. Projects undertaken in the construction sector are widely complex and have often significant budgets, and thus reducing risks associated should be a priority for each project manager. This master thesis presents an application of risk management in the early stage of a project life cycle of a construction project. In order to examine how risk and risk management process is perceived a case study of a school project was chosen. Moreover, based on the conducted interviews, the research presents how risks change during a project life cycle. All analyses are based on a theoretical background regarding risk, risk management process and project life cycle approach in the construction sector.

In this thesis, risk management have been investigated in a case study which helped to realize how the construction industry works with this concept. The research has been carried out from January 2011 to May 2011, at the Department of Civil and Environmental Engineering, Chalmers University of Technology, Sweden. The thesis has been carried out with Bygg-Fast, a consultancy company within construction project management, where a school project has been investigated in order to do this research. The research has also been supervised by Sven Gunnarsson at Chalmers University of Technology.

2.2.2.4. Crouhy, Galai and Mark, (2014): "The Essentials of Risk Management, Second Edition".

Project management is defined as an application which is used for the removal of the risks in the construction process and the improvement of the performance is also seen in this case. The enhancement of the project activities is made to meet the needs of the stakeholders and the thereby the processes seem to be identifying, responding and analysing the project risks. The risks are indicated as the environment rather than considering the fate. It is uncertainty that inherit the possibility regarding the plans and also considers the prospects of the achievement. Therefore the word risk indicates the risk that is involved in the business with making the damages to the continued business.

2.2.2.5. Sibomana A., (2015): "Effects of Risk Management Methods on Project Performance in Rwandan Construction Industry".

Using risk management methods and finding a way to link risk management techniques to project performance, will benefit project objectives such as quality, time and cost. The aim of this study is to determine the relationship between risk management and performance management and to know how involved parties are participate in techniques during the project stages. It was concluded that the more reliance on risk management techniques, the better the performance in terms of quality, time and budget. The conclusion is that risk management should be applied at all stages of the project to achieve the best performance. It has been proved after the study that the contractors have the greatest influence on the risk management process.

2.2.2.6. Bader A., (2015): "Risk Management in Fast-Track Projects: A Study of UAE Construction Projects".

The main goals are to identify and categorize the risks facing construction in the UAE, to analyse the importance of fast-tracking in the UAE construction industry, and to propose an appropriate way to control the risks of fast-tracking projects in the UAE. The main goal was to identify risk categories in construction projects in the UAE and classify them according to their levels. The risk allocation structure helped identify risks either internally or externally, internal risks are those that arise within the organization, while external risks exist in the external environment but can still influence the project. It should be noted that when implementing fast-tracking of projects, the degree of performance is clearly increased and the cost and time required to complete the project are reduced.

2.2.2.7. Odimabo O., (2016): "Risk Management System to Guide Building Construction Projects in Developing Countries: A Case Study of Nigeria".

The investment in construction projects is not without risks. A large number of construction projects in Less Developed Countries (LDCs) as well as in Nigeria suffer from difficulties in project completion at a specific time, financial issues and quality problems. These difficulties are usually responsible for transforming lucrative construction projects in LDCs into losing projects. Critical risks that directly affect the cost of a construction project are

change in material price, health and safety issues, bribery and corruption, waste of materials, mismanagement of the site, supervision and over time. Critical factors that directly affect quality are the import of corrupt materials, harsh working conditions, poor construction techniques, lack of safety equipment, poor communication between relevant stakeholders, and inappropriate leadership style. Timely increases in construction projects have directly caused quality problems, low productivity, poor construction techniques, poor communication between stakeholders, delays in contract payments, and poor site management and supervision. The majority of critical risks are internal, this means that contractors can improve measures to control or limit high-level risks while being measured to decrease the influence of medium and low risks on construction projects. Strategies include actions to respond to risks based on their importance or acceptability, as well as some positive responses to risks, such as exploitation, sharing, promotion, acceptance, and other negative responses to risks, such as avoidance, transfer of mitigation, and acceptance. Moreover, in construction projects where cost, time and quality are important, implementing a project within a specified budget, time-frame and optimum quality are vital, thus properly executing a RM method that will promote the successful completion of construction projects and thus make the project more successful.

2.2.3. Performance in Construction Management

2.2.3.1. Nurhidayah A., (2012): "The Role of Team Effectiveness in Construction Project Teams and Project Performance".

Due to increasing demand in the construction industry, construction firms are hiring different teams to meet the fierce competition, to ensure the success of these teams, companies must find the best way to assess their effectiveness on the performance of the project. There are growing opinions says that creating special teams for each project will lead to better performance The objective of the study is to study the different factors that link the effectiveness of the teams to the performance features of the project.

2.2.3.2. Magdelane V., (2013): "An Effective Performance Management System for a Selected Company in the Construction Industry".

On many occasions, the staff has highlighted the lack of purpose and value, empowerment, communication and flexibility between the employee and employer relationship. These behaviours are typical of an organization where employees motivation is lacking Furthermore, employees are not committed to producing good results, and do not pride themselves on high standards and quality. Recognition and appreciation to motivate and enhance performance is missing and is evident in the poor standards and quality of work. The lack of motivation finally had an impact on costs. The total cost associated with staff turnover is expensive and contributes to poor corporate performance. Costs for the turnover includes salary costs, personnel management, the direct costs of recruiting and developing alternatives, the direct costs of providing training, and the losses resulting from reduced inputs from new trainees until they are completely trained.

2.2.3.3. B.Kaviya, C.Hema, (2015): "Performance Management in Construction".

Projects are organized to achieve complicated tasks by multi-disciplinary teams in the construction industry. The success of a project depends on how well the involved party can work productively to achieve the goals within the scope and the restraints on cost and quality. Project managers and engineers are tasked with mixing inter-organizational efforts to achieve specific goals. It works with the sole objective of fulfilling the objectives set within available sources, and they take full accountability for the success or failure of the project. Performance management is about guiding and encouraging staff to work with maximum efficiency in line with the requirements of the firm.

2.2.3.4. Alsulamy S., (2015): "Developing a Performance Measurement Framework for Municipal Construction Projects in Saudi Arabia".

The concept of construction refers to a manner in which a structure, facility or any other construction is being prepared. Work begins with planning, organizing, coordinating and financing supplies for the project. Supplies include money, men, machine and materials. Each project is carried out based on a life-cycle method consisting of many different stages that are unique and are quite non-repetitive in nature. The typical construction process is

intertwined from one stage to the next with a steady stream of activities covering a wide range of heavy, specific and easy projects on the one hand for fast, changeable and complicated projects on other projects (Ballard & Howell, 1998). Various administrative actions have taken place in the construction process centred on coordination between organizations, benefits, costs and errors.

2.2.3.5. Maddux R.B., (2006): "Performance Management".

The risk rating system had been developed in the Algeria for the purpose of having the appropriate structure for the purpose of mitigating the risk factors. Therefore the structure enables the enhancement of the processes that are requisite for the management of the risk factors for measuring the performance in the construction industry. It also helps the organization to measure the performance level of the organization and also enables the expansion of the system requisite for determining the growth and the quality of the project. This is the overall description regarding the literature review which is being provided in the part of the literature and also explains the appropriate structure for the study.

CHAPTER 3
CONCEPTUAL / THEORETICAL FRAMEWORK

3.1. Introduction

Traditionally risk management used to be considered as a means to alleviate perhaps eliminate negative outcomes of exposures. However, the result of this and other empirical studies shows the ability of risk management to go beyond this and respond to market factors which are out of management control in order to control volatilities in earning which ultimately improve corporate performance. The empirical study investigates the relationship between total risk management and company's performance. The result reviled that there is a positive relationship between total risk management and company's performance in companies which have invested higher level of intellectual capital.

Risk management is becoming more dependent because it contributes effectively to improving organizational performance, also this is placed on the agenda of the owners of companies, engineers and workers. The primary aim of this research is to study the relationship between risk management and its reflection on performance management in Algeria. The quantitative and qualitative research will be adopted using the questionnaire. Due to Algeria is in its early stages of risk management and technique, it is becoming increasingly urgent to conduct research on risk management, performance management and the relationship between them and how to apply risk management techniques to achieve better performance.

3.2. Theoretical Framework

Newly research indicates that the previous factors influence the implementation of risk management in institutions (Daud, & Yazid, 2009), which classifies important risk management tools, risk management theories and concepts, and provides a common risk management interface. The aim of this research is to study the relationship between risk management and how it is reflected in performance management in Algeria and to study the history of risk management implementation and its impact on risk management. Based on

literature review and research problem, the theoretical framework was developed and presented in Figure 3.1 as shown.

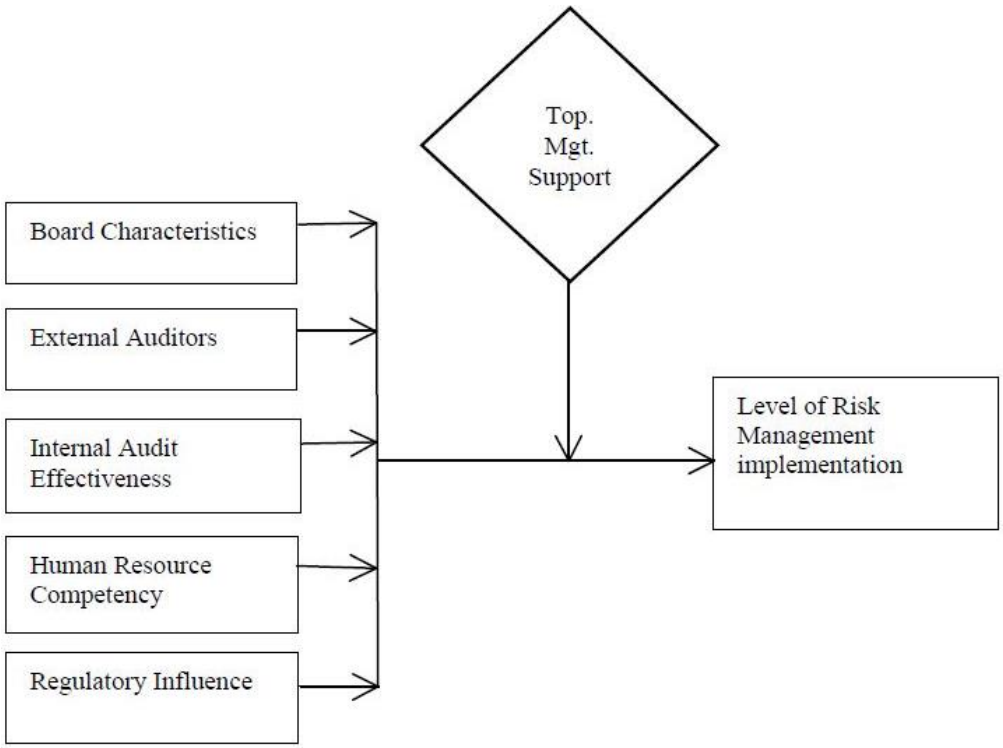

Figure 3. 1: Research Model

3.3. Concept of the Methods of Risk Management

Risk management concepts are implemented in the construction industry to study, enhance risk standards become more vital and a critical point to consider risk management methods. It appears that risk sharing refers to potential and actual threats that affect project objectives, and thus the project can be defined with exposure to opportunities. The risk is focused on the effective management of the project and, as a result, the project can be implemented by helping to strengthen the project, and the risk source must be identified with project uncertainties. The important factor in measuring risk with the help of different methods is to identify uncertainties in construction companies that appear to be the impacts on project objectives. The description of risk management methods involves risk avoidance, risk control, risk transfer and risk retention.

3.3.1. Risk Avoidance

Avoiding risk is the process of reducing risks, activities and risks that can adversely affect the project. While risk management aims to control the damage and financial consequences of project threats, while the whole elimination of every risk is rarely possible, the risk avoidance approach aims to distort many of the threats that can be achieved in order to avoid high-priced influences on the project. The risk avoidance approach seeks to reduce vulnerabilities that can pose a threat, and risks can be avoided through the policies, procedures and ongoing preparation of the parties concerned.

Risk avoidance entails adjusting the project plan so that the conditions triggering a risk event are no longer present and the risk is eliminated. While this strategy cannot be applied to all project risks, it is most effective for preventing risks.

Some examples of project plan adjustments that might help to avoid certain risks include changing a foreign supplier to a local one to avoid exposure to the exchange rate volatility risk or choosing a proven technology instead of an innovative one to avoid technological risk.

3.3.2. Risk Mitigation or Control

Risk mitigation preparation is the method of improving choices and acts to improve chances and decrease hazards to project goals. Execution of risk mitigation is the process of executing risk mitigation actions. Monitoring progress in risk mitigation involves following known hazards, knowing new hazards, and assessing the efficiency of the risk process throughout the project.

Risk control indicates to the assumption of risk but demands measures to limit its impact, likelihood of occurrence, mitigation or other management. Risk control can use the shape of installation of data collection or early alert systems that present more accurate information on risk, probability or timing assessment. If early alert can be received early enough to take move against him, it may be better to collect information on more realistic and probably more costly procedures. Risk control, such as aversion to risk, is not certainly cheap. If the project is about developing a new product, the competition is a risk. It may be a solution to speed up the project, even at large cost, to decrease market risk by hitting market competition; this is a regular policy in high-tech businesses. An example of risk monitoring

is the monitoring of technological progress in unique technological projects. The risk is that guaranteed scientific progress will not happen, necessitating the use of less-than-desirable backup technology or project abandonment.

3.3.3. Risk Retention

Risk retention, according to (Williams and Heims, 1989), becomes the only option in which risk prevention or transfer is impossible, avoidance is undesirable, the potential for financial loss is small, the probability of occurrence is negligible, and the transformation is uneconomical. It is generally recognized that risk avoidance in construction is impracticable because it may lead to a failure to proceed with projects or a contractor may offer a very high bid for a project. Risk reduction techniques as a result, in terms of potential impact, include the use of alternative strategies for contracts, different methods of construction, redesign of the project, further detailed and in-depth investigations at the site, etc.

Once all means of response and mitigation have been discovered, an amount of risks will stay. This doesn't mean that those hazards can be neglected; in most cases, those hazards will be subject to a detailed quantitative analysis to assess and calculate the required emergency levels. The aim is to reduce uncertainty in the project and in doing so raise the baseline assessment to reflect the more specific type of the project. Nevertheless, this does not mean that those hazards can easily be neglected. In fact, such systems should be subjected to efficient monitoring, check and management to assure that they are in the specific emergency allocation. It should be remarked that this state of emergency must consist of remaining risk and be evaluated as a low probability and possible influence. The high-risk should be subject to additional scrutiny so that an alternative method can be located.

3.3.4. Risk Transfer

Risk transfer is a risk management and controller strategy including a contractual shift to real risk from one side to another. If done effectively, the risk transfer guides risks and puts accountability on specific parties in order with their powers to manage and guarantee versus this risk. Accountability should ideally fall with any party that has dominated over possible resources of responsibility.

Risk transfer can be another possible way in which risk enhancement capacity can be increased so that the best option is as best explained as possible. The risks that are transferred are clearly demonstrated by helping to determine the nature of the risks. The diversion of the risks may harm that he has taken control of the management, so management can be controlled in a manner that is properly conceived by insurance companies. It appears that the risk transfer technique plays a significant part in the evolution of projects, and therefore the participation appears to be full or partial to transfer the participation of different parties in project implementation. Types of risks that are conceived for transportation in a construction project are insurance and project contract. Therefore risks can be transferred to the involved parties and thus can be described as a promotion in the form of development as involved in the issue.

3.4. Critiques of the Methods

The basic principle of the Risk Management Process (RMP) is the understanding the risk management of the project. In the RMP, the key stages are identification, measurement, examination and rebuttal (Smith et al. 2006) as shown in Figure 3.2. All steps in RMP should be involved when handling with risks, in order to efficiently perform the process in the project. The steps that are associated with the risk management process should be included in dealing with risks that must be effectively implemented in the project. In literature, there are several differences in RMP, but the most common frames consist of the above steps. However, in some risk management forms, there is another step that can be included, and most sources are identified as risk review or monitoring. Many authors have described the RM process model as consisting of major criticisms (Smith et al 2006). Criticism can be explained through supplementary analysis, which can be divided into different sections.

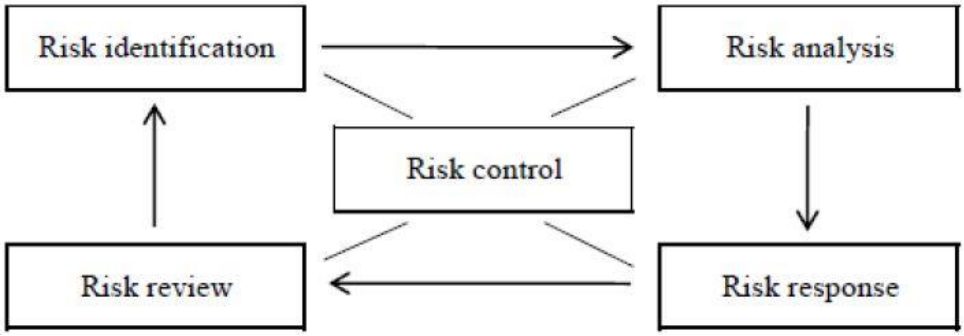

Figure 3. 2: Risk Management Methods

3.4.1. Methods Used in Risk Management

3.4.1.1. Risk Identification

Risk identification is the method of identifying hazards that are likely to interrupt a project, foundation or investment in accomplishing its aims. This involves documentation and reporting of apprehension.

Risk identification is the first crucial step in Risk Management Process (RMP). The purpose of risk identification is to identify early and ongoing situations that, if they happen, will have an adverse influence on the project's ability to accomplish performance goals or the ability to achieve results, and may happen from the project, or from outside provenance.

There are many models of risk identification, including program risk identification, risk evaluations to help in the purchase choice, alternative analysis, and operational uncertainties. Risk identification must match the type of evaluation required to support informed decision-making. The first step in the acquisition program is to define the aspirations of the program, thereby enhancing the Group's knowledge of what is necessary for the completion of the program. This gives the circumstances and limitations of risk identification and assessment. There are different reasons for risk. For risk classification, the project team should examine the extent of the program, budget, evaluation, techniques, performance difficulties, shareholders' expectations against the current plan and energy to deal with risks and the financial issue. Provide insight into risk tolerance areas by holding meetings with shareholders and reviewing previous data from similar projects. Risk identification is an

iterative process, and as the program progresses, it will obtain more data about the program and modify the risk in order to present the current knowledge.

Usually, the first step in RMP is unofficial and handled in different routes, depending on the company and the project team (Winch, 2002). This implies that risk rating is usually based on past knowledge that must be applied to future projects. For finding potential risks, the allocation of risks is needed. This can be divided and organized by the company. In this case, there is no better way than the other, since the sole purpose is to identify potential risks in the project. It may be difficult to kill threats, but after they are classified, it is simpler to act and handle. If risk factors are classified and distributed to any problems, risk management will be more efficient (PMI, 2004). RM not only fix problems early but also be prepared for possible problems that can happen suddenly. Addressing potential risks is not just a means of reducing damages in the project but also a means of transferring hazards to possibilities that can drive to financial, environmental and different benefits (Winch, 2002). The idea of identifying risks is to obtain a file of potential hazards that can be conducted in the project (PMI, 2004). In order to obtain all the potential hazards that may affect a particular project, various methods can be implemented.

The proposal to visualize risk factors for construction projects in the construction industry is known as the risk matrix. It is created by taking the method of assessing the public risk: the outcome of the probability and the extent of the loss as expressed in a given range. Simple verification techniques are used at an early stage, using both qualitative variables and quantitative variables. This technique relies on the great objectivity of decision makers as it is relatively straightforward, easy and simple to make. (Figure 3.3)

Risk managers also develop risk registers in order to draw a measure to identify and analyse the risk impact as described in the risk matrix. Risk management action also shows risk response strategies.

The following are the main characteristics of the risk matrix:

- The major aim of that approach is to identify and assess the scale of hazard.
- Easy-to-use technique for interpreting, analysing and implementing results.
- The variable measurement scale is the contractual measure.
- The method highlights the summary of risk response strategies.

Figure 3. 3: Risk Register with Risk Matrix

Lp.	The main of risks	Owner of risks	Reason	Effect	Risk assessment			Risk response strategy	Coast of strategy
					Probability	Impact	Level of risk		
Designing risk									
1	Lack of acceptance by investor of design proposals	Investor	Delays in approval	Increase in costs due to the suspension of work of the design team	5-40%	50thous-500thouse	Low	Market observation, alternative designing solutions	0
2	Delays and difficulties in obtaining opinions and permit	Investor	Delay of designing work, unknown scope of design	Distributed designing process	5-40%	500thous-2millions	Medium	Earlier diagnosis of the situation in local authorities offices, organization of meetings preceding designing process	50thous
3	Conflict among designing team members	Designer office	Insufficient flow of information among team members	Distributed designing process	0-5%	50thous-500thouse	Low	Response of a team leader to a form of conflicts	15thous
4	Too optimistic assessment of employee workload	Designer office	Approval of unrealistic deadline for individual work	Delay of designing work	5-40%	50thous-500thouse	Low	Proposing for employees to work overtime or ordering of part of work to another design team	120thous
5	Incorrect information from investor and lack of clear guidance	Investor	Design maybe issued with duplicate error or deleted error can generate timing constrains	Verification of errors will increase costs and increase time due to the development of the next revision of design	40-70%	2-5millions	High	Application to investor for extension of time to complete a design due to additional circumstances	20thous
6	Staff do not have sufficient knowledge about the subject of design	Designer office	Errors in design	Verification of errors will increase time due to the reported checks of designing work	5-40%	2-5millions	Medium	Designing team leader strengthens control over work providing for employees consultation with an expert	65thous
Time risk									
7	Acceptance of un realistic deadlines in contract	Designer office	Faulty contractual provisions	Deterioration of design quality of failure to meet the dead line	40-70%	2-5millions	High	Employment of new employees or ordering part of work to another party during a contract	105thous
Budget risk									
8	Underestimation of design budget	Investor	Budget may not be sufficient to carry out designing tasks	Deterioration of design quality	40-70%	2-5millions	High	Limiting scope of design necessary minimum	40thous

3.4.1.2. Risk Assessment

Risk assessment is the description of risks that may adversely affect the institution ability to manage business. These assessments assist to know these essential business hazards and provide criteria, methods, and instruments to diminish the influence of these hazards on business operations.

Companies can use the Risk Assessment Framework (RAF) to prioritize and share evaluation details, including any risks to their IT base. RAF assists the institution to identify the possible risks and any commercial assets at risk from these risks, as well as possible implications of these risks arise. In large institutions, risk assessment is usually performed by the Chief Risk Officer (CRO) or Certified Risk Management (CRM).

Risk assessment is the second stage of Risk Management Process (RMP) where the received data is analysed about potential hazards. Risk assessment can be defined as a short-term risk that has a major impact on the project, among all the hazards presented at the categorizing stage (Cooper et al., 2005). There are two types of risk assessment have been developed, quality approach and quantity approach. The qualitative approach is most appropriate when hazard can be found somewhere on the scale from top to bottom, quantitative approach is applied to define the potential and influence of certain hazard and is based on statistical assessments (Winch, 2002). Firms favour using a qualitative approach where it is appropriate to identify hazards rather than quantify (Liechtenstein, 1996). In addition, there is more one approach named quasi-quantitative analysis, which integrates the analytical values of quantitative analysis and classify the risk factors and qualitative approach (Cooper et al., 2005).

Risk assessment steps:

- Step 1: Identify the risks.
- Step 2: Determine what, or who could be harmed.
- Step 3: Assess the hazards and develop domination means.
- Step 4: Register the conclusions.
- Step 5: Evaluate and refresh the risk assessment routinely.

3.4.1.3. Risk Response

Risk response is the process of developing strategic options, taking appropriate steps or actions when an unacceptably high degree of exposure to risks is detected. Also may be called as risk treatment. A project team member is committed taking accountability for every risk response. This method guarantees that every risk requires the landlord response to observing the responses, although the landlord might authorize the response to another person.

Risk response is the third step of the Risk Management Process (RMP), and it refers to actions to be taken against specific hazards and threats. The response plan and method is based on the type of risk involved (Winch, 2002). Additional demands are that the risk should be supervised to observe the progress of the response, which will be accepted upon by the parties involved in this RMP (PMI, 2004).

The effect of less risk, the best can be handled (Winch, 2002). Most popular risk response strategies are avoidance, reduction, transport and retention (Potts, 2008). In addition to those kinds of responses, (Winch, 2002) suggests that seldom it is hard to make a determination based on very poor data. This can be bypassed by waiting for suitable data that will be able to deal with the risks. This method of action is termed “Delay Decision” but this strategy isn't fit in all cases, particularly when dealing with sharp risks. Those that require being administered earlier in the manner.

3.4.1.4. Monitoring and Reviewing Risks

Monitoring and Reviewing Risks is the method of following identified risks, observing remaining risks, identifying new risks, performing risk response strategies, and assessing their efficiency during the project lifecycle (Newton Square, 2004).

This last step of Risk Management Process (RMP) is essential as all data about the identified risks is obtained and controlled (Winch, 2002). Endless surveillance of RMP assists to identify new risks, pursue identified risks, and kill former risk of risk assessment plus project (PMI, 2004). The (PMI, 2004) also indicates that observing and control assumptions are to monitor the hazard situation, also to take remedial action if necessary.

The tools and ways used to control risks (PMI, 2004):

- Risk reassessment. Identify possible new risks, this is a constantly repeated method during the whole project.
- Monitor the overall situation of the project. Are there some changes in the project that could affect and induce potential new risks?
- Case meetings. Discussions with the risk holder, exchange of experiences and assistance in RM.
- Risk log updates.

Through full management of RMB, the method can be evaluated. This is a process of establishing a risk log were whole risks can be earmarked and managed to help coming projects (PMI, 2004). This is also, a method to enhance the work of the project. (Table 3.1)

Table 3. 1: Monitoring and Reviewing Risks

Discipline	Programming /planning	Preliminary Engineering	Final framework Design	Construction
Planning	•	•	•	
Funding Approval	•	•	•	
Environmental	•	•	•	•
Engineering	•	•	•	•
Project Management	•	•	•	•
Structural, Civil, Systems	•		•	•
Cost Estimating	•	•	•	•
Scheduling	•	•	•	•

Budgeting	•		•	•
Real Estate	•	•	•	•
Oversight/Construction Management	•	•	•	•
Contractor/Constructability	•	•	•	•
Other Technical	•	•	•	•
Risk Facilitation	•	•	•	•

3.4.2. Methods Used in Performance Management

Performance management is very important for all private firms and government institutions because it provides supervisors and managers with a way to gauge staff performance and decide whether employees meet firms' expectations. Performance judgment process differs according to the working conditions, the type of work and the employee's occupation.

3.4.2.1. Overview

Employee performance measures can determine compensation for the employee, the status of his / her job and chances for progress. For those purposes, performance management applications need to consist of techniques that allow honest and trustworthy crew performance assessment. The employer first sets performance standards to help measure staff performance. Performance criteria determine what staff need to satisfy or surpass the firm performance anticipation.

3.4.2.2. Graphics Rating Scales

Graphics evaluation scale is ideal for production-oriented work environments, as well as other fast-moving workplaces. The rating scale consists of a list of work-tasks, performance criteria, and a scale typically from 1 to 10 to assess staff performance. This technique of measuring the performance of staff demands planning same other techniques, however, it

can be accomplished almost fast, which is important for directors who handle huge branches or to perform tasks quickly due to lack of time.

3.4.2.3. Management by Objectives

In order to measure the performance of employees in supervisory or administrative positions, the use of the Management by Objectives (MBOs) is necessary. The first step in MBOs is to identify the objectives of the staff to determine the required resources to accomplish the objectives, the second step is to consist of timetables to accomplish each objective. Throughout the evaluation phase, the employee and the manager should meet regularly to review staff progress and re-assign the goals they need like time or supplies. Employee performance is gauged by the number of objects achieved within the time-frame.

3.4.2.4. Balanced Scorecard

Balanced Scorecard (BSC) is a performance management system that includes key measurement categories. BSC focuses on managing performance management strategies through performance indicators and process analysis. BSC determines the financial measures and results of the other indicators. Shortcoming or failure can be handled with the help of a scorecard. BSC directs the management team to focus on operational issues, deliver visibility and objectives to the organization, and focus on the organization's efforts.

3.4.2.5. Forced Ranking

The forced arrangement gained a bad name for all times, but this procedure became familiar under former CEO Jack Welch, Manager of General Electric’s Co. (GE’s). Welch invited executives and administrators to divide the staff into three groups. The highest performance is 20% of the workmanship, the ordinary performance is 70%, plus the less performing workers formatting about 10% of the workmanship. Forced ranking gauge staff successes compared to their peers' achievements, rather than comparing the current staff assessment era with that of the former staff. For this reason, forced arrangement creates a highly competitive working environment.

3.5. Risks at Construction Project Stages

Different sources of construction hazard have been classified in previous studies. Many methods have been proposed in the literature for identifying risk.

(EI-Sayegh, S. M, 2008) lists different circumstances of landlord, plans, contractors, subcontractors, supplier, political, financial, etc. (Nieto-Morote A and Ruz-Vila F, 2011) have four methods of risk ranking: project management risk, engineering risk, performance risk and supplier risk. (Kuo Y and Lu S, 2013), divided group risk into five subcategories: engineering drawing, construction management, natural and socio-economic risk. (Dikmen, I., Birgonul, M.T. and Han, S, 2007), divided group risk into eight subcategories: Management risk, resource risk, production risk, drawing risk, repayment risk, customer risk and subcontractors.

A different method can be applied to identify the hazards linked with building projects and should assist the purpose of determining the approach for the objective of the study. In this paper, the risk will be grouped using (Enshassi A and Mosa J A, 2008) method who has classified typical risk groups that are peculiar to LDCs.

Construction risks can be classified into these nine categories:

1. Technical Risks: Technical risks cover anything that restrains the firm from producing the product that the client requires. That may involve doubt of supplies and availability of elements, inadequate on-site examination, or unfinished drawing. Those risks can normally happen if there are modifications in the extent and specifications of the project and if there are mistakes in drawing or monitoring.
2. Logistical Risks: There are several logistical risks that demand to be approached before establishing the project. That involves the availability of transportation and the availability of tools such as extra pieces, petrol. Without approaching those logistical problems, the firm is jeopardizing enormous obstacles and setbacks in the project.
3. Environmental Risks: Environmental risks cover natural catastrophes, climate, and periodically changes. Those risks are normally neglected when people are ignorant of local circumstances. If a firm aspires to operate on a design in a new town, city or even a country, it requires becoming accustomed to the climate in that region. If a

firm is equipping for possible climate risks, it is more reasonable to dodge delays and possible disasters.

4. Management Risks: The most familiar risk linked to management is the uncertain supplies output. Before establishing a project, the firm requires being assured that it has quite experienced staff and well outlined their tasks and reliability. The fail to arrange this can start disaster damages.
5. Economic Risks: Local taxes, distension, change in foreign currency are some possible economic risks may happen throughout the project. If a firm operating a global project, it is essential to know how it will switch foreign currency. The tax rate varies widely among countries, so this should stand into consideration before the project starts. Firm's finances will be different if it operates in a tax-free country versus a high-tax country.
6. Socio-Political Risks: Customs and import limitations and challenges in the disposal of material are some of the socio-political risks that may be faced throughout a project. Depending on wherever a firm's project is placed, there will be several rules and regulations that firm obligated to take. Every project has different rules and regulations, the firm must be aware of this.
7. Physical Risks: The factors of this risk include the accidents due to bad protection systems, broken equipment and materials.
8. Design Risks: Incorrect designs, bad harmonious designs (constructional, mechanistic, electric, etc.), mistaken quantities, and rush design.
9. Legal Risks: This category related to papers like difficulty to get a permit, and ambiguity to work legislation.

3.6. Advantages and Disadvantages of the Methods

3.6.1. Advantages and Disadvantages of the Methods in the Risk Management in Construction Projects

Risk management method defines as an important preparation in firms in recent times. Several firms favour accomplishing the advantages of risk management. Following are few advantages of risk management in projects:

1. Benefits of risk identification:

Identifying risks assists to promote attention to peaceful in emergency times. This means that all the hazards in the past are most likely to happen and it has been engineered to be achieved without any running assumption. These hazards are often kept in most cases. It aids in risk opportunities to be informed of future matters.

2. Benefits of risk assessment:

It concentrates on specific duties on helping the influence of business or projects. This phase concentrates on concepts that are addressed amongst shareholders. It has a great influence in dealing with cases that are completed with conceivable solutions. Participating in these types of evaluations will help address the risks they face, and it improves organizational habits.

3. Treatment of risks:

It assists in addressing the special hazards that are subsets to implement a plan. It has an internal agreement that is achieved and lessened towards underdeveloped procedures. Their opportunity lies in a lack of arrangement, and they are even more aware of the lucrative data being mitigated through internal restrictions.

4. Minimization of risks:

The hazards that are addressed in specific assessment plans are expected for business purposes. It can rush up data to modify procedures and emergencies that have succeeded in designated business purposes. The cost-benefit analysis should be reviewed as part of the risk ownership. It concentrates on policy modify in specific structural behaviour.

5. Awareness about the risks:

The observed conditions will generate awareness of the conditions for the risks that are a successful analysis and assessment of the practice of risk units. It can focus on risk therapies in lessons learned and no preparation is scheduled. It has subsequent phases for each unit in the specified data.

6. Successful business strategies:

The RM procedure is not a one-time project. It has different stages adapted to the lack of planning, preparation and strong implementation of all drawings. It has the operational effectiveness to be achieved when mitigating negative risks. They have emergency policies on preparing businesses for treatment measures.

7. Saving cost and time:

It threatens the task that is accomplished on plans and other business procedures. It always saves costs that are grouped under the things that are exercised. It blocks waste and compensates fire time.

8. Harvesting knowledge:

Here we need to seek knowledge about the shareholders' experience of a proactive strategy that is applied to uninitiated threats towards acquired knowledge and this provides a model for addressing ready-made risks. It has serial plans that revel from the beginning until the common knowledge.

9. Protecting resources:

RM strategies and procedures assist to protect the organization's sources. This helps to strengthen sources rather than to use them not legally. It also provides protection between adaptive adjustments to staff substitution and is grouped with each other with other sources. It builds production plans, alternative plans, or reorientation.

10. Regulatory compliances:

This frame helps to meet organizational requirements. It implements and manages RM. This enhancement helps to achieve high aspects of credit. It also derives high efficient against capital variability and even the rating measures that are assigned to recompense the business plans. It translates to great confidence from the shareholders involved in the insured business.

11. Values shareholders:

It aims at the ability to borrow from a shareholder who has a great force within the department and allows the specific parts that the firm can reach to. It also has the precise decision-making means within existing models as well as expected organizational recruitment.

12. Possibilities of risks:

The probability of clean risks being managed by the intensity or influence of an institution that is updated to possess risk strategies. They have insight into solid profit layers that support a RM culture. It organizes the designed data and even the approach towards a consistent and balanced vision. It supports all the normal demands of the plan.

13. Identification of risks:

The RM method assists identify risks with a specific system to define optimal RM and have the maximum opportunity for risks related to the implementation of the guidance provided. It has the full support of the entire foundation when risks are classified. They will become simplified and effective within complicated elements.

14. Provides guidance:

It provides advance guidance on the structure that is enabled by the experiment and the assessment of risks that are developed in the structure of risk strategies. It also develops advanced RM techniques linked to the results of acquired knowledge and other risks.

15. Reduces impact and loss:

RM has more specific actions when there is a predefined agenda or object damage. It contributes to stress and anxiety. Complex issues when they are collected. This ensures that the organization has all the possible outcomes of the independent and objective evaluations analysed to take the challenges.

16. Stability of earnings:

The business process in the following level of operations will focus on the quantity of planned data. It decreases the influence of business actions. The staff will be reduced so that they remain in the secure zone.

17. Managing the strategic plans:

RM has strategic plans for the most commonly used plans. This data is based on most of the sources associated with the data specified for the migration. This is reflected in the produced data that handles most of the money flows produced in negative positions.

18. Handling previous projects:

If the risk is examined precisely in the past stages, it can be transferred without treating the detailed data. This stage can be held to reveal future risks that conflict with the schematic table and increases new risks to rivals managed by banned tactics.

19. Nurturing risks:

Every risk potential will be conducted by a diverse logic that can be compensated in the hard comparisons and options that determine the harmonious decision creators for each project. This needs well-trained workers to minimize risk conditions.

3.6.2. Advantages and Disadvantages of the Methods in the Performance Management in Construction Projects

Managing the risks reduces the time-wasting to counterbalance the projects. It assures that the project that exchanges are to enhance the liquidity in the firm and spent on the investigation and expansion of the designated matters that hold to guarantee project management.

1. Complex calculations:

RM includes complicated risk management accounts. Without the automatic tool, each risk account becomes complex. It includes typical data that adds to staff criteria. This procedure is actually hard to foretell.

2. Unmanaged losses:

If the company deals with bankruptcy, then it will be passed to the wages of the staff, the company is responsible for the loss caused by an inappropriate schedule on risk management.

3. Uncertainty:

Even if the uncertainty of loss, the people have to include it in the planned scheme for loss of cuts and even think additional insurance cuts.

4. Depends on external entities:

RM relies on outside institutions that are formed within the organization and normally relies on outside data. It covers all dependent data about risks related to different valid sources. Removable sources are dependent on outside institutions that tend to obtain data.

5. Mitigation:

Mitigation normally ensures the loss of hidden funds that may cause risk mismanagement. This starts an unsecured receiving of data within the firm's rare casualties.

6. Difficulty in performing:

RM needs a lot of time to collect data on strategical tactics. It has global measures that are decreased and admitted according to financial advantages. It corresponds to the difficult realization without up-to-date experience without compensating the needed amount of data.

7. Performance:

Due to the difficulty of risk management, it can only be handled objectively, because it maintains control of possibilities in each case. This can be classified with the difficulty of implementing controls. It manages cost-benefit study that has not been completed. This method focuses more on the application of restraints.

8. Potential threats:

These potential threats should be guarded to control and not appear in the market. This application decreases the level of hazards and raises the relative control.

Each type of method will have limits and advantages for project risk management. Therefore to create an efficient management of risk, one has to concentrate on strategic systems to mitigate hazards that are efficient on risk applicants. Risk management becomes the main case when the organization targets result regardless of threats, damage and potential vulnerabilities.

CHAPTER 4
METHODOLOGY

4.1. Introduction

The research methodology describes research methods and techniques used in the study. Design includes research, the field of study and population or sample size. These include sampling procedures, data collection methods, secondary data sources, instrument validity and reliability, and data analysis.

4.2. Research Design

According to (Kothari, 2008) conceptual structure is the way research is designed, and this is the method of the research design. Conceptual structure is a schema for the collection and analysis of data according to the hypothesis imposed in the study, and to find a way to deal and apply the final analysis of data. The researcher used descriptive research methodology, using quantitative and qualitative analysis. In the quantitative approach, data were used in the form of numbers obtained from questionnaires.

4.3. Target Population

The case study is risk management in construction projects and its reflection on performance management in Algeria. The study is concerned with the size of the sample (215) who work as engineers and sub-contractors in the construction management industry, in all the states in an organized manner, where the largest percentage of questionnaires were allocated to the major states in the field of construction at present, such as Algiers, Annaba, Constantine, Oran, Tlemcen, Béjaïa, and Jijel. According to (Kothari, 2004), in order to obtain the highest possible precision in the selection of elements, all elements must be investigated in all fields. It can be assumed that if this theory is applied, no element will have any residual chance.

4.4. Sampling Frame

The sample frame is the source of the sample that taken to investigated in, and it's the list of the target population that can be sampled for consideration and may include people, groups, and institutions. Sample design helps to obtain precise and accurate data, and the optimal method of selecting the sample group to be studied must be used to obtain the most accurate results (Kothari, 2004). (Page 41-45)

4.4.1. Sampling Technique

A simple random sample is used because the researcher considers this to give a real view of the results and thus not be biased. Fair representation of each party (engineers and sub-contractors) was also taken into consideration when sampling.

Sampling technology provides a scope of methods that decrease the amount of data needed to collect it by looking only at data from a subset instead of all cases or elements. In the focus group, for example, you may want to consciously seek from respondents on both ends to ensure that all views are appropriately represented (Mark 2009).

4.4.2. Sample Size

In this study, the researcher selects the sample size of 215 engineers and sub-contractors. When the target population in the research is large and cannot be analysed all, by using a random sampling technique a smaller sample is taken. Samples will be tested with the required degree of certainty, this will give the researcher a view of the size of the sample and this size must be to assure the objective accuracy of the results. When taking a population sample, several methods must be used to reach good levels of confidence and to obtain the least possible margin of error. When sampling, sometimes engineers and sub-contractors are very knowledgeable and have good experience to answer and sometimes others do not know enough to answer.

First, the researcher must know the error margin for the sample, the researcher is happy with 95% confidence level (with margin error 0.05). This research contains a group of 215 people as engineers and sub-contractors and needs to be checked to see which tools are best provided for this research.

4.5. Data Gathering Instruments

4.5.1. Structured in-depth Interviews

An in-depth interview allows the researcher to study the respondent's level of understanding. Since an interview is a useful discussion between two people, the interviews aim to attract preceding responses to the data through direct questioning. All respondents are asked the same questions, and it will be easy for the researcher to repeat the conversation.

This is the most familiar form of data collection in any construction survey such as raised opinions of different people on a topic such as the influence of risk on a construction project. The advantages of using an interview technique are that respondents can open into areas of interest and can use signals such as facial expression to emphasize their responses (Frankel, Allen, 1996).

4.5.2. Questionnaire

The questionnaires are prepared and distributed to the target groups in order to obtain preceding and trustworthy data from the respondents. Questionnaires are used to investigate reactions, ideas, feelings, opinions, knowledge and some aspects of behaviour. The use of questionnaires to collect data is an approximately quick way to collect this information with nearly good response rates. It consists of open and closed questions.

The questionnaire was composed of three sections to accomplish the aim of this research, as follows:

- Section A: Personal information about the respondents such as gender, age, experience, type of work, etc.
- Section B: Close-ended questions (Likert scale), it contains 25 questions about the risk and performance management in Algeria.
- Section C: Open-ended questions (Writing), it contains 9 questions about the opinion of respondents on the risk and performance management in Algeria

Open-ended questions are useful as they give respondents the chance to respond properly as they apply details that they wish to qualify and clarify issues as well as give them a chance to express themselves. Objective responses are achieved through closed-ended questions, while self-answers are obtained through open-ended questions. The instrument's attempt to

link certain aspects of quantitative and qualitative data makes it an effective tool (Sheila and Muiria 1996).

The questionnaire was prepared in Arabic language (Appendix 1) and English language (Appendix 2). To guarantee a full and correct response to the questionnaire, an interview was handled with each respondent to describe and explain the study aim and to gain data into the design of the questionnaire, in particular, to identify the relationship between the risk management and performance management (Naum, 1998).

4.5.3. Documentary Review

The paper also reviews the obtained literature, as well as other books on the subject. This method has been selected because it is necessary to provide historical information and data about risk management techniques prior to collect primary data. Indeed, before the initial data are received, a wide range of data is received and used to verify the initial data that the field would receive.

4.6. Data Processing and Analysis

The collected data are prepared and analysed. This includes coding, editing, and tabulating data, in particular, quantitative data. The idea is to make the data pure and obvious to other people. Qualitative analysis methods have been used. They are supplemented with some of the statistics obtained mainly from secondary data obtained through a documentary analysis. Statistics obtained from initial data are also covered in this research.

4.6.1. Editing

The editing is done as a method of re-evaluating and correcting the errors in the ruling. It also includes correction of spelling mistakes, punctuation and capitalization.

4.6.2. Coding

The data have been coded to form data according to the subjects and sub-topics of the study. This is necessary to interpret and analyse results.

4.6.3. Graphical Presentation

Graphical presentations are used to display data in number and percentages. The graphs show the number of responses to questions consistently. The researcher uses Excel, SPSS and Minitab to analyse data and displays in tables and graphs. The presentations give a clear understanding and analysis of the results.

4.7. Data Collection Procedure

Numerous and several references were used to collect data in an appropriate and correct manner. For the theoretical framework, a literary research is carried, using scientific studies written by experts in this field, as well as books and articles on project management and risk.

4.8. Validity and Reliability of the Collected Data

The researcher carries out a pre-test of the instrument using a pilot sample (35) taken from the basic sample under study. The experts, including the research supervisor, are asked to govern the instruments with respect to the comprehensiveness of the questionnaire and the interview manual to answer the research questions. The questionnaires and the interview manual are revised to include these comments.

CHAPTER 5
DATA ANALYSIS AND DISCUSSION

5.1. Introduction

Data is the most important for the construction project because it helps in knowing the actual scenario of the construction project. Data analysis chapter is one of the most important thesis chapters. The success or failure of a research study depends to a large extent on the appropriateness and analysis of the data. Therefore, the analysis of data has a significant contribution to the research study and the result obtained from this chapter will help to reach the conclusion of the research study. Thus, researcher provides sufficient focus on collecting useful data, as well as in analyzing data effectively. Data analysis helps provide sufficient focus on undertaken issues to a thesis study. Moreover, data analysis chapter delivers a superior understanding of the current situation of the conducted research subject. Tools and techniques support data analysis in linking principles and theories of literature reviews with search results. Besides, the data analysis chapter of thesis supports in the user evaluation of the research results.

This particular research is in risk management in construction projects and its reflection on the performance management. The research helps to identify the impact of performance management and risk management in the construction industry in Algeria. The research is conducted to identify the needs of performance management and risk management in the construction industry in Algeria as well as to recognize the most appropriate performance management and risk management principles and practices that help the construction industry in Algeria to achieve further growth and development. Data analysis helps in designing an effective performance management framework for the industry. Apart from this, it also helps in the effective implementation of appropriate principles of performance management and risk management in the industry that improve the quality standards of the industry. A mixed methodology has been used for this particular thesis. Furthermore, in this methodology, quantitative research methodology and qualitative research methodology have been applied. For quantitative research, a survey was conducted among construction workers, engineers, and minimum management staff. On the other hand, for qualitative research, managers are considered.

5.2. Questionnaire Analysis

5.2.1. Quantitative Research Analysis

Quantitative research conducted by survey technology. The project undertaken is in risk management and it's reflection on performance management in construction projects, and therefore the construction-related people are considered for quantitative research. Furthermore, for this specific research two different groups of vital stakeholders are being considered: front-line sub-contractors and lower level management staff. A survey was conducted among construction sub-contractors and lower level management staff. From the survey, numeric data was collected and with appropriate statistical tools, data were analysed. For this particular research with a random sampling of about 215 construction sub-contractors and the lower level, managers are surveyed. From the survey, 177 papers were surveyed because 38 people of the sample didn't submit the questionnaire or they didn't answer all the questionnaire. The research was conducted with a perception of 177 respondents. The survey collected the opinion of large numbers of respondents and thus provided extensive knowledge on the subject of the particular research. In order to conduct the survey, permission has been granted by the construction company's authority.

Excel program was used to organize the data and facilitate the further analysis of it. The data were inspected in the programs Excel 2016, SPSS version 23, and Minitab version 17, also test conditions checked in every test to choose the suitable of them throw the statistical process.

Firstly, a pilot sample of size 35 individuals were selected randomly; the responses of the corresponding 35- questionnaires were analysed to ensure the validity and efficiency of the study instrument.

The main properties of the responses were presented as in the following:

- The researcher presented the preliminary picture of the questionnaire to a competent arbitrator, and about 80% of them gave their agreement with minor modifications.
- The validity and reliability coefficients were calculated using SPSS program.

The validity property tested by the internal consistency of the items with the total average of the overall responses of the questionnaire, the following table shows the person coefficients of the items with the overall responses.

Table 5. 1: Internal validity coefficients

#	Item	Correlation coefficient
1	Risk and risk management is perceived in a construction project.	0.47**
2	Risk tends to change during the project's life cycle.	0.41**
3	The chosen procurement option has an impact on risk management.	0.32*
4	Background variables – such as age, education, and complementary training – affect risk management.	0.43**
5	The individual or personal differences between site managers and other managers in construction affect risk management.	0.31*
6	Risk management process can effectively be analysed in construction project.	0.39**
7	The significant impacts of applying risk management on construction projects will enhance the possibility of success and the sustainability of the project in the future.	0.48**
8	Risk retention affects the performance of the project.	0.32*
9	Project team leader should be committed to his/her responsibilities; he/she should monitor the project progress closely, especially in terms of cost, time, and quality?	0.31*
10	Materials supplied should be recorded and monitored closely in order to have continuous and sufficient supply.	0.33*
11	Risk control (loss control or risk mitigation) influences the project performance in the construction industry.	0.32*
12	Risk transfer influences project performance in the construction industry.	0.31*
13	We can innovate the new dimensions and steps of risk management process in public sectors.	0.32*
14	Modifications should be minimized during the construction process to avoid delays.	0.32*
15	* Fast-tracking is used in the Algeria construction projects.	0.32*

16	* Fast-tracking holds the future of the Algeria's construction industry.	0.31*
17	I implement risk management in my projects.	0.59**
18	It is necessary to implement risk management in construction projects.	0.36*
19	Please rate this statement: "Risk in the Algeria construction is allocated to the most appropriate party".	0.31*
20	Construction insurance against risk is expensive due to high premiums in Algeria.	0.32*
21	It is necessary to identify project risks at the project planning phase.	0.37**
22	Risk management is important only for special projects such as international projects.	0.31*
23	Risk management is necessary in project management for a successful project.	0.43**
24	The major contents and objectives of project risk management are the same as the ones in project management.	0.31*
25	The purpose of project risk management is to reduce project uncertainties.	0.53**

* sig. at $\alpha \leq 0.05$ ** sig. at $\alpha \leq 0.01$

The previous table shows a strong internal validity between the items and the average overall responses of the questionnaire.

- The instrument ability of the questionnaire to distinguish between upper 30% vis lower 30% responses were tested using the nonparametric Mann-Whitney test; the results were presented in the following table:

Table 5. 2: Extreme validity coefficient

	Group	Rank mean	U-value	Sig.
Upper responses	9	13	0.00	0.001**
Lower responses	9	5		

The previous table shows the ability of the questionnaire in distinguishing between the best upper and lower groups of the responses.

- The researcher tests the reliability of the questionnaire by using the cronbachs alpha with value 0.84, which indicates a higher reliability level.
- The normality property of the responses was tested using skewness and kurtosis properties with one sample non-parametric Kolmogorov Smrinov test. The following table presents the coefficients of the skewness and kurtosis properties of the questionnaire items

Table 5. 3: Skewness and kurtosis coefficients

#	Item	Mean	St. Deviation	skewness	kurtosis
1	Risk and risk management is perceived in a construction project.	4.08	0.56	0.02	0.26
2	Risk tends to change during the project's life cycle.	3.94	0.61	0.03	-0.27
3	The chosen procurement option has an impact on risk management.	3.68	0.62	-.01	0.07
4	Background variables – such as age, education, and complementary training – affect risk management.	3.66	0.71	0.27	-0.41
5	The individual or personal differences between site managers and other managers in construction affect risk management.	3.82	0.69	0.25	-0.84
6	Risk management process can effectively be analysed in construction project.	3.42	0.64	0.7	0.27
7	The significant impacts of applying risk management on construction projects will enhance the possibility of success and the sustainability of the project in the future.	3.98	0.62	0.01	0.27

8	Risk retention affects the performance of the project.	3.90	0.76	0.17	-1.23
9	Project team leader should be committed to his/her responsibilities; he/she should monitor the project progress closely, especially in terms of cost, time, and quality?	3.72	0.64	0.32	-0.62
10	Materials supplied should be recorded and monitored closely in order to have continuous and sufficient supply.	3.86	0.67	0.16	-0.71
11	Risk control (loss control or risk mitigation) influences the project performance in the construction industry.	3.94	0.68	-0.32	0.35
12	Risk transfer influences project performance in the construction industry.	3.96	0.75	-0.52	0.36
13	We can innovate the new dimensions and steps of risk management process in public sectors.	3.36	0.85	0.25	-0.42
14	Modifications should be minimized during the construction process to avoid delays.	4.26	0.77	-1.04	1.14
15	* Fast-tracking is used in the Algeria construction projects.	2.58	1.07	0.19	-0.88
16	* Fast-tracking holds the future of the Algeria's construction industry.	3.8	0.75	-0.23	-0.13
17	I implement risk management in my projects.	3.46	0.76	0.14	-0.22
18	It is necessary to implement risk management in construction projects.	3.82	0.62	0.15	-0.47

19	Please rate this statement: “Risk in the Algeria construction is allocated to the most appropriate party”.	4.04	0.85	-0.28	-1.09
20	Construction insurance against risk is expensive due to high premiums in Algeria.	3.18	0.80	0.15	-0.48
21	It is necessary to identify project risks at the project planning phase.	3.78	0.61	0.16	-0.45
22	Risk management is important only for special projects such as international projects.	2.18	0.89	0.69	-0.03
23	Risk management is necessary in project management for a successful project.	3.72	0.70	0.08	0.33
24	The major contents and objectives of project risk management are the same as the ones in project management.	3.48	0.64	0.54	-0.07
25	The purpose of project risk management is to reduce project uncertainties.	3.52	0.67	0.54	-0.18

The previous table indicates the normality property for all items of the questionnaire with skewness and kurtosis coefficients tends to zero value.

The one sample non-parametric Kolmogorov Smrinov test was presented and applied through the total mean responses of the questionnaire items.

Table 5. 4: The one sample non-parametric Kolmogorov Smrinov test

#	Sample size	Test statistic	Sig.
Total responses	35	0.08	0.2

The table indicates that the responses of the questionnaire are normally distributed, and the researcher can apply the parametric test in the following analyses.

Analysis of section A: Personal Information

The sample data of the study was statistically described by the following:

1. The Gender

The sample size was 177 individuals, the distributed with respect to gender as the following:

Table 5. 5: The Gender information in sample

Gender	Frequency	Percent %	Valid Percent	Cumulative Percent
Male	164	92.7	92.7	92.7
Female	13	7.3	7.3	100.0
Total	177	100.0	100.0	

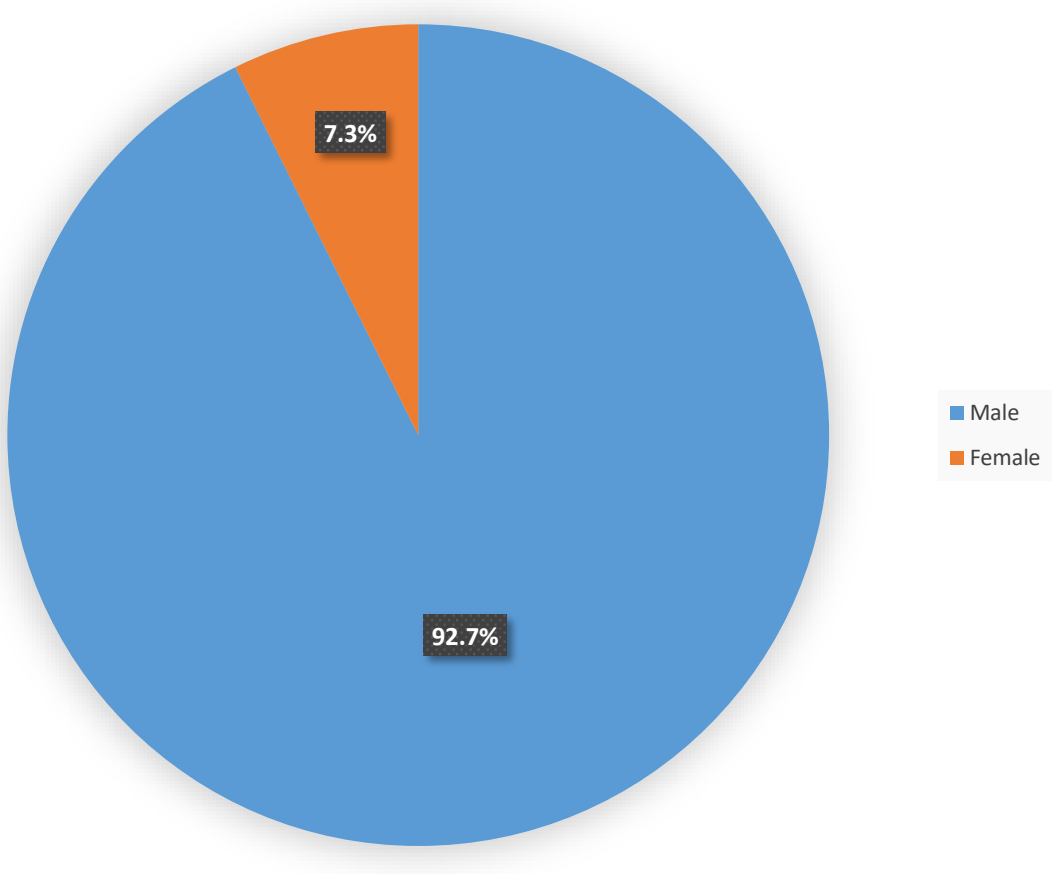

Figure 5. 1: The Gender information in sample

2. The Age

The sample size was 177 individuals, the distributed with respect to age as the following:

Table 5. 6: The Age information in sample

Age	Frequency	Percent %	Valid Percent	Cumulative Percent
21 - 30	96	54.2	54.2	54.2
31 - 40	61	34.5	34.5	88.7
41 - 50	16	9.5	9.0	97.7
over 50	4	2.3	2.3	100.0
Total	177	100.0	100.0	

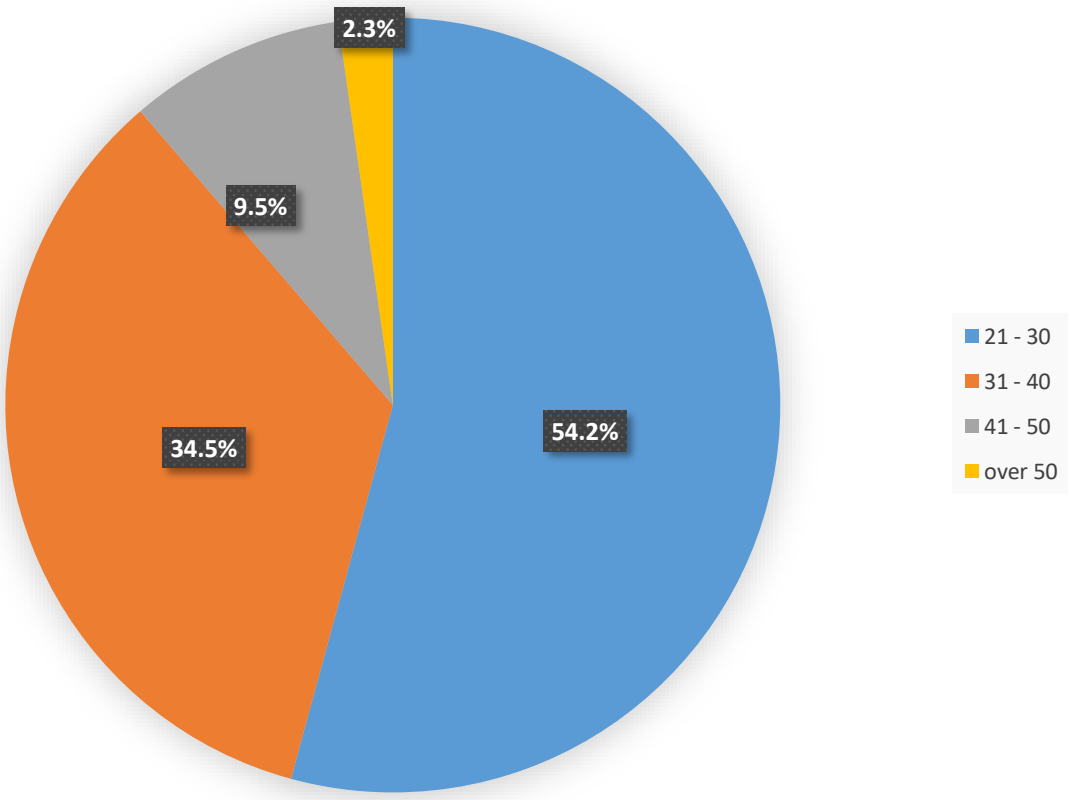

Figure 5. 2: The Age information in sample

3. The Academic Level of the sample

The sample size was 177 individuals, the distributed with respect to academic level as the following:

Table 5. 7: The Academic Level information in sample

Academic Level	Frequency	Percent %	Valid Percent	Cumulative Percent
Secondary	10	5.6	5.6	5.6
Diploma	18	10.2	10.2	15.8
Bachelor	74	41.8	41.8	57.6
Other	75	42.4	42.4	100.0
Total	177	100.0	100.0	

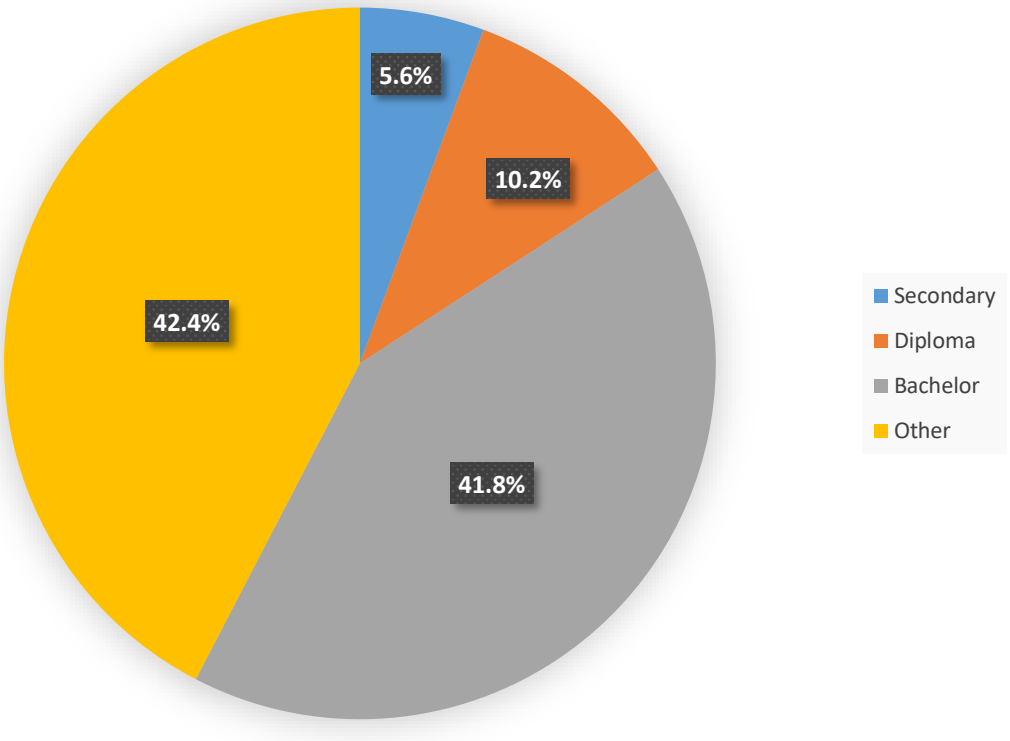

Figure 5. 3: The Academic Level information in sample

4. The Salary groups of the sample

The sample size was 177 individuals, the distributed with respect to salary as the following:

Table 5. 8: The Salary information in sample

Salary (DZD)	Frequency	Percent %	Valid Percent	Cumulative Percent
20000-24999	6	3.4	3.4	3.4
25000-29999	26	14.7	14.7	18.1
Over 30000	145	81.9	81.9	100.0
Total	177	100.0	100.0	

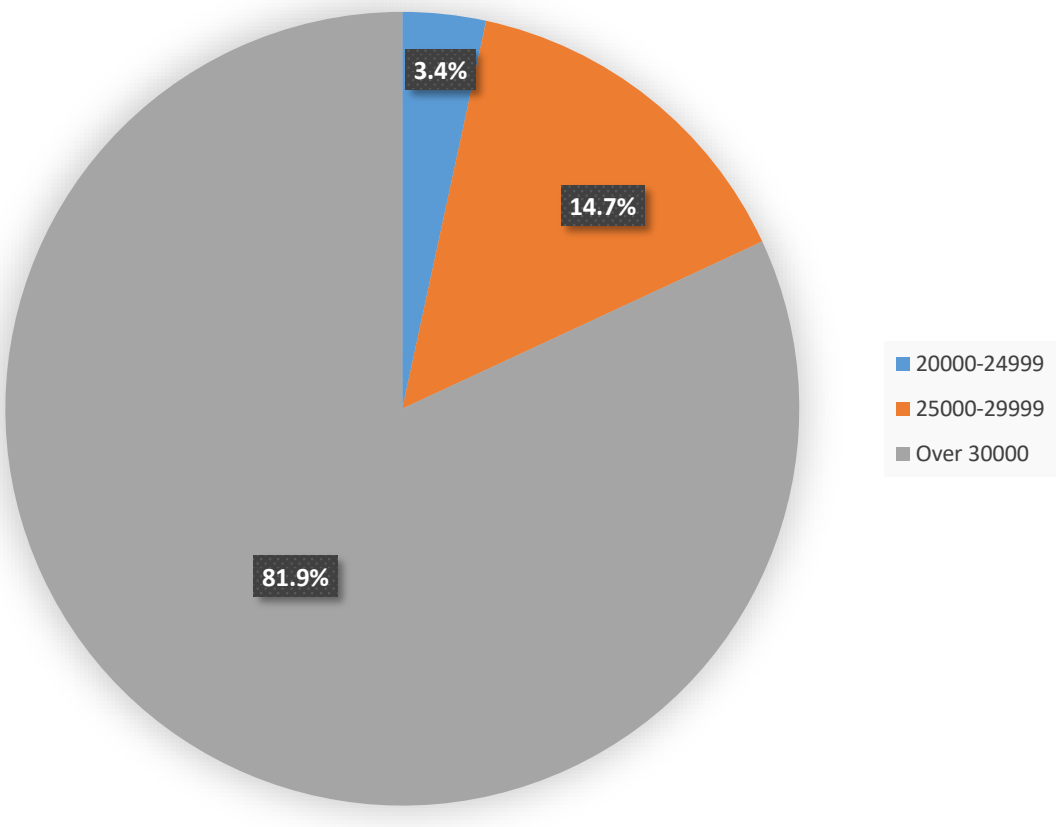

Figure 5. 4: The Salary information in sample

5. The Company Type groups of the sample

The sample size was 177 individuals, the distributed with respect to company type as the following:

Table 5. 9: The Company Type information in sample

Company type	Frequency	Percent %	Valid Percent	Cumulative Percent
International	16	9.0	9.0	9.0
Governmental	69	39.0	39.0	48.0
Private	92	52.0	52.0	100.0
Total	177	100.0	100.0	

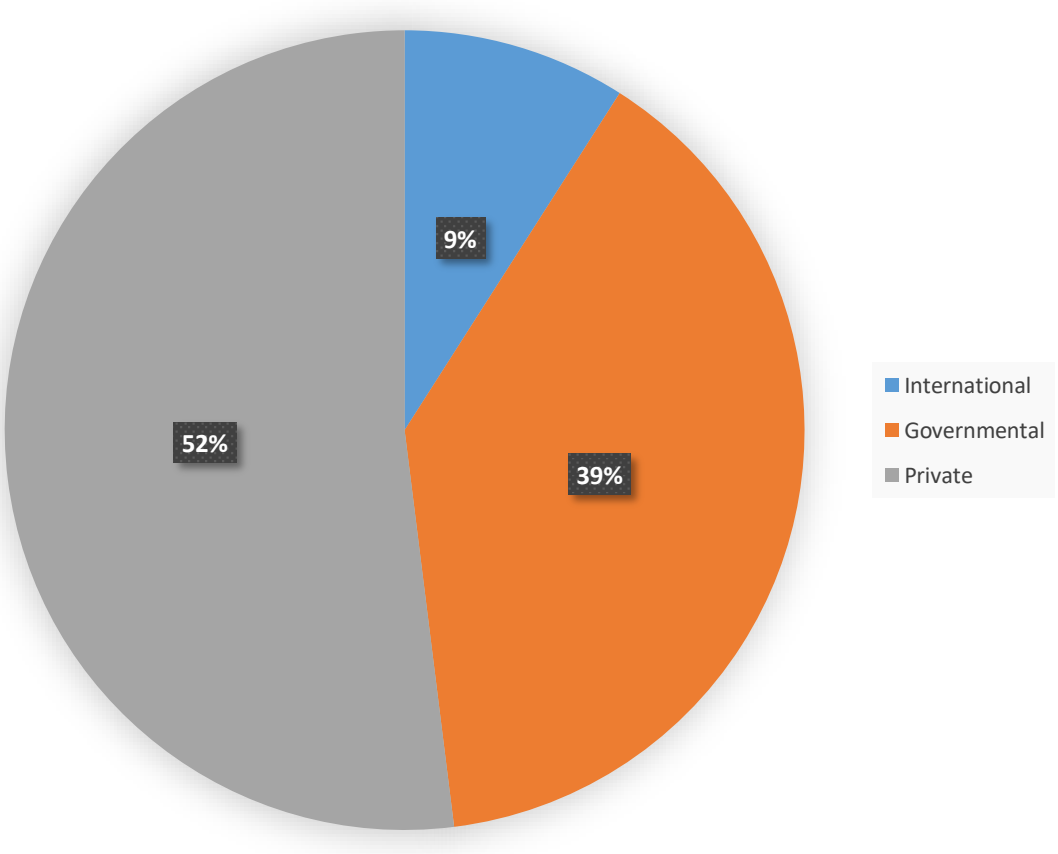

Figure 5. 5: The Company Type information in sample

6. The Years of Construction Experience of the sample groups:

The sample size was 177 individuals, the distributed with respect to years of construction experience as the following:

Table 5. 10: The Years of Construction Experience information in sample

Construction Experience	Frequency	Percent %	Valid Percent	Cumulative Percent
0-2	32	18.1	18.1	18.1
3-5	57	32.2	32.2	50.3
6-10	49	27.7	27.7	78.0
11-20	24	13.6	13.6	91.5
Over 20 years	14	8.5	8.5	100.0
Total	177	100.0	100.0	

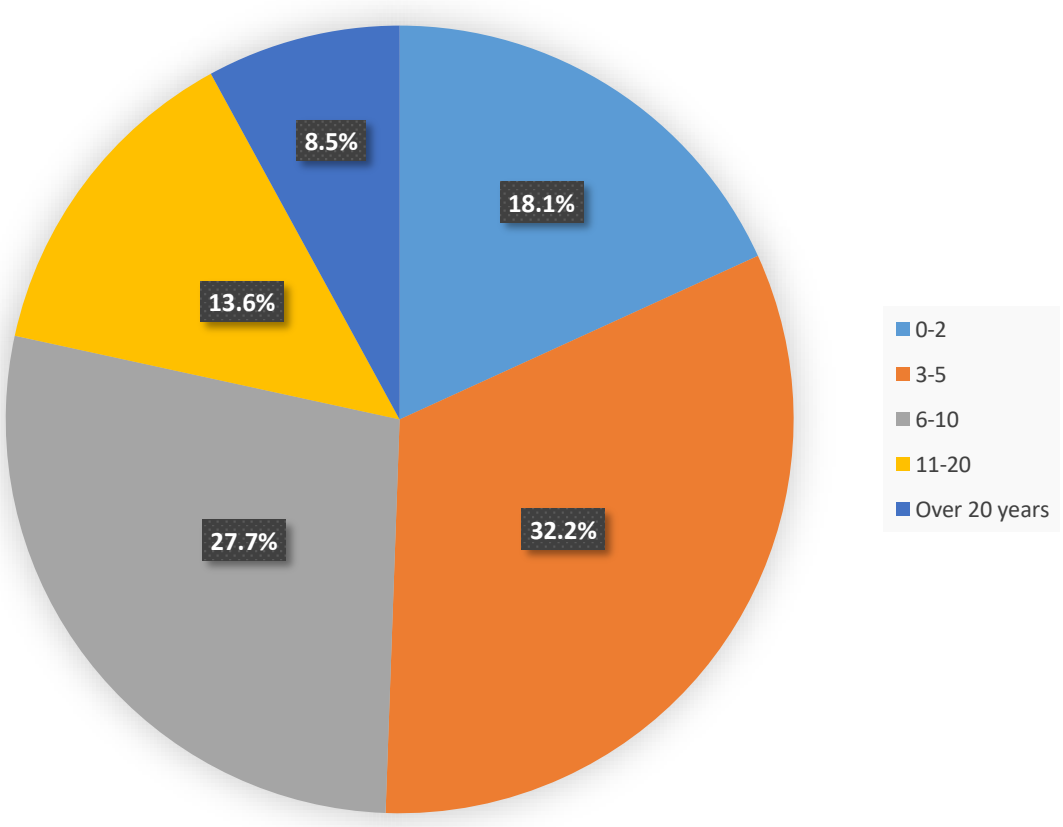

Figure 5. 6: The Years of Construction Experience information in sample

7. The Types of the Construction Project of the groups of the sample

The sample size was 177 individuals, the distributed with respect to types of the construction project as the following:

Table 5. 11: The Types of the Construction Project information in sample

Types of the Construction Project	Frequency	Percent %	Valid Percent	Cumulative Percent
Housing + Building	75	42.4	42.4	42.4
Housing + Building + Industrial + Infrastructure	10	5.6	5.6	48.0
Housing + Building + Infrastructure	48	27.1	27.1	75.1
Housing + Building + Infrastructure + other	2	1.1	1.1	76.3
Housing + Industrial	2	1.1	1.1	77.4
Building	35	19.8	19.8	97.2
Industrial + Infrastructure	5	2.8	2.8	100.0
Total	177	100.0	100.0	

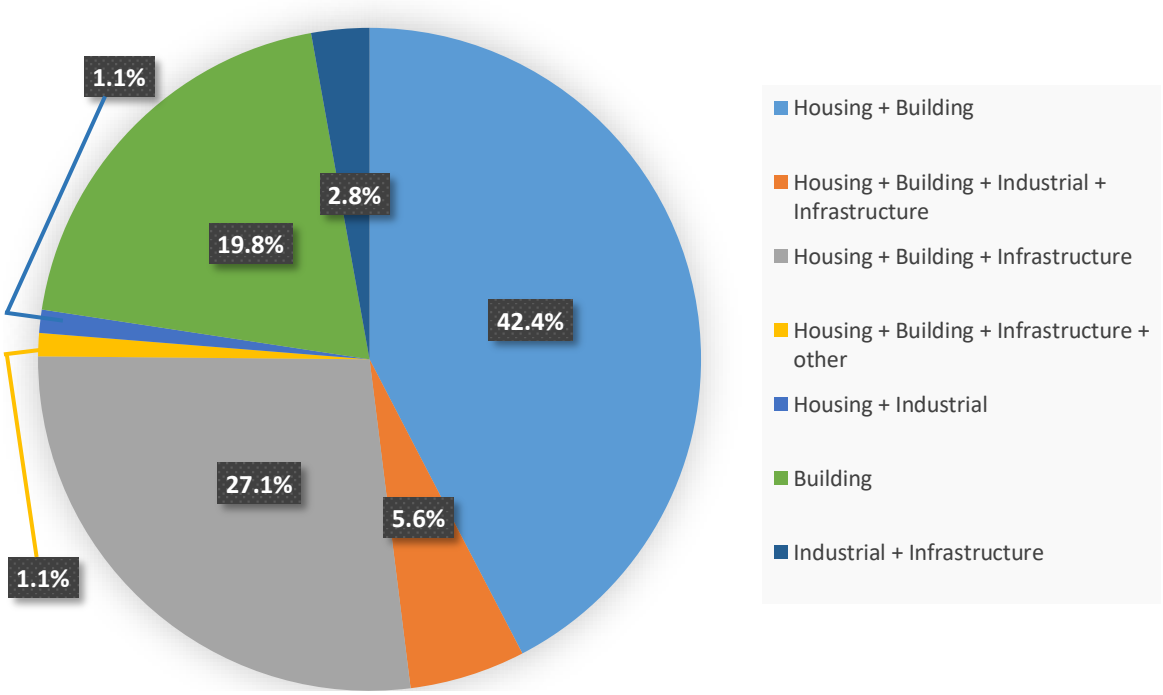

Figure 5. 7: The Types of the Construction Project information in sample

8. The Project Manager Position of the sample members

The sample size was 177 individuals, the distributed with respect to the question, (Are you project manager?) as the following:

Table 5. 12: The Project Manager Position information in sample

Project Manager Position	Frequency	Percent %	Valid Percent	Cumulative Percent
Yes (a project manager)	96	54.2	54.2	54.2
No (not a project manager)	81	45.8	45.8	100.0
Total	177	100.0	100.0	

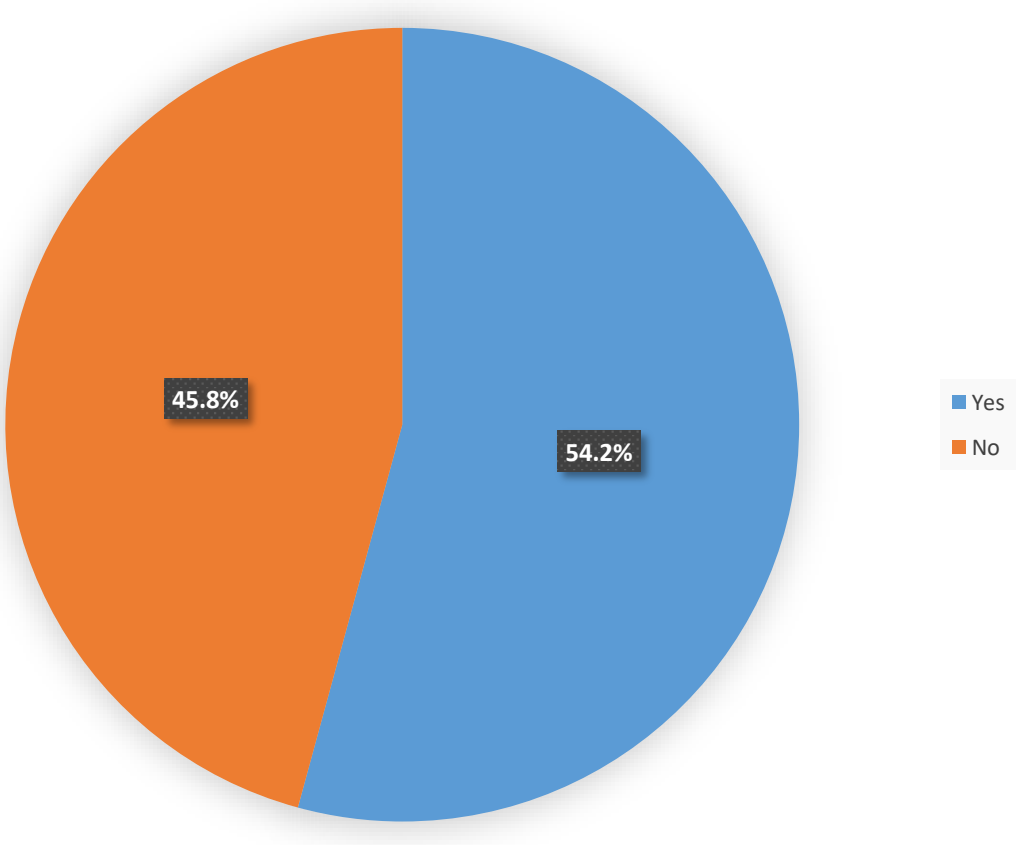

Figure 5. 8: The Project Manager Position group in sample

9. The Place of the Work (Algeria – Outside Algeria)

The sample size was 177 individuals, the distributed with respect to the question (Have you ever worked on a construction project in a country other than the Algeria?) as the following:

Table 5. 13: The Place of the Work group in sample

Place of the Work	Frequency	Percent %	Valid Percent	Cumulative Percent
Yes (work outside)	19	10.7	10.7	10.7
No (just Algeria)	158	89.3	89.3	100.0
Total	177	100.0	100.0	

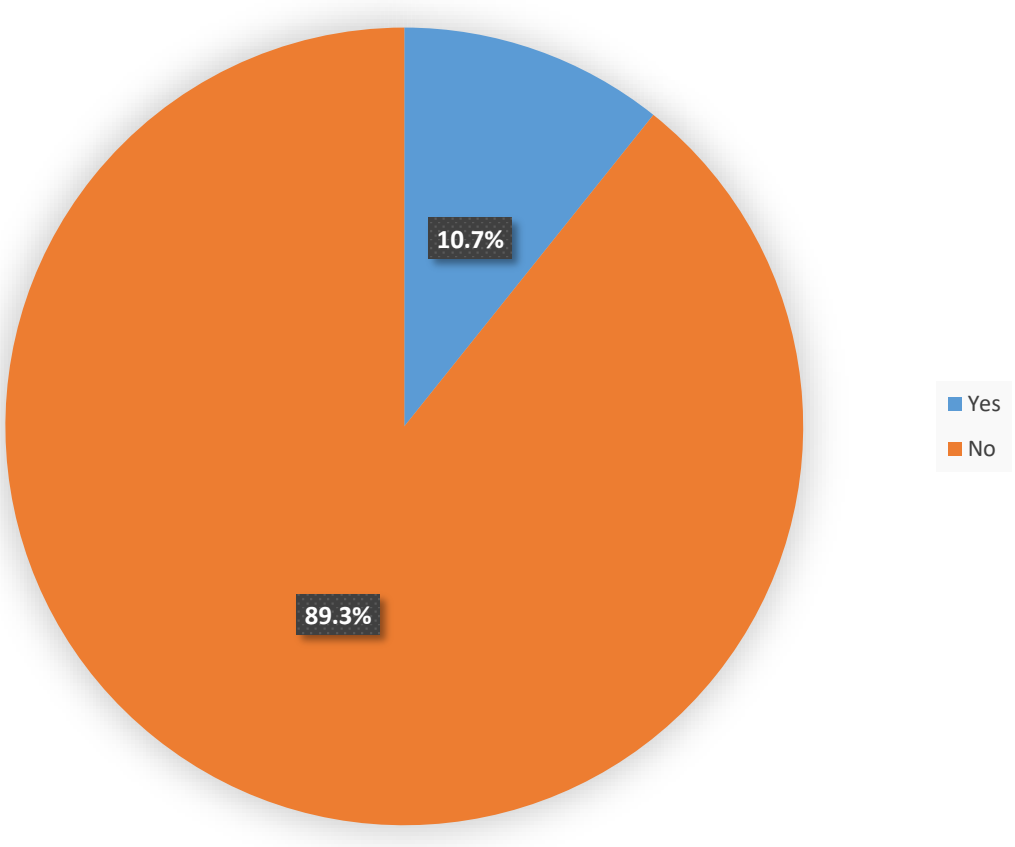

Figure 5. 9: The place of the Work Group in sample

Analysis of section B: Likert Scale

1. Analysis of question 1

The researcher found in analysing question “Risk and risk management is perceived in a construction project” the following:

Table 5.14 shows the frequency of “Strongly disagree” are 13, “Disagree” are 39, “Neutral” are 42, “Agree” are 63 and “Strongly Agree” are 20. Also, Table 5.14 and Figure 5.10 shows percent "Strongly disagree" are 7.3%, “Disagree” are 22%, “Neutral” are 23.7%, “Agree” are 35.6%, and “Strongly agree” are 11.3%.

Table 5. 14: Percentage and Frequency of Q1

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	7.3	7.3	7.3
	Disagree	39	22.0	22.0	29.4
	Neutral	42	23.7	23.7	53.1
	Agree	63	35.6	35.6	88.7
	Strongly agree	20	11.3	11.3	100.0
	Total	177	100.0	100.0	

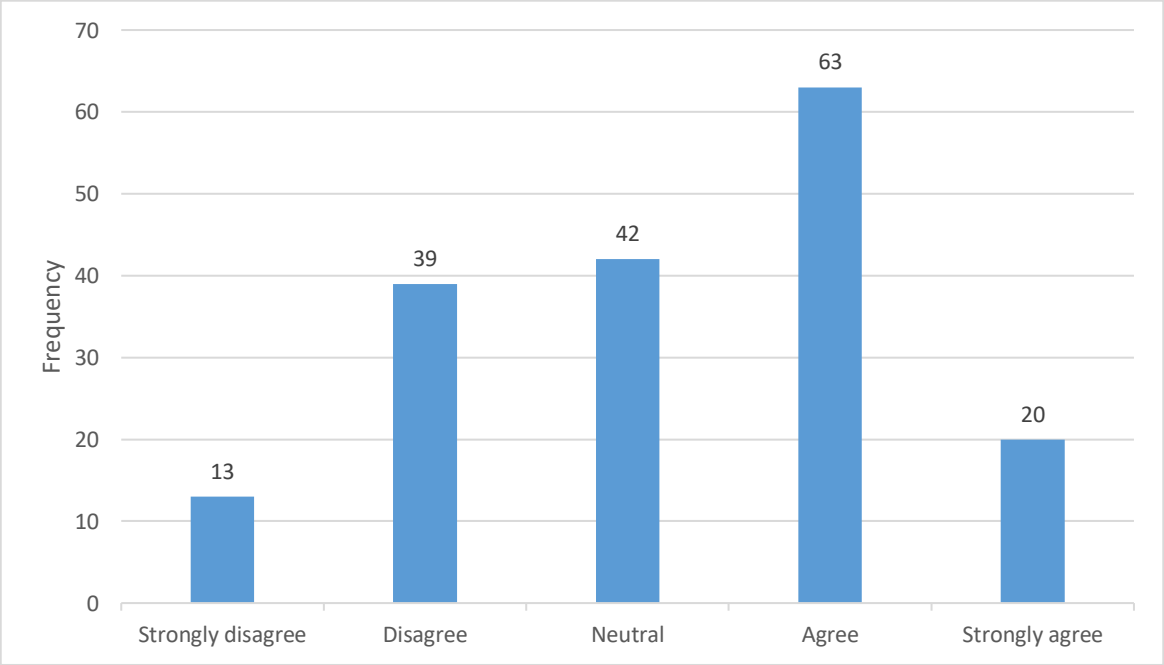

Figure 5. 10: Frequency of Q1

Table 5.15 shows the mean of the question one equals 3.215 (64.3%), Test-value = 2.521, and P-value = 0.013 which is higher than the level of significance α=0.05, so the mean is insignificantly different from the hypothesis. The researcher found that the respondents (neutral) to this item.

Table 5. 15: Test-values and Means for Q1

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk and risk management is perceived in a construction project.	3.215	64.3	2.521	0.013

2. Analysis of question 2

The researcher found in analysing question "Risk tends to change during the project's life cycle" the following:

Table 5.16 shows the frequency of "Strongly disagree" are 16, "Disagree" are 35, "Neutral" are 43, "Agree" are 67 and "Strongly Agree" are 16. Also, Table 5.16 and Figure 5.11 shows the percent of "Strongly disagree" are 9%, "Disagree" are 19.8%, "Neutral" are 24.3%, "Agree" are 37.9%, and "Strongly agree" are 9%.

Table 5. 16: Percentage and Frequency of Q2

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	9.0	9.0	9.0
	Disagree	35	19.8	19.8	28.8
	Neutral	43	24.3	24.3	53.1
	Agree	67	37.9	37.9	91.0
	Strongly agree	16	9.0	9.0	100.0
	Total	177	100.0	100.0	

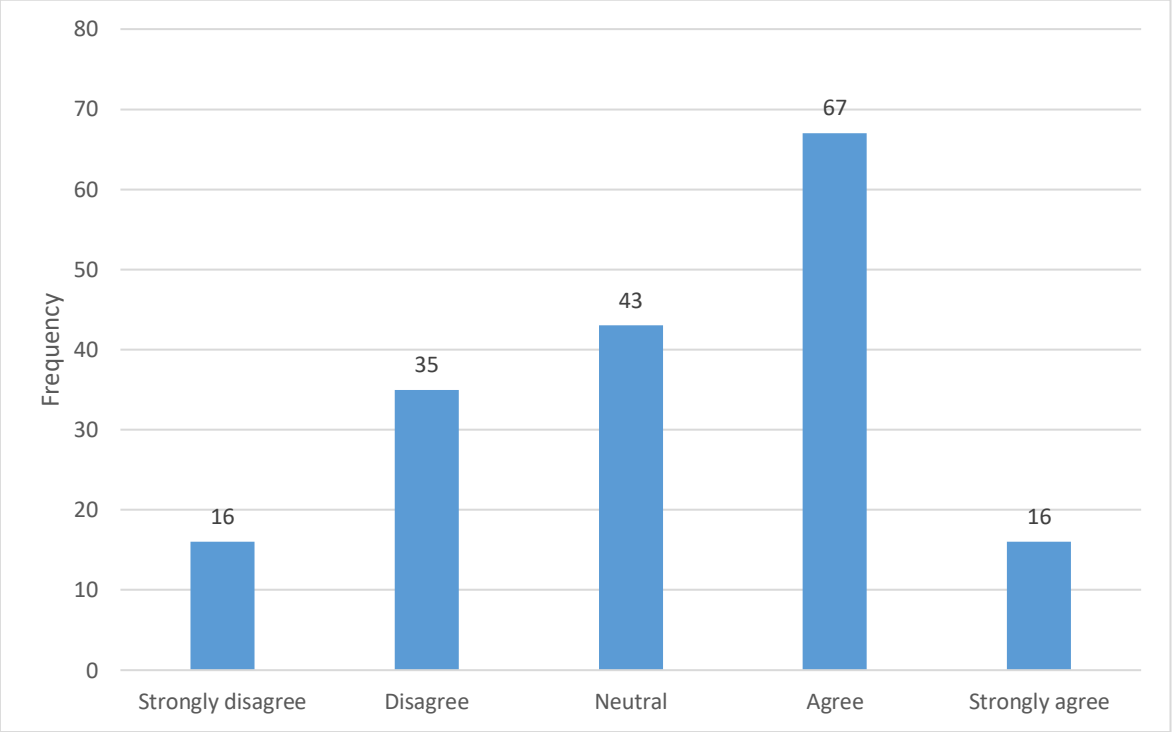

Figure 5. 11: Frequency of Q2

Table 5.17 shows the mean of the question two equals 3.181 (63.6%), Test-value = 2.131, and P-value = 0.034 which is higher than the level of significance α=0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (neutral) to this item.

Table 5. 17: Test-values and Means for Q2

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk tends to change during the project's life cycle.	3.181	63.6	2.131	0.034

3. Analysis of question 3

The researcher found in analysing question "The chosen procurement option has an impact on risk management" the following data:

Table 5.18 shows the frequency of "Strongly disagree" are 12, "Disagree" are 25, "Neutral" are 65, "Agree" are 69 and "Strongly Agree" are 6. Also, Table 5.18 and Figure 5.12 shows the percent of "Strongly disagree" are 6.8%, "Disagree" are14.1%, "Neutral" are 36.7 %, "Agree" are 39%, and "Strongly agree" are 3.4%.

Table 5. 18: Percentage and Frequency of Q3

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.8	6.8	6.8
	Disagree	25	14.1	14.1	20.9
	Neutral	65	36.7	36.7	57.6
	Agree	69	39.0	39.0	96.6
	Strongly agree	6	3.4	3.4	100.0
	Total	177	100.0	100.0	

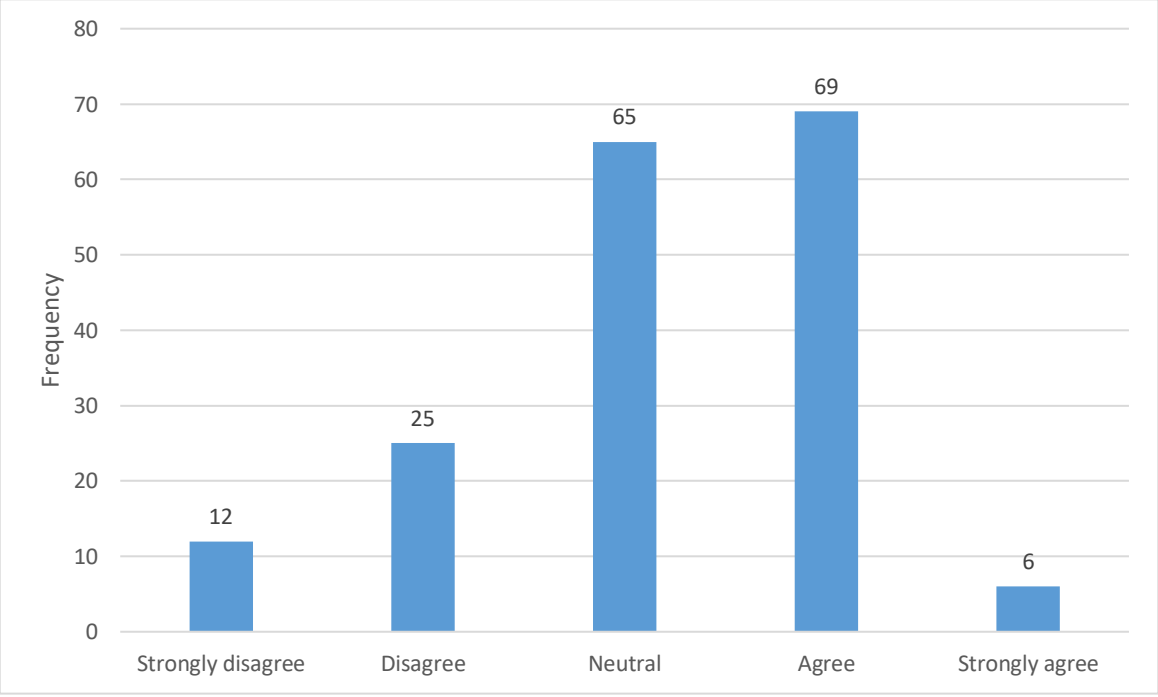

Figure 5. 12: Frequency of Q3

Table 5.19 shows the mean of the question three equals 3.181 (63.62%), Test-value = 2.521, and P-value = 0.013 which is higher than the level of significance α=0.05, so the mean is insignificantly different from the hypothesis. The researcher found that the respondents (neutral) to this question.

Table 5. 19: Test-values and Means for Q3

Question	mean	Proportional mean	Test-value	P-value (Sig.)
The chosen procurement option has an impact on risk management.	3.181	63.62	2.521	0.013

4. Analysis of question 4

The researcher found in analysing question "Background variables – such as age, education, and complementary training – affect risk management" the following data:

Table 5.20 shows the frequency of "Strongly disagree" are 15, "Disagree" are 18, "Neutral" are 73, "Agree" are 56 and "Strongly Agree" are 15. Also, Table 5.20 and Figure 5.13 shows the percent of "Strongly disagree" are 8.5%, "Disagree" are 10.2%, "Neutral" are 41.2 %, "Agree" are 31.6%, and "Strongly agree" are 8.5%.

Table 5. 20: Percentage and Frequency of Q4

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	8.5	8.5	8.5
	Disagree	18	10.2	10.2	18.6
	Neutral	73	41.2	41.2	59.9
	Agree	56	31.6	31.6	91.5
	Strongly agree	15	8.5	8.5	100.0
	Total	177	100.0	100.0	

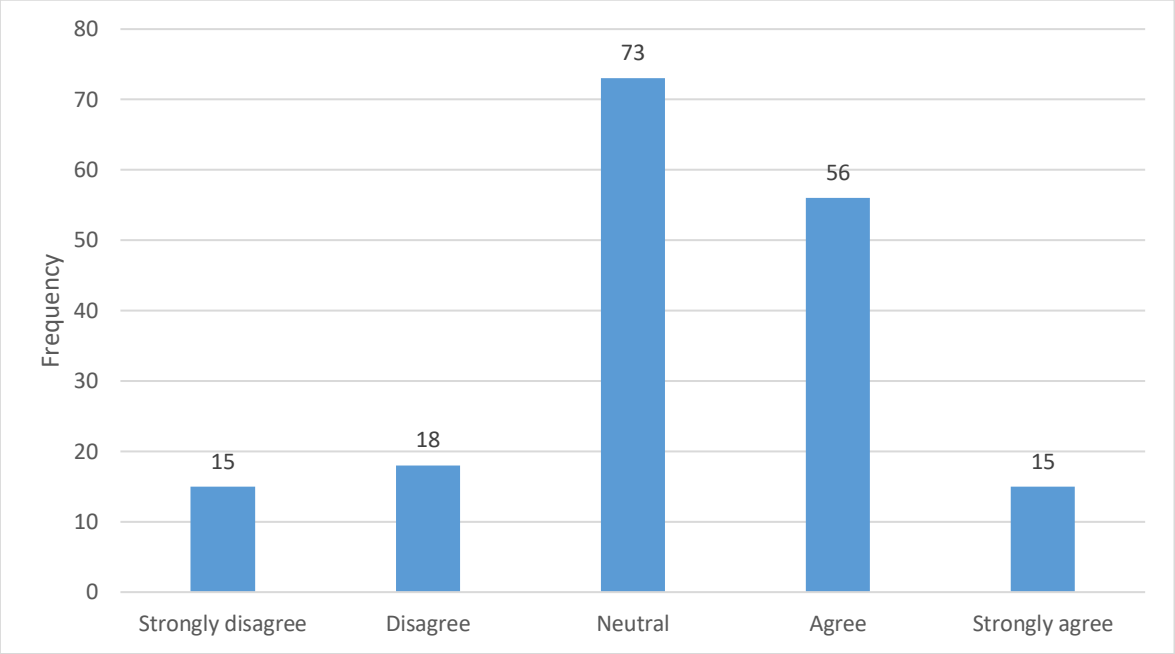

Figure 5. 13: Frequency of Q4

Table 5.21 shows the mean of question four equals 3.215 (64.3%), Test-value = 2.780, and P-value = 0.006 which is lower than the level of significance α=0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (neutral) to this question.

Table 5. 21: Test values and Means for Q4

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Background variables – such as age, education, and complementary training – affect risk management.	3.215	64.3	2.780	0.006

5. Analysis of question 5

The researcher found in analysing question "The individual or personal differences between site managers and other managers in construction affect risk management" the following data:

Table 5.22 shows the frequency of "Strongly disagree" are 13, "Disagree" are 30, "Neutral" are 63, "Agree" are 55 and "Strongly Agree" are 16. Also, Table 5.22 and Figure 5.14 shows the percent of "Strongly disagree" are 7.3%, "Disagree" are 16.9%, "Neutral" are 35.6%, "Agree" are 31.1%, and "Strongly agree" are 9%.

Table 5. 22: Percentage and Frequency of Q5

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	13	7.3	7.3	7.3
	Disagree	30	16.9	16.9	24.3
	Neutral	63	35.6	35.6	59.9
	Agree	55	31.1	31.1	91.0
	Strongly agree	16	9.0	9.0	100.0
	Total	177	100.0	100.0	

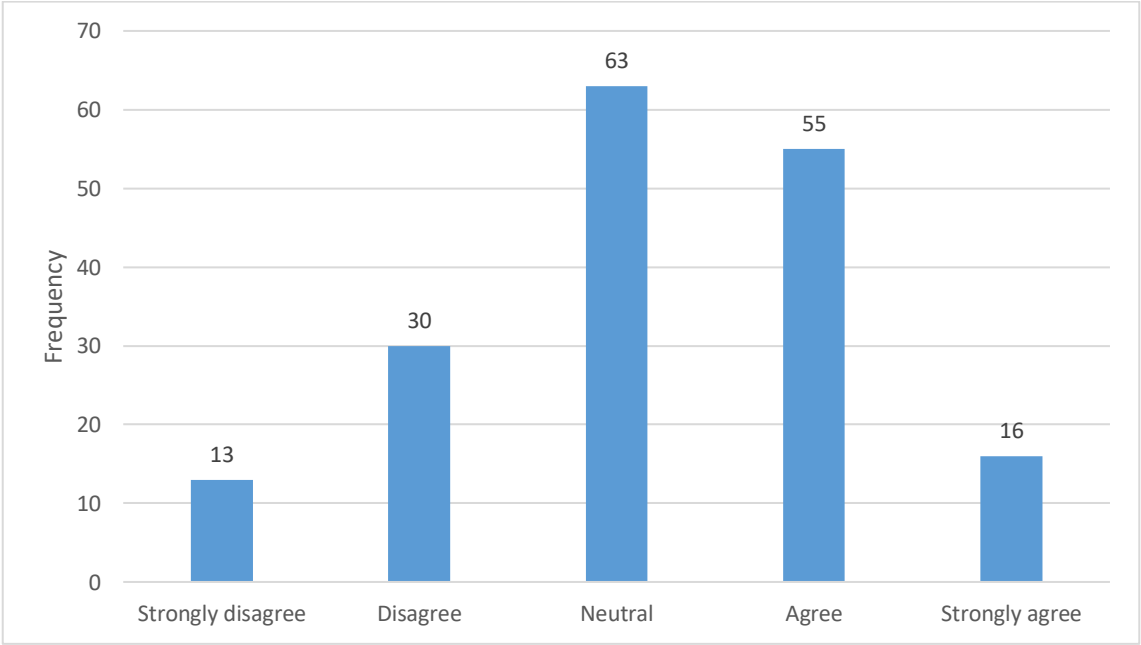

Figure 5. 14: Frequency of Q5

Table 5.23 shows the mean of question five equals 3.175 (63.5%), Test-value = 2.210, and P-value = 0.028 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 23: Test-values and Means for Q5

Question	mean	Proportional mean	Test-value	P-value (Sig.)
The individual or personal differences between site managers and other managers in construction affect risk management.	3.175	63.5	2.210	0.028

6. Analysis of question 6

The researcher found in analysing question "Risk management process can effectively be analysed in construction project" the following data:

Table 5.24 shows the frequency of "Strongly disagree" are 2, "Disagree" are 31, "Neutral" are 93, "Agree" are 44 and "Strongly Agree" are 7. Also, Table 5.24 and Figure 5.15 shows the percent of "Strongly disagree" are 1.1%, "Disagree" are 17.5%, "Neutral" are 52.5 %, "Agree" are 24.9%, and "Strongly agree" are 4%.

Table 5. 24: Percentage and Frequency of Q6

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.1	1.1	1.1
	Disagree	31	17.5	17.5	18.6
	Neutral	93	52.5	52.5	71.2
	Agree	44	24.9	24.9	96.0
	Strongly agree	7	4.0	4.0	100.0
	Total	177	100.0	100.0	

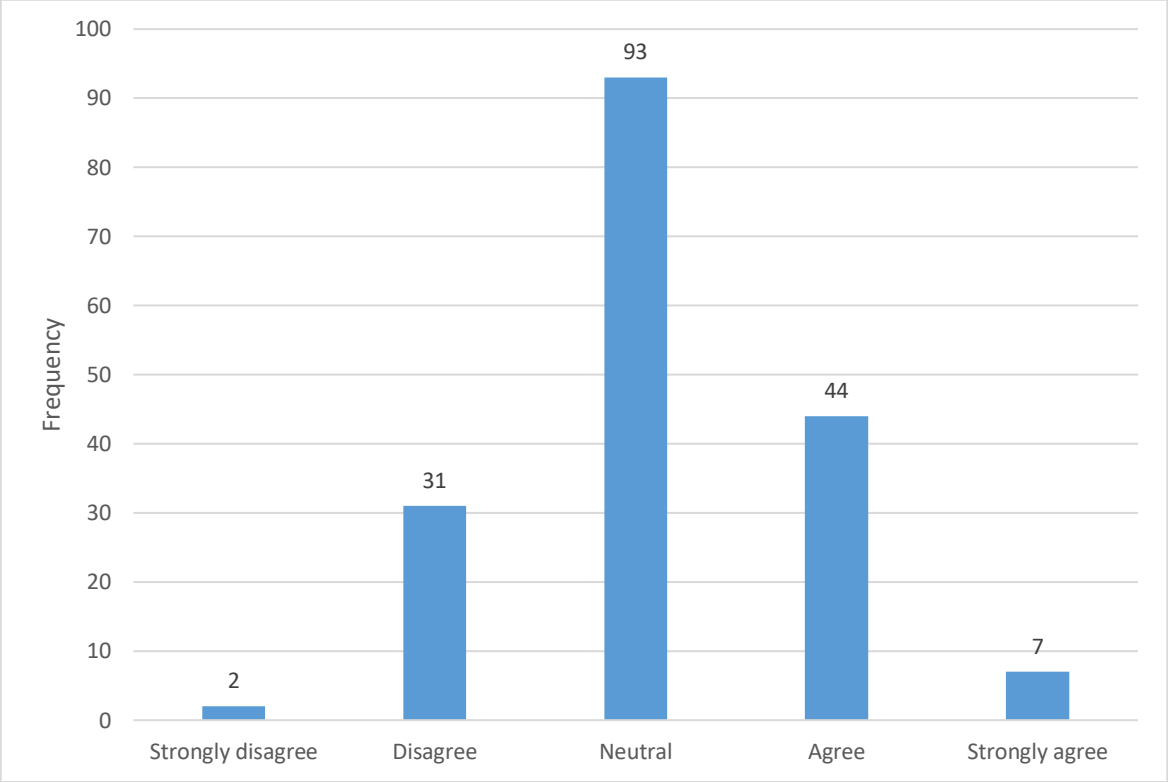

Figure 5. 15: Frequency of Q6

Table 5.25 shows the mean of question six equals 3.130 (62.6%), Test-value = 2.207, and P-value = 0.029 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 25: Test-values and Means for Q6

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk management process can effectively be analyzed in construction project.	3.130	62.6	2.207	0.029

7. Analysis of question 7

The researcher found in analysing question "The significant impacts of applying risk management on construction projects will enhance the possibility of success and the sustainability of the project in the future" the following data:

Table 5.26 shows the frequency of "Strongly disagree" are11, "Disagree" are 35, "Neutral" are 60, "Agree" are 56, and "Strongly Agree" are 15. Also, Table 5.26 and Figure 5.16 shows the percent of "Strongly disagree" are 6.2%, "Disagree" are 19.8%, "Neutral" are 33.9 %, "Agree" are 31.6%, and "Strongly agree" are 8.5%.

Table 5. 26: Percentage and Frequency of Q7

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	6.2	6.2	6.2
	Disagree	35	19.8	19.8	26.0
	Neutral	60	33.9	33.9	59.9
	Agree	56	31.6	31.6	91.5
	Strongly agree	15	8.5	8.5	100.0
	Total	177	100.0	100.0	

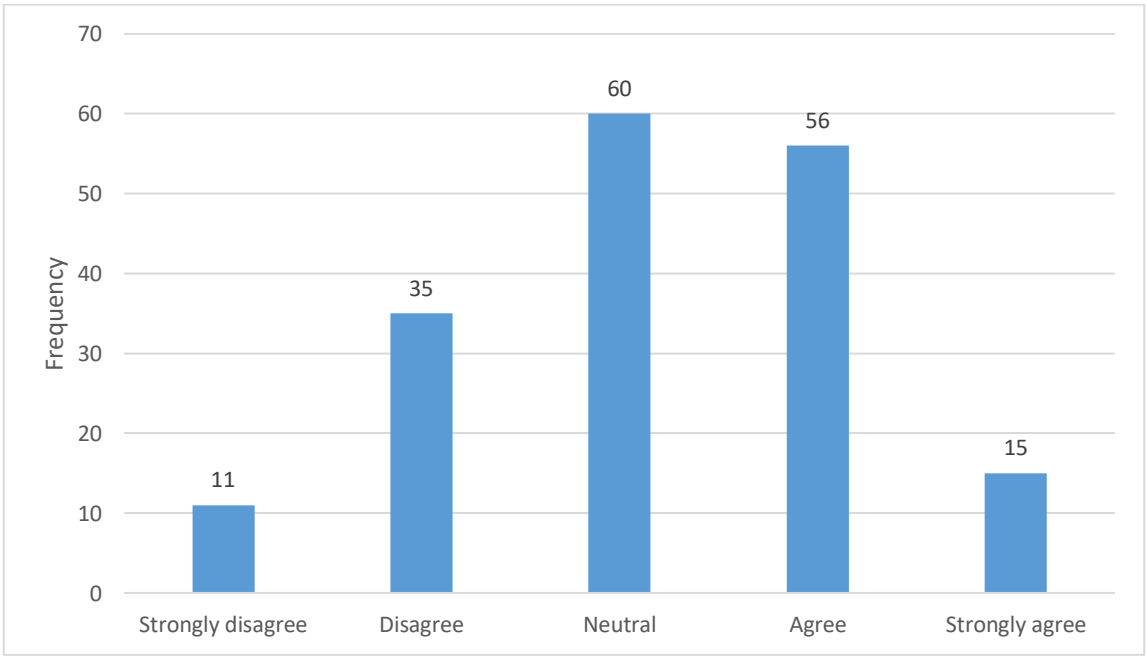

Figure 5. 16: Frequency of Q7

Table 5.27 shows the mean of question seven equals 3.164 (63.28%), Test-value = 2.098, and P-value = 0.037 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 27: Test-values and Means for Q7

Question	mean	Proportional mean	Test-value	P-value (Sig.)
The significant impacts of applying risk management on construction projects will enhance the possibility of success and the sustainability of the project in the future.	3.164	63.28	2.097	0.037

8. Analysis of question 8

The researcher found in analysing question "Risk retention affects the performance of the project" the following data:

Table 5.28 shows the frequency of "Strongly disagree" are 17, "Disagree" are 28, "Neutral" are 53, "Agree" are 49 and "Strongly Agree" are 30. Also, Table 5.28 and Figure 5.17 shows the percent of "Strongly disagree" are 9.6%, "Disagree" are 15.8%, "Neutral" are 29.9 %, "Agree" are 27.7%, and "Strongly agree" are 16.9%.

Table 5. 28: Percentage and Frequency of Q8

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	17	9.6	9.6	9.6
	Disagree	28	15.8	15.8	25.4
	Neutral	53	29.9	29.9	55.4
	Agree	49	27.7	27.7	83.1
	Strongly agree	30	16.9	16.9	100.0
	Total	177	100.0	100.0	

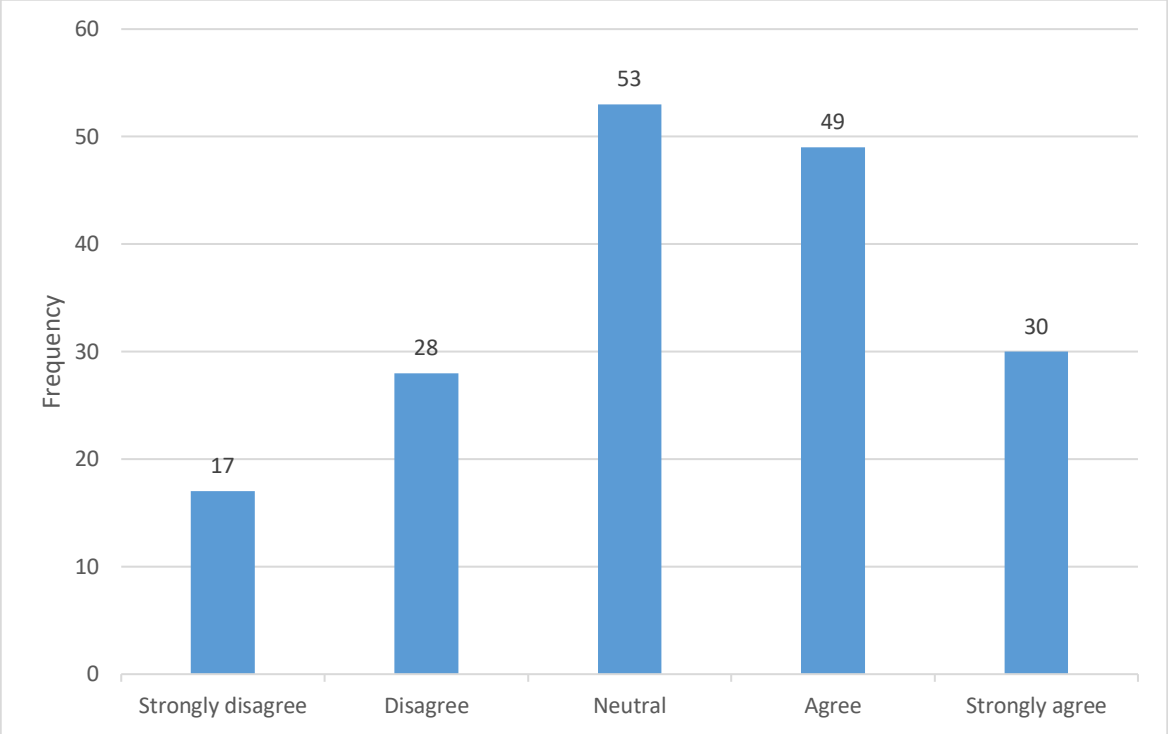

Figure 5. 17: Frequency of Q8

Table 5.29 shows the mean of question equals 3.266 (65.32%), Test-value = 2.049, and P-value = 0.004 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 29: Test-values and Means for Q8

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk retention affects the performance of the project.	3.266	65.32	2.049	0.004

9. Analysis of question 9

The researcher found in analysing question "Project team leader should be committed to his/her responsibilities; he/she should monitor the project progress closely, especially in terms of cost, time, and quality?" the following data:

Table 5.30 shows the frequency of "Strongly disagree" are 3, "Disagree" are 32, "Neutral" are 75, "Agree" are 57 and "Strongly Agree" are 10. Also, Table 5.30 and Figure 5.18 shows the percent of "Strongly disagree" are 1.7%, "Disagree" are 18.1%, "Neutral" are 42.4 %, "Agree" are 32.2%, and "Strongly agree" are 5.6%.

Table 5. 30: Percentage and Frequency of Q9

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	32	18.1	18.1	19.8
	Neutral	75	42.4	42.4	62.1
	Agree	57	32.2	32.2	94.4
	Strongly agree	10	5.6	5.6	100.0
	Total	177	100.0	100.0	

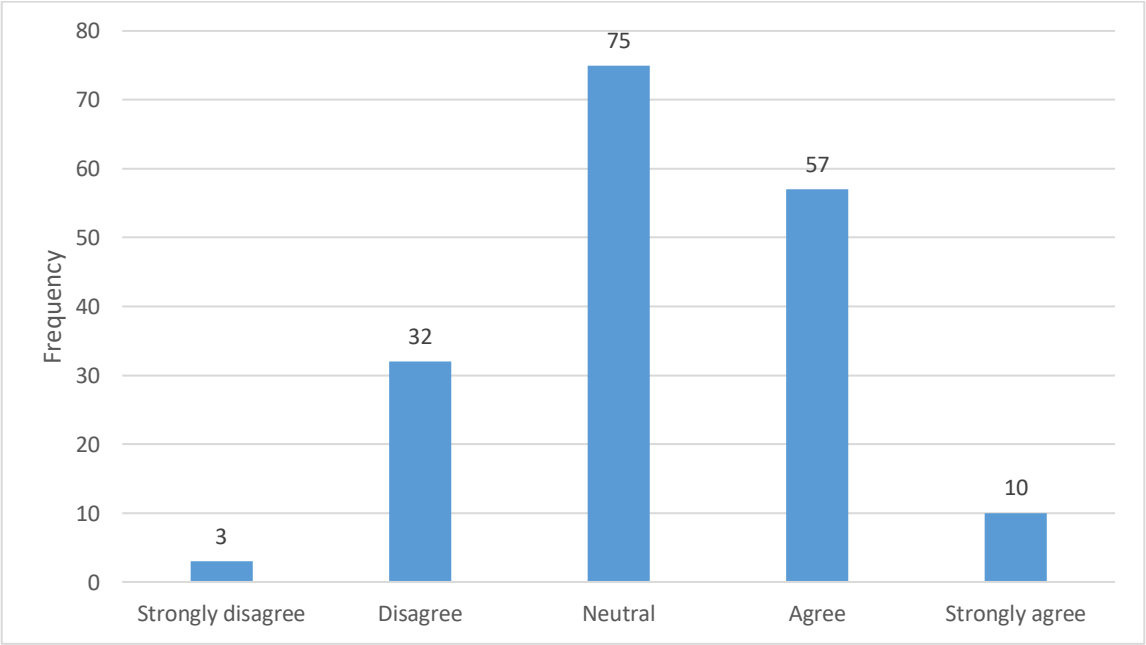

Figure 5. 18: Frequency of Q9

Table 5.31 shows the mean of question nine equals 3.220 (64.4%), Test-value = 3.380, and P-value = 0.001 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 31: Test-values and Means for Q9

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Project team leader should be committed to his/her responsibilities; he/she should monitor the project progress closely, especially in terms of cost, time, and quality?.	3.220	64.4	3.380	0.001

10. Analysis of question 10

The researcher found in analysing question "Materials supplied should be recorded and monitored closely in order to have continuous and sufficient supply" the following data:

Table 5.32 shows the frequency of "Strongly disagree" are 6, "Disagree" are 36, "Neutral" are 63, "Agree" are 57 and "Strongly Agree" are 15. Also, Table 5.32 and Figure 5.19 shows the percent of "Strongly disagree" are 3.4%, "Disagree" are 20.3%, "Neutral" are 35.6 %, "Agree" are 32.2%, and "Strongly agree" are 8.5%.

Table 5. 32: Percentage and Frequency of Q10

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	3.4	3.4	3.4
	Disagree	36	20.3	20.3	23.7
	Neutral	63	35.6	35.6	59.3
	Agree	57	32.2	32.2	91.5
	Strongly agree	15	8.5	8.5	100.0
	Total	177	100.0	100.0	

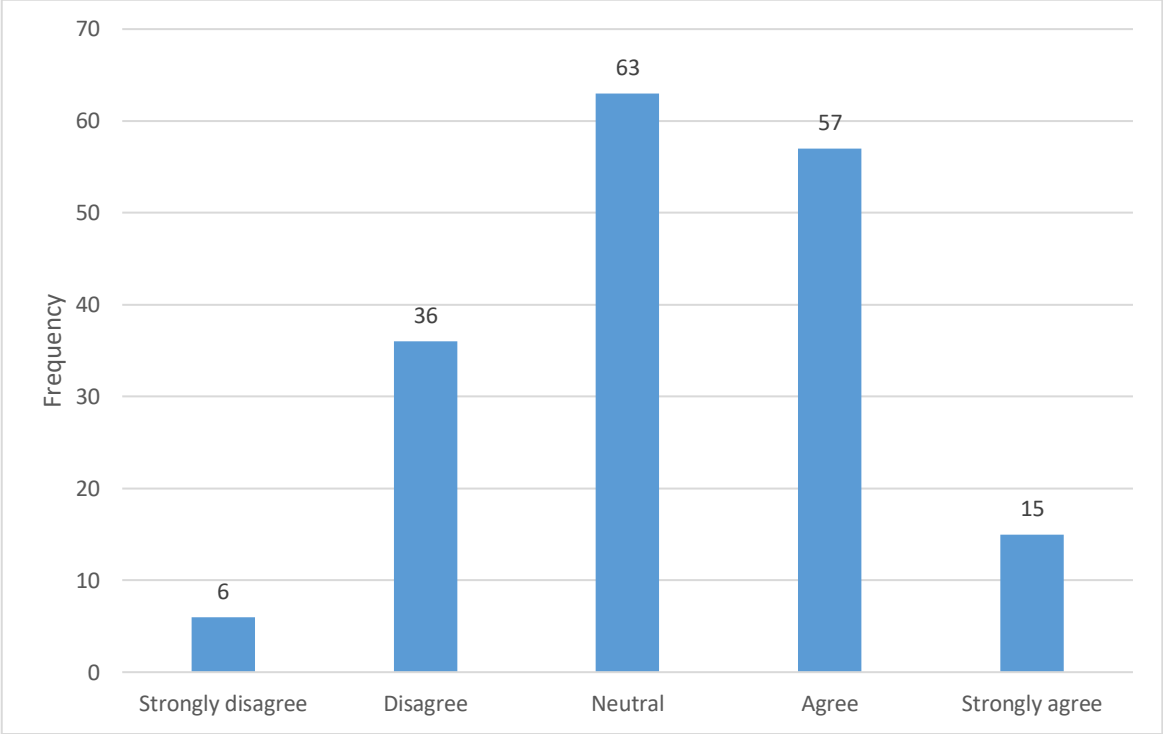

Figure 5. 19: Frequency of Q10

Table 5.33 shows the mean of question ten equals 3.221 (64.42%), Test-value = 2.997, and P-value = 0.003 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 33: Test-values and Means for Q10

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Materials supplied should be recorded and monitored closely in order to have continuous and sufficient supply.	3.221	64.42	2.997	0.003

11. Analysis of question 11

The researcher found in analysing question "Risk control (loss control or risk mitigation) influences the project performance in the construction industry" the following data:

Table 5.34 shows the frequency of "Strongly disagree" are18, "Disagree" are 36, "Neutral" are 35, "Agree" are 70 "Strongly Agree" are 18. Also Table 5.34 and Figure 5.20 shows the percent of "Strongly disagree" are 10.2%, "Disagree" are 20.3%, "Neutral" are 19.8 %, "Agree" are 39.5%, and "Strongly agree" are 10.2%.

Table 5. 34: Percentage and Frequency of Q11

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	18	10.2	10.2	10.2
	Disagree	36	20.3	20.3	30.5
	Neutral	35	19.8	19.8	50.3
	Agree	70	39.5	39.5	89.8
	Strongly agree	18	10.2	10.2	100.0
	Total	177	100.0	100.0	

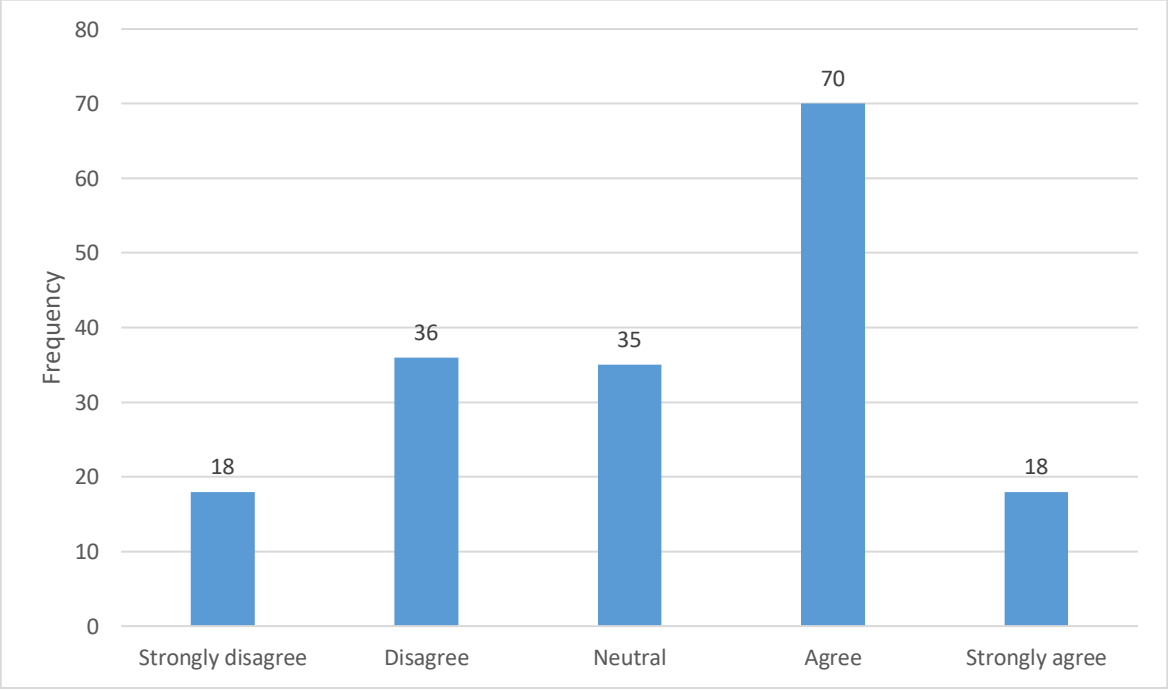

Figure 5. 20: Frequency of Q11

Table 5.35 shows the mean of question eleven equals 3.192 (63.84%), Test-value = 2.173, and P-value = 0.013 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 35: Test-values and Means for Q11

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk control (loss control or risk mitigation) influences the project performance in the construction industry	3.192	63.84	2.173	0.013

12. Analysis of question 12

The researcher found in analysing question "Risk transfer influences project performance in the construction industry" the following data:

Table 5.36 shows the frequency of "Strongly disagree" are is 14, "Disagree" are is 40, "Neutral" are 41, "Agree" are 60 and "Strongly Agree" are 60. Also, Table 5.36 and Figure 5.21 shows the percent of "Strongly disagree" are 7.9%, "Disagree" are 22.6%, "Neutral" are 23.2 %, "Agree" are 33.9%, and "Strongly agree" are 12.4%.

Table 5. 36: Percentage and Frequency of Q12

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	14	7.9	7.9	7.9
	Disagree	40	22.6	22.6	30.5
	Neutral	41	23.2	23.2	53.7
	Agree	60	33.9	33.9	87.6
	Strongly agree	22	12.4	12.4	100.0
	Total	177	100.0	100.0	

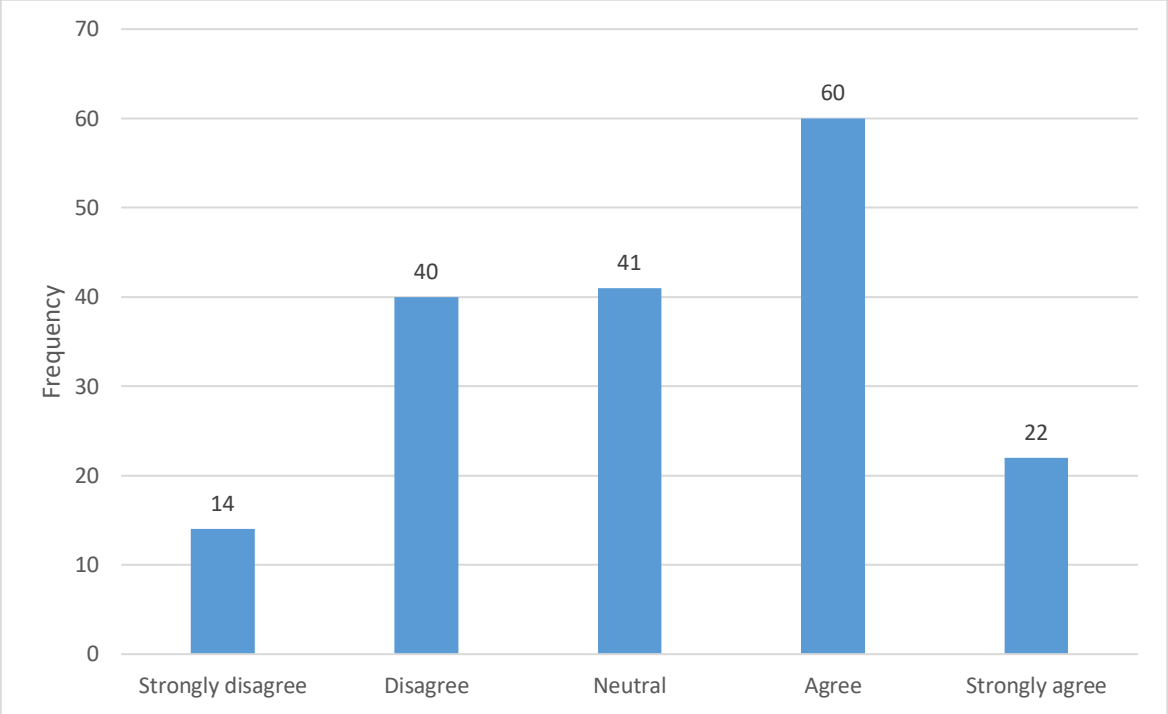

Figure 5. 21: Frequency of Q12

Table 5.37 shows the mean of question twelve equals 3.203 (63.84%), Test-value = 2.33, and P-value = 0.021 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 37: Test-values and Means for Q12

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk transfer influences project performance in the construction industry.	3.203	63.84	2.333	0.021

13. Analysis of question 13

The researcher found in analysing question "We can innovate the new dimensions and steps of risk management process in public sectors" the following data:

Table 5.38 shows the frequency of "Strongly disagree" are 6, "Disagree" are 33, "Neutral" are 82, "Agree" are 42 and "Strongly Agree" are 14. Also, Table 5.38 and Figure 5.22 shows the percent of "Strongly disagree" are 3.4%, "Disagree" are 18.6%, "Neutral" are 46.3 %, "Agree" are 23.7%, and "Strongly agree" are 7.9%.

Table 5. 38: Frequency and Percentage of Q13

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	3.4	3.4	3.4
	Disagree	33	18.6	18.6	22.0
	Neutral	82	46.3	46.3	68.4
	Agree	42	23.7	23.7	92.1
	Strongly agree	14	7.9	7.9	100.0
	Total	177	100.0	100.0	

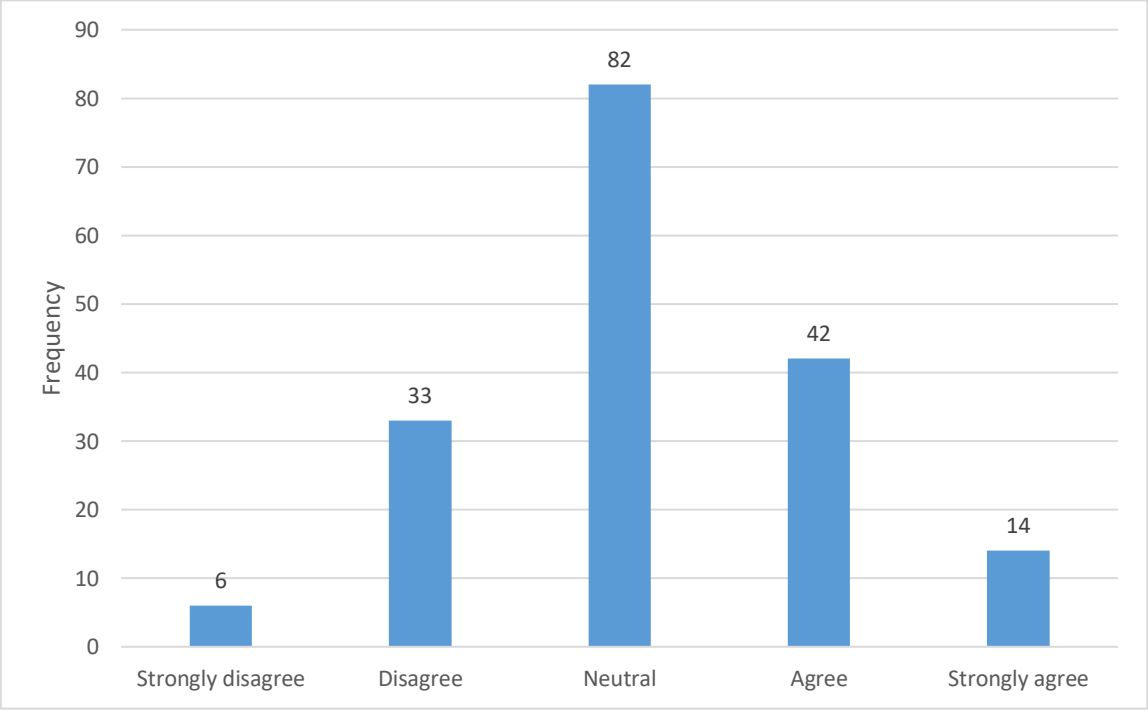

Figure 5. 22: Frequency of Q13

Table 5.39 shows the mean of question thirteen equals 3.141 (62.82%), Test-value = 2.026, and P-value = 0.044 which is lower than the level of significance α = 0.05, so the mean is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 39: Test-values and Means for Q13

Question	mean	Proportional mean	Test-value	P-value (Sig.)
We can innovate the new dimensions and steps of risk management process in public sectors.	3.141	62.82	2.026	0.044

14. Analysis of question 14

The researcher found in analysing question "Modifications should be minimized during the construction process to avoid delays." the following data:

Table 5.40 shows the frequency of "Strongly disagree" are 15, "Disagree" are 31, "Neutral" are 39, "Agree" are 51 and "Strongly Agree" are 41. Also, Table 5.40 and Figure 5.23 shows the percent of "Strongly disagree" are 8.5%, "Disagree" are 17.5%, "Neutral" are 22 %, "Agree" are 22.8%, and "Strongly agree" are 23.2%.

Table 5. 40: Percentage and Frequency of Q14

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	8.5	8.5	8.5
	Disagree	31	17.5	17.5	26.0
	Neutral	39	22.0	22.0	48.0
	Agree	51	28.8	28.8	76.8
	Strongly agree	41	23.2	23.2	100.0
	Total	177	100.0	100.0	

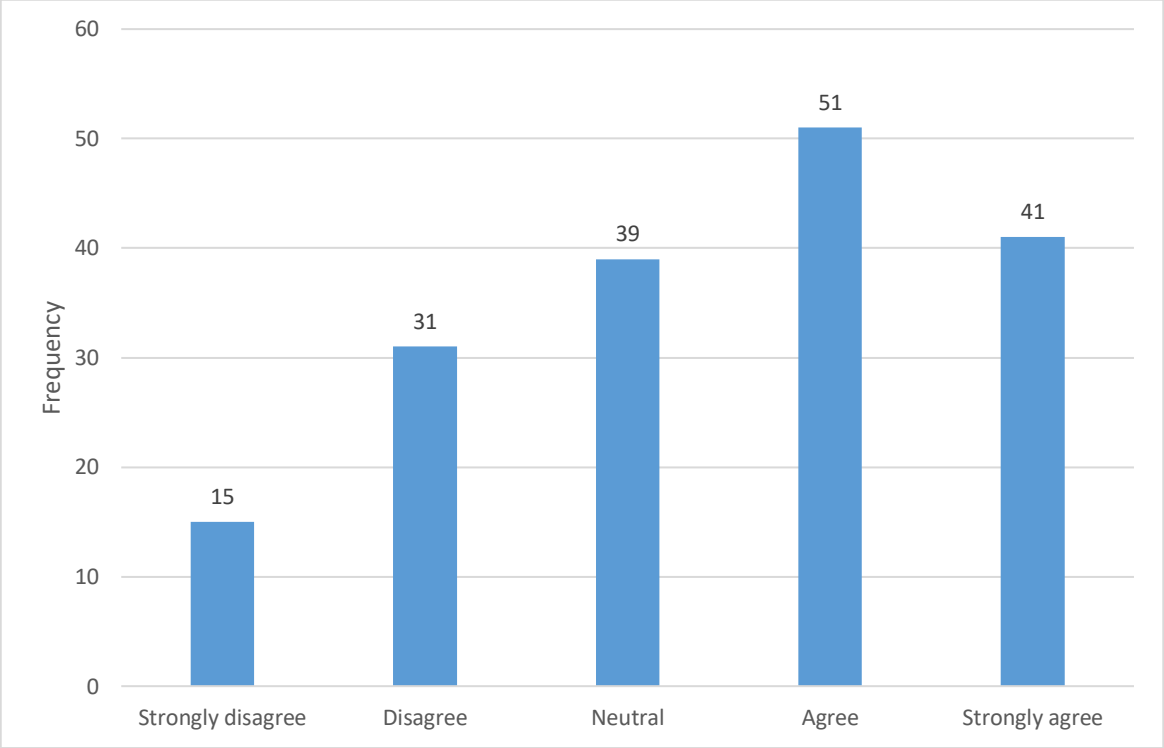

Figure 5. 23: Frequency of Q14

Table 5.41 shows the mean of question fourteen equals 3.407 (68.17%), Test-value = 4.316, and P-value = 0.000 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 41: Test-values and Means for Q14

Question	mean	Proportional mean	Test-value	P-value (Sig.)
We can innovate the new dimensions and steps of risk management process in public sectors.	3.407	68.17	4.316	0.000

15. Analysis of question 15

The researcher found in analysing question “Fast-tracking is used in the Algeria construction projects” the following data:

Table 5.42 shows the frequency of “Strongly disagree” are 19, “Disagree” are 58, “Neutral” are 53, “Agree” are 41 and “Strongly Agree” are 6. Also, Table 5.42 and Figure 5.24 shows the percent of “Strongly disagree” are 10.7%, “Disagree” are 32.8%, “Neutral” are 29.9%, “Agree” are 23.2%, and “Strongly agree” are 3.4%.

Table 5. 42: Percentage and Frequency of Q15

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	19	10.7	10.7	10.7
	Disagree	58	32.8	32.8	43.5
	Neutral	53	29.9	29.9	73.4
	Agree	41	23.2	23.2	96.6
	Strongly agree	6	3.4	3.4	100.0
	Total	177	100.0	100.0	

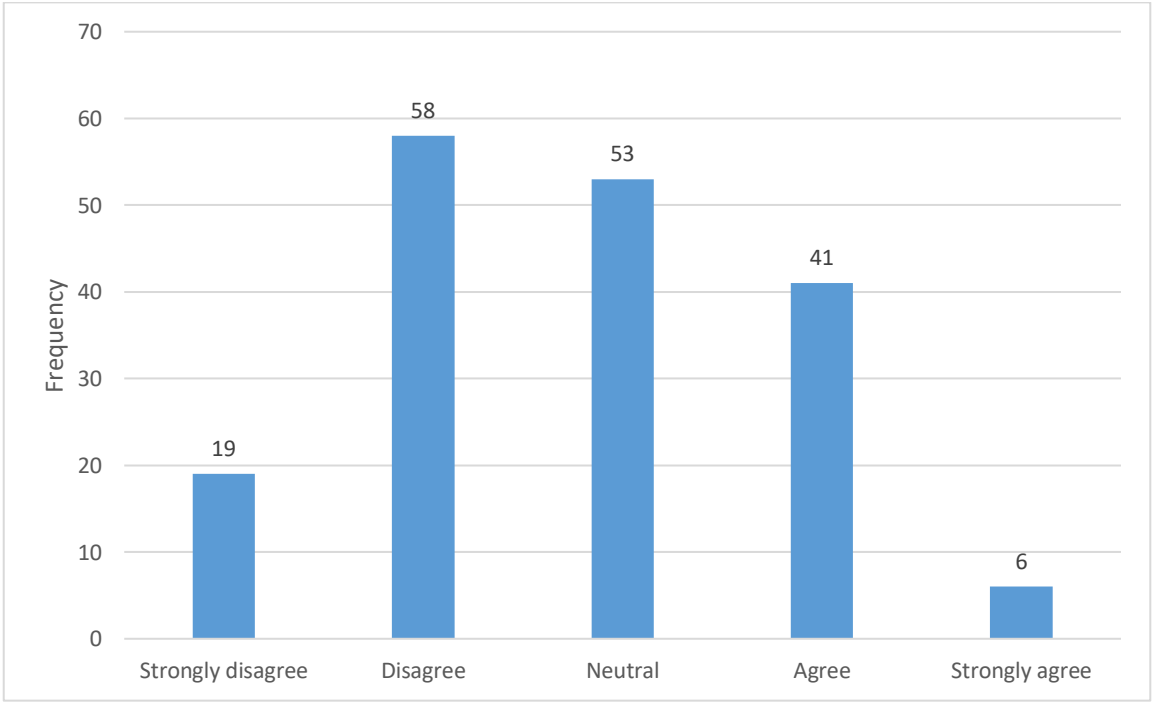

Figure 5. 24: Frequency of Q15

Table 5. 43 shows the mean of question fifteen equals 2.757 (55.14%), Test-value = -3.123, and P-value = 0.002 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 43: Test-values and Means for Q15

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Fast-tracking is used in the Algeria construction projects	2.757	55.14	-3.123	0.002

16. Analysis of question" 16

The researcher found in analysing question 16 "Fast-tracking holds the future of the Algeria's construction industry" the following data:

Table 5.44 shows the frequency of "Strongly disagree" are 2, "Disagree" are 22, "Neutral" are 70, "Agree" are 67 and "Strongly Agree" are 16. Also, Table 5.44 and Figure 5.25 shows the percent of "Strongly disagree" are 1.1%, "Disagree" are 12.4%, "Neutral" are 39.5 %, "Agree" are 37.9%, and "Strongly agree" are 9%.

Table 5. 44: Percentage and Frequency of Q16

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.1	1.1	1.1
	Disagree	22	12.4	12.4	13.6
	Neutral	70	39.5	39.5	53.1
	Agree	67	37.9	37.9	91.0
	Strongly agree	16	9.0	9.0	100.0
	Total	177	100.0	100.0	

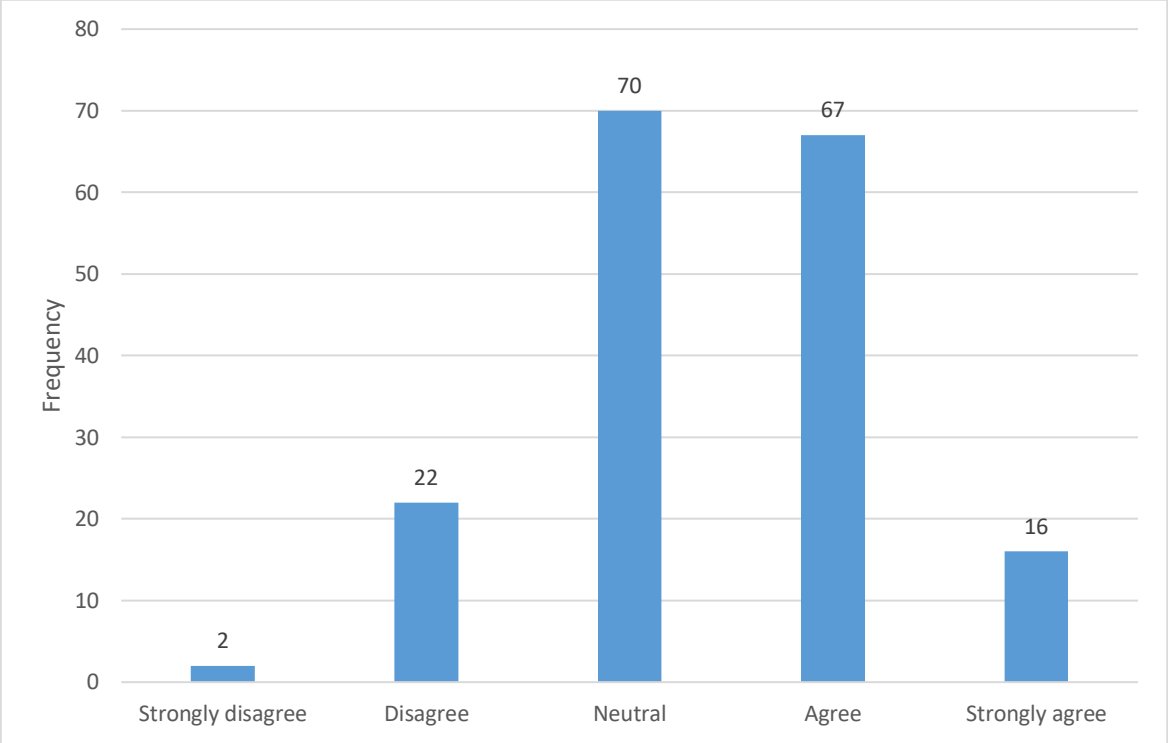

Figure 5. 25: Frequency of Q16

Table 5.45 shows the mean of question sixteen equals 3.412 (68.24%), Test-value = 6.363, and P-value = 0.000 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 45: Test-values and Means for Q16

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Fast-tracking holds the future of the Algeria's construction industry	3.412	68.24	6.363	0.000

17. Analysis of question 17

The researcher found in analysing question “I implement risk management in my projects” the following data:

Table 5.46 shows the frequency of “Strongly disagree” are 3, “Disagree” are 32, “Neutral” are 82, “Agree” are 52 and “Strongly Agree” are 8. Also, Table 5.46 and Figure 5.26 shows the percent of “Strongly disagree” are 1.7%, “Disagree” are 18.1%, “Neutral” are 46.3 %, “Agree” are 29.4%, and “Strongly agree” are 4.5%.

Table 5. 46: Percentage and Frequency of Q17

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	32	18.1	18.1	19.8
	Neutral	82	46.3	46.3	66.1
	Agree	52	29.4	29.4	95.5
	Strongly agree	8	4.5	4.5	100.0
	Total	177	100.0	100.0	

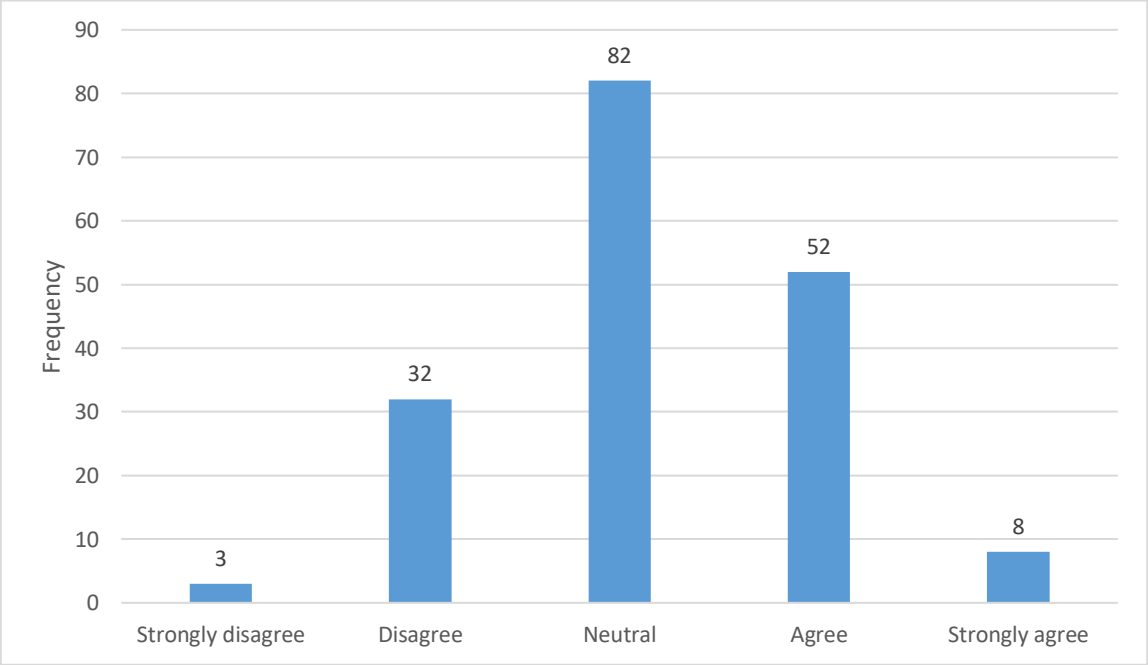

Figure 5. 26: Frequency of Q17

Table 5.47 shows the mean of question seventeen equals 3.169 (63.38%), Test-value = 2.698, and P-value = 0.008 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 47: Test-values and Means for Q17

Question	mean	Proportional mean	Test-value	P-value (Sig.)
I implement risk management in my projects.	3.169	63.38	2.698	0.008

18. Analysis of question 18

The researcher found in analysing question 18 "It is necessary to implement risk management in construction projects" the following data:

Table 5.48 shows the frequency of "Strongly disagree" are 8, "Disagree" are 33, "Neutral" are 64, "Agree" are 60 and "Strongly Agree" are 12. Also, Table 5.48 and Figure 5.27 shows the percent of "Strongly disagree" are 4.5%, "Disagree" are 18.6%, "Neutral" are 36.2%, "Agree" are 33.9%, and "Strongly agree" are 6.8%.

Table 5. 48: Percentage and Frequency of Q18

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	4.5	4.5	4.5
	Disagree	33	18.6	18.6	23.2
	Neutral	64	36.2	36.2	59.3
	Agree	60	33.9	33.9	93.2
	Strongly agree	12	6.8	6.8	100.0
	Total	177	100.0	100.0	

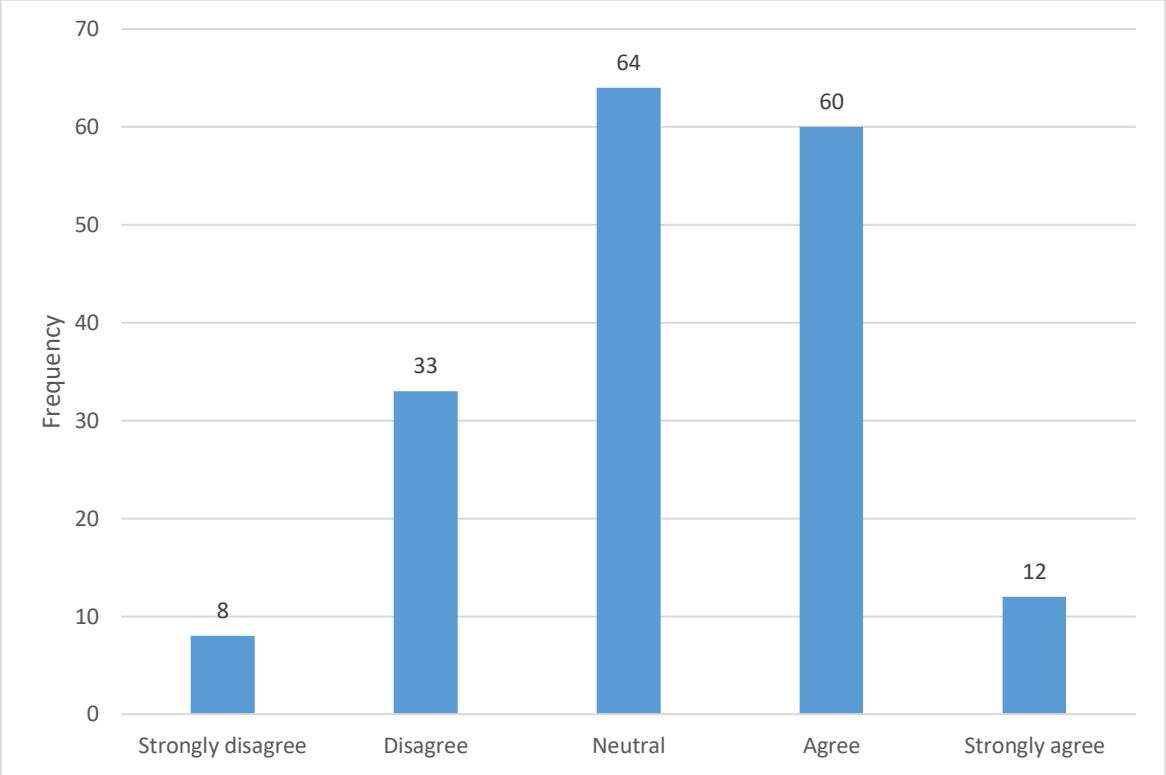

Figure 5. 27: Frequency of Q18

Table 5.40 shows the mean of question eighteen equals 3.198 (63.96%), Test-value = 2.708, and P-value = 0.007 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 49: Test-values and Means for Q18

Question	mean	Proportional mean	Test-value	P-value (Sig.)
It is necessary to implement risk management in construction projects.	3.198	63.96	2.708	0.007

19. Analysis of question 19

The researcher found in analysing question "Please rate this statement: "Risk in the Algeria construction is allocated to the most appropriate party" the following data:

Table 5.50 shows the frequency of "Strongly disagree" are 2, "Disagree" are 31, "Neutral" are 93, "Agree" are 44 and "Strongly Agree" are 7. Also, Table 5.50 and Figure 5.28 shows the percent of "Strongly disagree" are 1.1%, "Disagree" are 17.5%, "Neutral" are 52.5%, "Agree" are 24.9%, and "Strongly agree" are 4%.

Table 5. 50: Percentage and Frequency of Q19

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	9.0	9.0	9.0
	Disagree	33	18.6	18.6	27.7
	Neutral	55	31.1	31.1	58.8
	Agree	36	20.3	20.3	79.1
	Strongly agree	37	20.9	20.9	100.0
	Total	177	100.0	100.0	

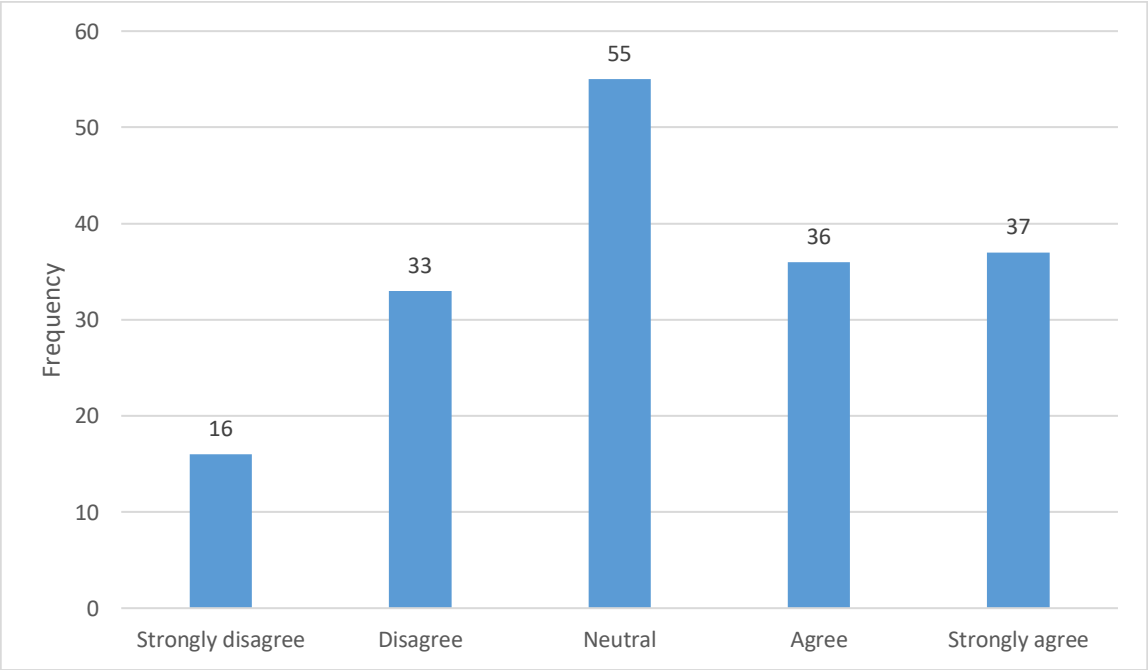

Figure 5. 28: Frequency of Q19

Table 5.51 shows the mean of question nineteen equals 3.254 (65.08%), Test-value = 2.733, and P-value = 0.007 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 51: Test-values and Means for Q19

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Please rate this statement: "Risk in the Algeria construction is allocated to the most appropriate party	3.254	65.08	2.733	0.007

20. Analysis of question 20

The researcher found in analysing question "Construction insurance against risk is expensive due to high premiums in Algeria" the following data:

Table 5.52 shows the frequency of "Strongly disagree" are 2, "Disagree" are 31, "Neutral" are 93, "Agree" are 44 and "Strongly Agree" are 7. Also, Table 5.52 and Figure 5.29 shows "Strongly disagree" are 1.1%, "Disagree" are 17.5%, "Neutral" are 52.5 %, "Agree" are 24.9%, and "Strongly agree" are 4%.

Table 5. 52: Percentage and Frequency of Q20

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Disagree	32	18.1	18.1	18.1
	Neutral	87	49.2	49.2	67.2
	Agree	53	29.9	29.9	97.2
	Strongly agree	5	2.8	2.8	100.0
	Total	177	100.0	100.0	

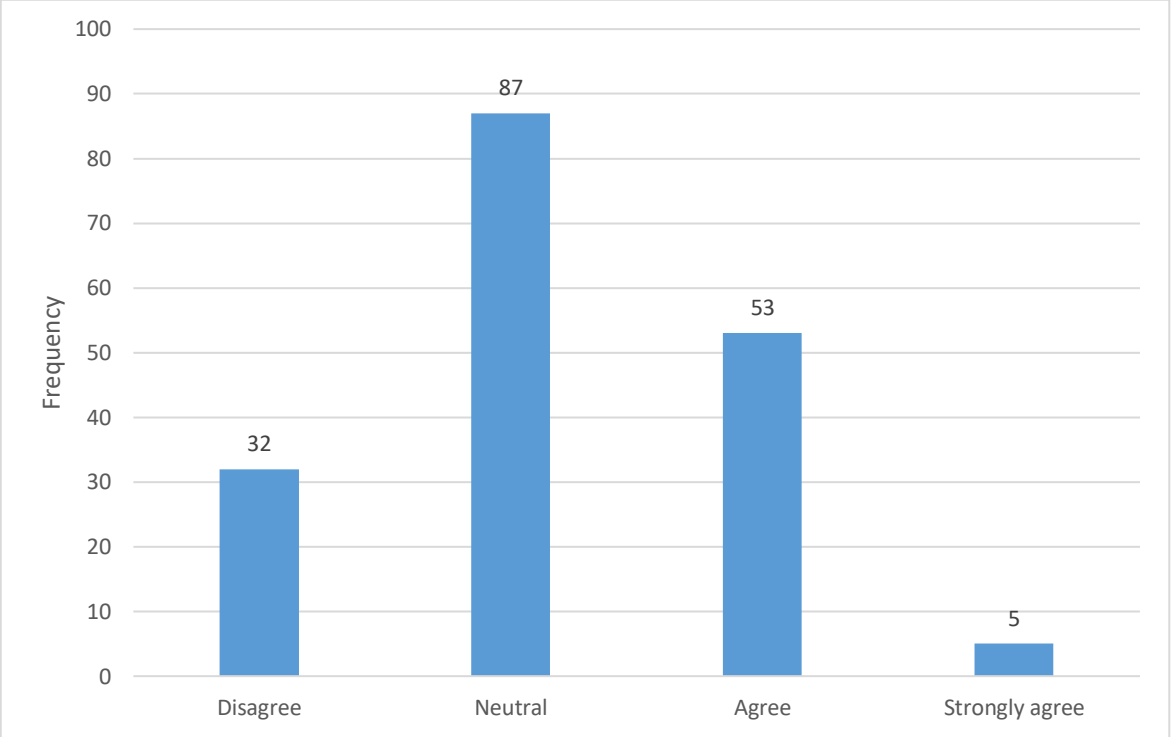

Figure 5. 29: Frequency of Q20

Table 5.53 shows the mean of question twenty equals 3.175 (63.5%), Test-value = 3.098, and P-value = 0.002 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 53: Test-values and Means for Q20

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Construction insurance against risk is expensive due to high premiums in Algeria.	3.175	63.5	3.098	0.002

21. Analysis of question 21

The researcher found in analysing question "It is necessary to identify project risks at the project planning phase" the following data:

Table 5.54 shows the frequency of "Strongly disagree" are 4, "Disagree" are 24, "Neutral" are 76, "Agree" are 63 and "Strongly Agree" are 10. Also, Table 5.54 and Figure 5.30 shows the percent of "Strongly disagree" are 2.3%, "Disagree" are 13.6%, "Neutral" are 42.9 %, "Agree" are 35.6%, and "Strongly agree" are 5.6%.

Table 5. 54: Percentage and Frequency of Q21

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	2.3	2.3	2.3
	Disagree	24	13.6	13.6	15.8
	Neutral	76	42.9	42.9	58.8
	Agree	63	35.6	35.6	94.4
	Strongly agree	10	5.6	5.6	100.0
	Total	177	100.0	100.0	

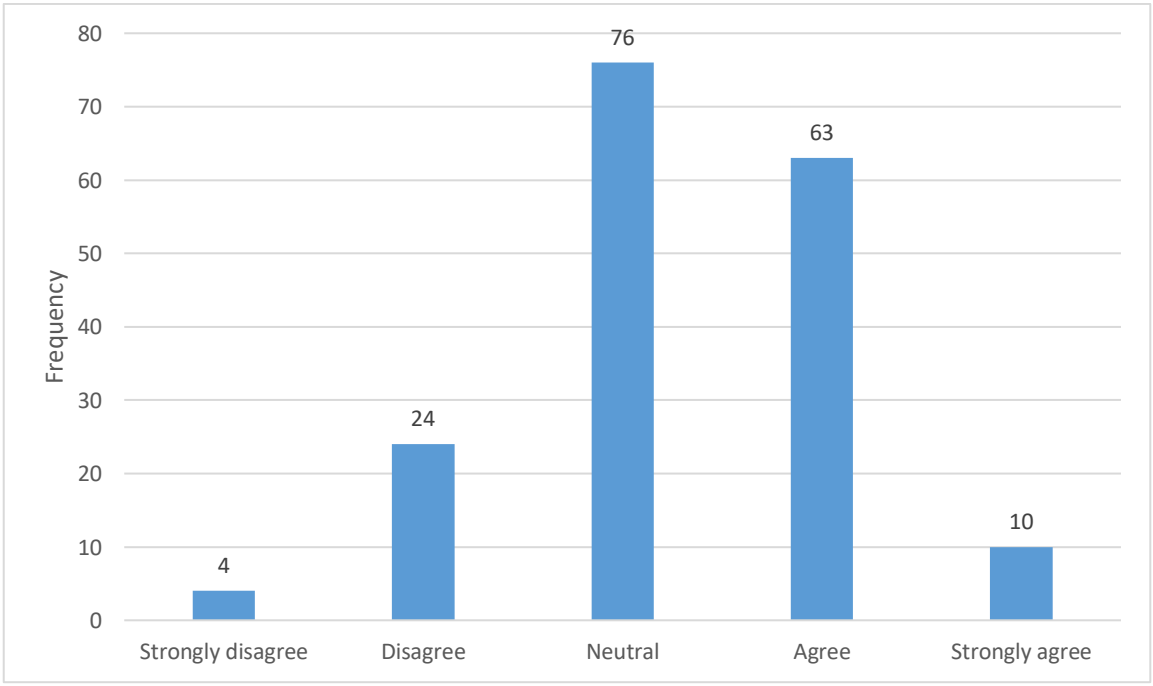

Figure 5. 30: Frequency of Q21

Table 5.55 shows the mean of question twenty-one equals 3.288 (65.76%), Test-value = 4.490, and P-value = 0.000 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 55: Test-values and Means for Q21

Question	mean	Proportional mean	Test-value	P-value (Sig.)
It is necessary to identify project risks at the project planning phase	3.288	65.76	4.490	0.000

22. Analysis of question 22

The researcher found in analysing question "Risk management is important only for special projects such as international projects" the following data:

Table 5.56 shows the frequency of "Strongly disagree" are 20, "Disagree" are 64, "Neutral" are 60, "Agree" are 28 and "Strongly Agree" are 5. Also, Table 5.56 and Figure 5.31 shows the percent of "Strongly disagree" are 11.3%, "Disagree" are 36.2%, "Neutral" are 33.9 %, "Agree" are 15.8%, and "Strongly agree" are 2.8%.

Table 5. 56: Percentage and Frequency of Q22

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	20	11.3	11.3	11.3
	Disagree	64	36.2	36.2	47.5
	Neutral	60	33.9	33.9	81.4
	Agree	28	15.8	15.8	97.2
	Strongly agree	5	2.8	2.8	100.0
	Total	177	100.0	100.0	

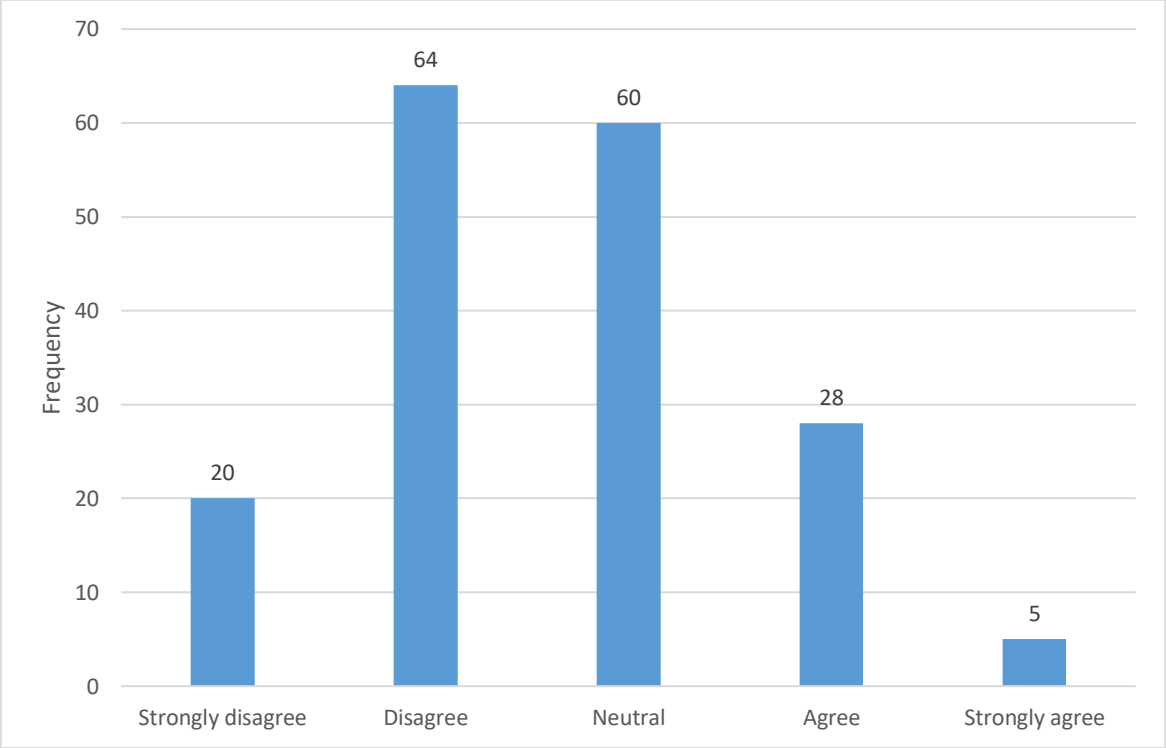

Figure 5. 31: Frequency of Q22

Table 5.57 shows the mean of question twenty-two equals 2.627 (52.54%), Test-value = -5.087, and P-value = 0.000 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 57: Test-values and Means for Q22

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk management is important only for special projects such as international projects.	2.627	52.54	-5.087	0.000

23. Analysis of question 23

The researcher found in analysing question "Risk management is necessary in project management for a successful project." the following data:

Table 5.58 shows the frequency of "Strongly disagree" are 8, "Disagree" are 26, "Neutral" are 70, "Agree" are 61 and "Strongly Agree" are 12. Also, Table 5.58 and Figure 5.32 shows the percent of "Strongly disagree" are 4.5%, "Disagree" are 14.7%, "Neutral" are 39.5 %, "Agree" are 34.5%, and "Strongly agree" are 6.8%.

Table 5. 58: Percentage and Frequency of Q23

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	4.5	4.5	4.5
	Disagree	26	14.7	14.7	19.2
	Neutral	70	39.5	39.5	58.8
	Agree	61	34.5	34.5	93.2
	Strongly agree	12	6.8	6.8	100.0
	Total	177	100.0	100.0	

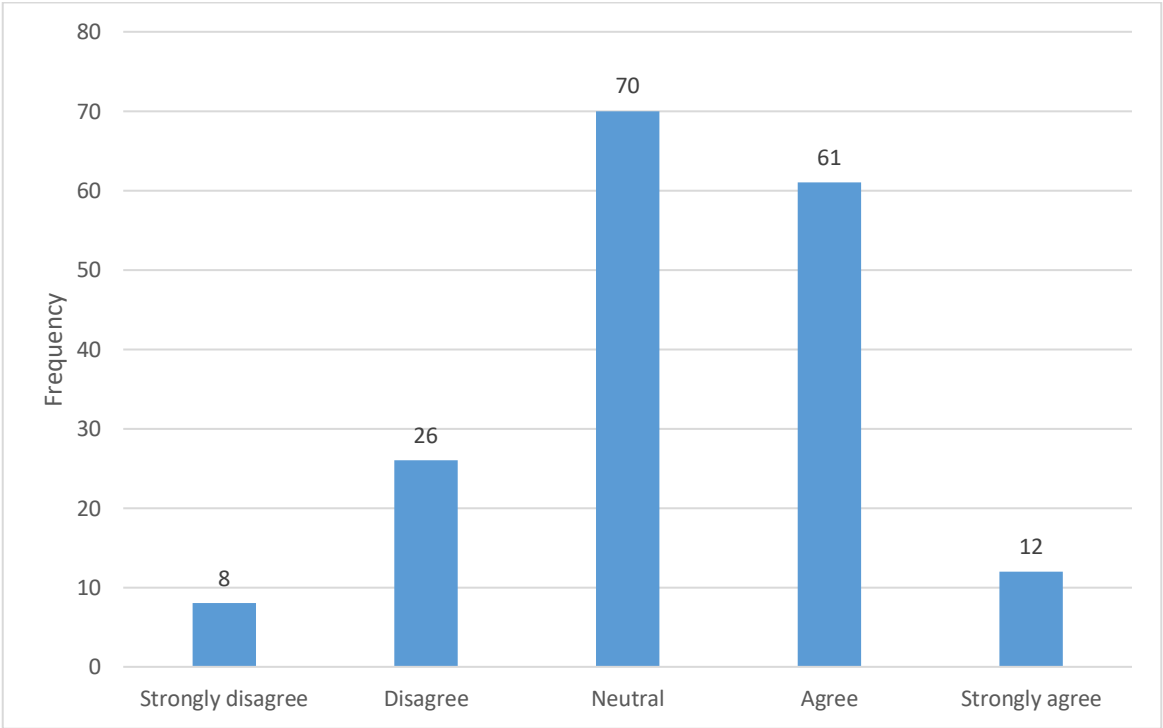

Figure 5. 32: Frequency of Q23

Table 5.59 shows the mean of question twenty-three equals 3.243 (64.86%), Test-value = 3.427, and P-value = 0.001 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 59: Test-values and Means for Q23

Question	mean	Proportional mean	Test-value	P-value (Sig.)
Risk management is necessary in project management for a successful project.	3.243	64.86	3.427	0.001

24. Analysis of question 24

The researcher found in analysing question "The major contents and objectives of project risk management are the same as the ones in project management" the following data:

Table 5.60 shows the frequency of "Strongly disagree" are 3, "Disagree" are 32, "Neutral" are 82, "Agree" are 52 and "Strongly Agree" are 8. Also, Table 5.60 and Figure 5.24 shows the percent of "Strongly disagree" are 1.7%, "Disagree" are 18.1%, "Neutral" are 46.3 %, "Agree" are 2.4%, and "Strongly agree" are 4.5%.

Table 5. 60: Percentage and Frequency of Q24

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	32	18.1	18.1	19.8
	Neutral	82	46.3	46.3	66.1
	Agree	52	29.4	29.4	95.5
	Strongly agree	8	4.5	4.5	100.0
	Total	177	100.0	100.0	

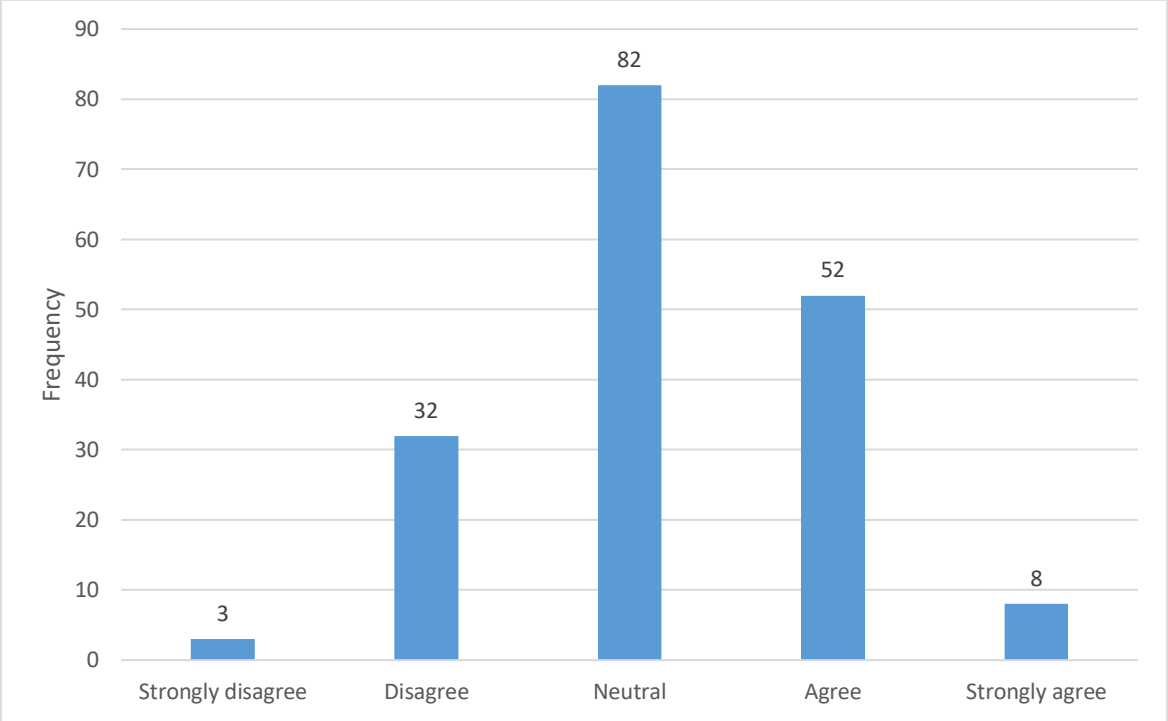

Figure 5. 33: Frequency of Q24

Table 5.61 shows the mean of question twenty-four equals 3.169 (63.38%), Test-value = 2.698, and P-value = 0.008 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 61: Test-values and Means for Q24

Question	mean	Proportional mean	Test-value	P-value (Sig.)
The major contents and objectives of project risk management are the same as the ones in project management	3.169	63.38	2.698	0.008

25. Analysis of question 25

The researcher found in analysing question “The purpose of project risk management is to reduce project uncertainties." the following data:

Table 5.62 shows the frequency of “Disagree” are 32, “Neutral” are 88, “Agree” are 49 and “Strongly Agree” are 8. Also, Table 5.62 and Figure 5.34 shows the percent of “Disagree” are 18.1%, “Neutral” are 49.7 %, “Agree” are 27.7%, and “Strongly agree” are 4.5%.

Table 5. 62: Percentage and Frequency of Q25

		Frequency	Percent %	Valid Percent	Cumulative Percent
Valid	Disagree	32	18.1	18.1	18.1
	Neutral	88	49.7	49.7	67.8
	Agree	49	27.7	27.7	95.5
	Strongly agree	8	4.5	4.5	100.0
	Total	177	100.0	100.0	

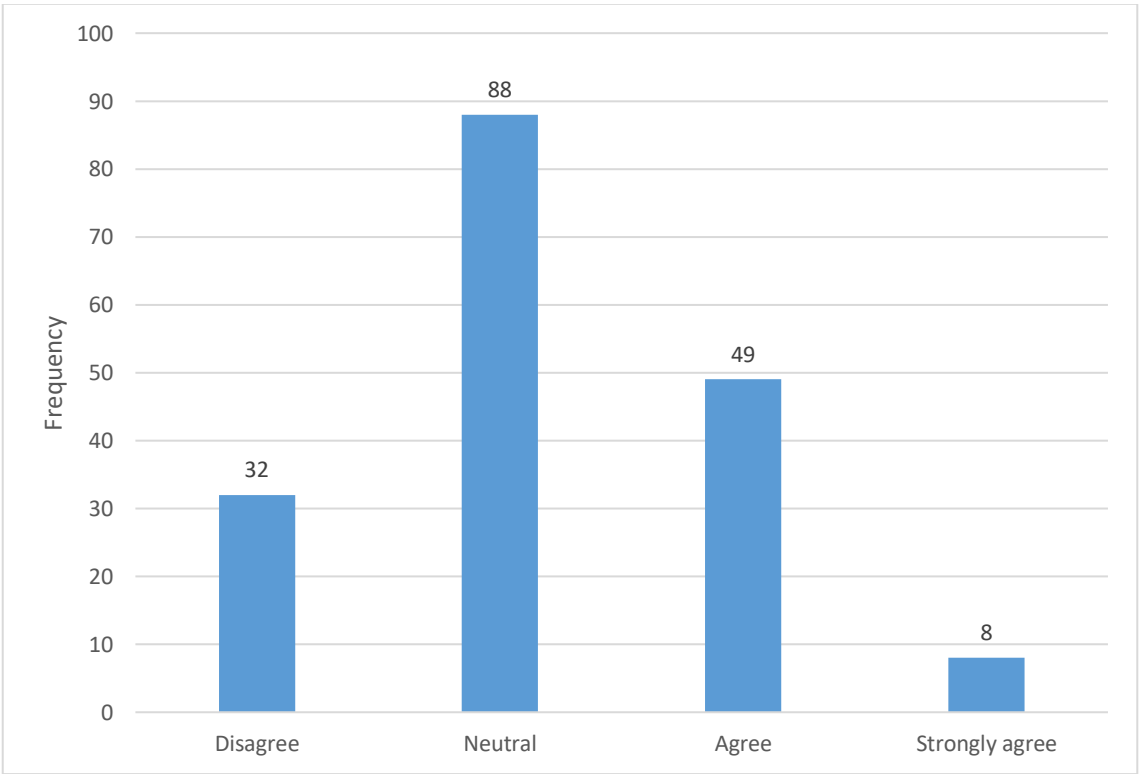

Figure 5. 34: Frequency of Q25

Table 5.63 shows the mean of question twenty-five equals 3.186 (63.72%), Test-value = 3.183, and P-value = 0.002 which is lower than the level of significance α = 0.05, so the mean of this question is significantly different from the hypothesis. The researcher found that the respondents (not-neutral) to this question.

Table 5. 63: Test-values and Means for Q25

Question	mean	Proportional mean	Test-value	P-value (Sig.)
The purpose of project risk management is to reduce project uncertainties.	3.186	63.72	3.183	0.002

Table 5. 64: Means and Test-values for Hypothesis

	N	Minimum	Maximum	Mean	Std. Deviation
Question 1	177	1.0	5.0	3.215	1.1328
Question 2	177	1.0	5.0	3.181	1.1287
Question 3	177	1.0	5.0	3.181	0.9541
Question 4	177	1.0	5.0	3.215	1.0276
Question 5	177	1.0	5.0	3.175	1.0541
Question 6	177	1.0	5.0	3.130	0.7834
Question 7	177	1.0	5.0	3.164	1.0397
Question 8	177	1.0	5.0	3.266	1.1978
Question 9	177	1.0	5.0	3.220	0.8674
Question 10	177	1.0	5.0	3.220	0.9782
Question 11	177	1.0	5.0	3.192	1.1762
Question 12	177	1.0	5.0	3.203	1.1596
Question 13	177	1.0	5.0	3.141	0.9277
Question 14	177	1.0	5.0	3.407	1.2539
Question 15	177	1.0	5.0	2.757	1.0350

Question 16	177	1.0	5.0	3.412	0.8624
Question 17	177	1.0	5.0	3.169	0.8357
Question 18	177	1.0	5.0	3.198	0.9714
Question 19	177	1.0	5.0	3.254	1.2376
Question 20	177	2.0	5.0	3.175	0.7522
Question 21	177	1.0	5.0	3.288	0.8538
Question 22	177	1.0	5.0	2.627	0.9752
Question 23	177	1.0	5.0	3.243	0.9431
Question 24	177	1.0	5.0	3.169	0.8357
Question 25	177	2.0	5.0	3.186	0.7792
Total	177	2.28	4.12	3.1756	0.55233
Valid N (listwise)	177				

Figure 5.35 Shows the questions with the supreme mean are questions 16 at 3.412, 14 at 3.407 and 21 at 3.288, while question 22 has the lowest mean at 2.627. It shows also the total mean 3.1756 of the hypothesis is significantly more than the hypothesis.

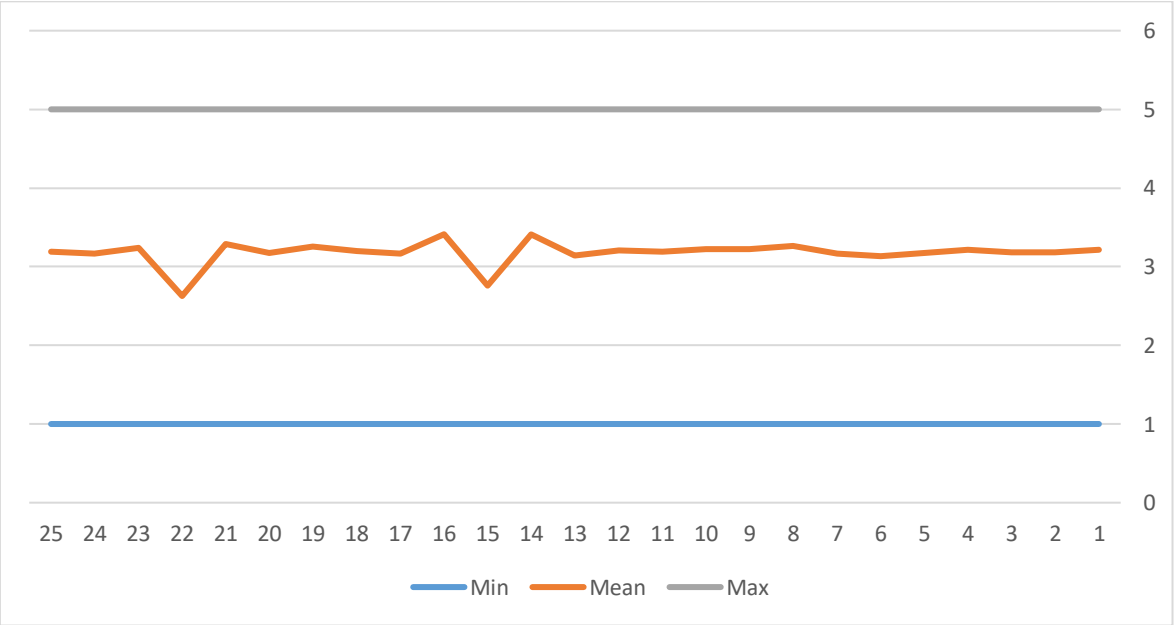

Figure 5. 35: Mean of Likert Scale questions related to hypothesis

Analysis of section C: Writing

The researcher found that most of the respondents answered the questions in a similar way, so the researcher chooses the most similar answers.

1. **What are the main factors that contribute to a more effective risk management in the construction projects?**
   - Financial issue (Lack of funds).
   - Lack of raw and basic materials.
   - Errors in design, drawings and the calculation of quantities.
   - Lack of tools.
   - Disrespect of laws.
   - Lack of continuous and control on the project.
2. **What are the sources of risk that construction project managers have to deal with?**
   - Weather.
   - Fires.
   - Earthquakes.
   - Accidents such as injuries and explosions.
   - Lack of experience, awareness and efficiency of workers.
   - Failure to inform workers of risks.
3. **What risks affect the Algeria's construction projects and how are they categorized?**
   - Earthquakes.
   - Weather.
   - Changing prices.
   - Lack of experience and efficiency of workers.
   - Lack of project supervision and workflow by the project manager (No-Supervision).
   - Lack of education and knowledge.
   - Soil quality and suitability.

4. **How do various risk management concepts apply to the Algeria's construction industry?**

   Apply to most projects but it has a little effect because it depends on the project type and/or size.

5. **What risk mitigation frameworks are in place and which of these might be used for risk control in fast-track projects in the Algeria?**
   - Provide protection and safety to manpower.
   - Make an emergency plan and activate it to minimize the risks.
   - Listen to decision makers and project managers and obey them.
   - Identify the safety standers and the type of risks.

6. **What is the average size of the project management team?**

   It depends on the project size but the average is between (2) people and (5) people.

7. **What was the maximum size of the project management team?**

   It depends on the project size but the average is between (5) people and (9) people.

8. **What are the effects of risk avoidance or prevention on the performance of a construction?**
   - Protect workers and provide safety for them.
   - Successful construction and easy implementation.
   - Commitment to the deadline.
   - Precision in work, order and safety.
   - Accuracy in action

9. **What are the significant impacts of "applying risk management" on the project?**
   - Safety
   - Quality
   - Time management
   - System, order and regulation.
   - Financial liquidity.

5.2.2. Qualitative Research Analysis

The qualitative research analysis helps in obtaining in-depth knowledge and information about the undertaken research subject; hence, the qualitative research has been conducted on this specific research. The qualitative research supports the researcher in gaining deep detail knowledge of the performance management and risk management in the construction projects. The impact of the performance management and risk management in the construction industry has been evaluated by this research. For the qualitative research interview technique, has been applied. The top level and middle-level managers are considered for the interview as the researcher think their perception of the performance and risk management is valuable. The interviews with the top level and middle-level managers are descriptive in nature, which provide detail knowledge about the research subject. For the qualitative research, 12 managers were interviewed. Hence, the research will be conducted on the perceptions of the 12 managers.

Question 1: Do you think performance management is important for the construction project? If yes, how performance management helps in construction projects?

In my opinion, performance management is one of the most important aspects for the construction project as it helps in assessing the performance of the staffs of the construction project including the human resources machines and other resources, which are applied in the construction project. Effective measures like benchmarking standard, balance scorecard help in measuring the performances of the employees employed in a construction project. Hence, the performance management is important for the construction project. It supports in improving the performance of the employees by effective reward, recognition, and promotion strategies. Apart from these, effective rebuke and punishment are also essential for improving the performance of the employees. Therefore, effective performance management measures and related strategies help in improving the performance of the employees of the construction project, thus help in improving the overall performance of the project. Hence, the performance management in construction project helps in completing the project within predetermined budget and time schedule of the project.

Question 2: Do you think risk management is essential for the construction project? If yes how risk management help in a construction project?

In my opinion, risk management is essential for the construction project as the construction projects have potential inherent risks that prevent the construction project to achieve the goals and objectives of the construction projects. The risk management techniques help in assessing the potential risks of the construction projects and then with the effective implementation of required risk management techniques help in minimizing risks of the construction projects. The risk prevention measures help in stopping the potential risk of the construction projects. On the other hand, risk controlling measures support in minimizing the effects of the potential risks of the construction project. The risk retention policy helps in assessing the unavoidable risks of the construction projects and help in managing the risks. The risk transfer policy helps in transferring the potential risks of the construction projects so that reduce the effect of the potential risks, hence improve the potentiality of the construction project and also help to manage the financial risks of the construction project.

5.3. Discussion

Both the performance management and risk management are important for the construction projects and both the performance management and risk management play a substantial role in the successful accomplishment of the goals and objectives of the construction project. The performance management supports in improving the efficiency of the workers involved with the construction project and thus helps in improving the overall performance of the construction project. The performance management supports in assessing the performance of the employees associated with the construction project and help in improving their performance by implementing effective techniques like reward, recognition, promotion as well as if necessary rebuke, demotion and punishments that motivate and pressurize the employees to deliver their best to the project. Hence, the performances of the employees use to be improved.

In the same way, the risk management is also very helpful for the construction projects. The risk management tools and techniques help in assessing the potential risks of the construction projects. After successful assessment of the risks, the risks are managed by appropriate risk management strategies as per the nature and characteristics of the risks the strategies use to

be applied. The risk management strategies are risk prevention strategy, risk controlling strategy, risk retention strategy and risk transfers strategy. All these risk management strategies are useful for minimizing the potential risks of the construction projects; hence play a useful role in risk management for the undertaken construction project.

Therefore, it can be stated that for the successful accomplishment of the construction project the performance management and risk management are important and performance management and risk management play vital role in the construction project thus, essential for the construction project.

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

The main objective of this thesis is to understand if construction companies and engineers use risk management in Algeria. An effective risk management process encourages the construction company to identify and quantify risks and to consider hazard containment and reduction policies. Construction companies that manage risk effectively and efficiently enjoy financial savings, and greater productivity, improved success rates of new projects and better decision making. Risk management in the construction project management context is a comprehensive and systematic way of identifying, analysing and responding to risks to achieve the project objectives.

The research results show that the Algerian construction firms significantly differ from the construction companies in foreign countries in the adoption of risk management practices. To manage the risk effectively and efficiently, the contractor must understand risk responsibilities, risk event conditions, risk preference, and risk management capabilities.

The questionnaires showed that respondents who worked outside Algeria or worked in international firms have much better experience, awareness and application than others who work in local companies. This may be due to the fact that the countries where these people worked have awareness programs and strict laws to apply risk management in the field of construction, or may be due to the fact that these companies have experience managing risk to maintain their resources and achieve the desired profit, and by working in these firms, the expertise has transferred to these persons.

In my view, the use of risk management in the Algerian construction companies is low to moderate, with little differences between the types, sizes and risk tolerance of the organizations, and experience and risk tolerance of the individual respondents. The lack of experience, supervision and funds makes it very difficult to change Algerian companies' attitude towards risk management. Nevertheless, the construction companies need to include risk as an integral part of their project management. Qualitative methods of risk assessment

are used in construction companies most frequently, ahead of quantitative methods. In construction project risk management, risks may be compared by placing them on a matrix of risk impact against a probability. Mitigation options are then derived from predefined limits to ensure the risk tolerance in the construction industry. The risk management framework for construction projects can be improved by combining qualitative and quantitative methodologies to risk analysis. Risk management remains essential in construction projects, as companies often fail to meet deadlines or exceed costs.

6.2. Recommendations

The appropriate recommendations that can be provided in this case are:

1. Algeria government should impose several rules to maximize the role of risk management.
2. Establishing special committees to supervise all companies especially the companies that do not comply fully with the laws imposed.
3. Rules and regulations should be followed to enable the purpose of the project to be enhanced.
4. Activating the role of the judicial and executive authorities in prosecution and punishment of companies or individuals who violate laws.
5. The appropriate analysis to improve risks and increase the current performance of the construction project management.
6. Activate the use of technology in risk management to improve performance in general and calculate risk accurately.
7. Risk mitigation paves the way for risk enhancement and therefore considerations are taken in accordance with project values.
8. Providing the values of the project leads to the stability can be gained for the development of the purpose of the project.
9. The joint project tool should be used in the industry for the purpose of risk transfer because the structure clearly illustrates the values necessary to manage project methods.
10. Mitigating factors are also recommended as part of a solution that must focus on growth and study of research objectives.
11. An explanation of the risks and other mitigating factors that should be followed to improve analysis should be provided, as the structure clearly explains the promotion of businesses that need to mitigate existing uncertainties in the form of methods.
12. The development of the project can be visualized in the form of constructing values and so the transfer and risk control are described in the procedures presented to mitigate existing risks in analysis management, it can also enhance the process that should be referred to through the development of risk mitigation methods to improve construction projects.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE FORM IN ENGLISH

Dear Mr. /Mrs. …….. Esquire.

Greetings,

I would like to ask you to participate in a study on the Performance and Risk Management in Construction Projects from the viewpoint of construction companies and engineers. I am currently doing my master's degree in Construction Management at the Near East University, NC. This questionnaire is of importance for my studies. Your participation in this questionnaire is **completely voluntary and confidential**. All the collected data will be treated as collective combined total.

If you agree to take a part in this questionnaire, please answer the following questions as accurate as possible. The expected time for fulfilling this questionnaire is approximately (20) minutes.

If you would have any further questions about this project, please contact the researcher Haytham Alagha at e-mail: haytham.alagha.90@gmail.com

Thank You for your participation.

Researcher

Haytham Alagha

Risk Management in Construction Projects and its Reflection on the Performance Management in Algeria

2017

A. Personal Information

1. Name: …….....

2. Gender: ☐ Male ☐ Female

3. Age:

☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ Over 50

4. Academic Level:

☐ Secondary ☐ Diploma ☐ Bachelor

☐ Postgraduate ☐ Other (Specify): ……

5. Average annual salary: (DZD)

☐ 10000-14999 ☐ 15000-19999 ☐ 20000-24999

☐ 25000-29999 ☐ Over 30000

6. Company Name: ……...

7. Your company is:

☐ Local ☐ International ☐ Governmental ☐ Private

8. Please indicate how many years of construction experience you have:

☐ 0-2 years ☐ 3-5 years ☐ 6-10 years

☐ 11-20 years ☐ Over 20 years

9. Your experience in construction project includes (Note: you can choose more than one type)

☐ Housing ☐ Building ☐ Industrial

☐ Infrastructure/Heavy Engineering ☐ Other (Specify): …….

10. Are you a project manager? ☐ Yes ☐ No

If no, please specify: ……..

11. Have you ever worked on a construction project in a country other than the Algeria?

☐ Yes ☐ No

If yes, please specify: ……

B. Please select your agreement choice by putting "X" in the table for each argument

No.	Do you agree with the following arguments?	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	Risk and risk management is perceived in a construction project.					
2.	Risk tends to change during the project's life cycle.					
3.	The chosen procurement option has an impact on risk management.					
4.	Background variables – such as age, education, and complementary training – affect risk management.					
5.	The individual or personal differences between site managers and other managers in construction affect risk management.					
6.	Risk management process can effectively be analyzed in construction project.					
7.	The significant impacts of applying risk management on construction projects will enhance the possibility of success and the sustainability of the project in the future.					
8.	Risk retention affects the performance of the project.					
9.	Project team leader should be committed to his/her responsibilities; he/she should monitor the project progress closely, especially in terms of cost, time, and quality?					
10.	Materials supplied should be recorded and monitored closely in order to have continuous and sufficient supply.					
11.	Risk control (loss control or risk mitigation) influences the project performance in the construction industry.					
12.	Risk transfer influences project performance in the construction industry.					
13.	We can innovate the new dimensions and steps of risk management process in public sectors.					

14.	Modifications should be minimized during the construction process to avoid delays.					
15.	* Fast-tracking is used in the Algeria construction projects.					
16.	* Fast-tracking holds the future of the Algeria's construction industry.					
17.	I implement risk management in my projects.					
18.	It is necessary to implement risk management in construction projects.					
19.	Please rate this statement: "Risk in the Algeria construction is allocated to the most appropriate party".					
20.	Construction insurance against risk is expensive due to high premiums in Algeria.					
21.	It is necessary to identify project risks at the project planning phase.					
22.	Risk management is important only for special projects such as international projects.					
23.	Risk management is necessary in project management for a successful project.					
24.	The major contents and objectives of project risk management are the same as the ones in project management.					
25.	The purpose of project risk management is to reduce project uncertainties.					

* **Fast tracking** is a technique where activities are performed in parallel. These are activities that would have been performed sequentially using the original schedule. In fast-tracking, the activities are worked on simultaneously instead of waiting for each piece to be completed separately.

C. Writing

1. What are the main factors that contribute to a more effective risk management in the construction projects?

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2. What are the sources of risk that construction project managers have to deal with?

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3. What risks affect the Algeria's construction projects and how are they categorized?

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4. How do various risk management concepts apply to the Algeria's construction industry?

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5. What risk mitigation frameworks are in place and which of these might be used for risk control in fast-track projects in the Algeria?

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6. What is the average size of the project management team?

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7. What was the maximum size of the project management team?

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8. What are the effects of risk avoidance or prevention on the performance of a construction?

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9. What are the significant impacts of "applying risk management" on the project?

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APPENDIX 2

QUESTIONNAIRE FORM IN ARABIC

عزيزي السيد / السيدة: ..... المحترم

تحية طيبة،

أود أن أطلب منكم المشاركة في دراسة حول إدارة الأداء والمخاطر في مشاريع البناء من وجهة نظر شركات البناء والمهندسين. أنا حاليا اقوم بعمل درجة الماجستير في إدارة البناء في جامعة الشرق الأدنى، قبرص التركية. هذا الاستبيان مهم جدا لدراستي.

مشاركتك في هذا الاستبيان هي **طوعية تماما وسرية**. وسيتم التعامل مع جميع البيانات التي تم جمعها كمجموع مجتمعة.

إذا كنت توافق على المشاركة في هذا الاستبيان، يرجى الإجابة على الأسئلة التالية بدقة على قدر الإمكان. الوقت المتوقع للانتهاء من الاستبيان حوالي (20) دقيقة.

إذا كان لديك أي أسئلة أخرى حول هذا الاستبيان، يرجى الاتصال بالباحث هيثم الأغا على البريد الإلكتروني : haytham.alagha.90@gmail.com

أشكركم على مشاركتكم.

الباحث

هيثم الأغا

إدارة المخاطر وتأثيرها على إدارة الأداء في مشاريع البناء في الجزائر

2017

أ. معلومات شخصية

1. الاسم: .....
2. العنوان: .....
3. رقم الهاتف: .....
4. الايميل: .....
5. الجنس ذكر ☐ أنثى ☐
6. العمر

30-21 ☐ 40-31 ☐ 50-41 ☐ 50 فما فوق ☐

7. المستوى التعليمي:

بكالوريوس ☐ دبلوم ☐ ثانوي ☐

آخر(حدد): ..... ☐ دراسات عليا ☐

8. متوسط الراتب السنوي (دينار جزائري)

20000-24999 ☐ 15000-19999 ☐ 10000-14999 ☐

فما فوق 30000 ☐ 25000-29999 ☐

9. اسم الشركة .....

10. شركتك هي

خاصة ☐ حكومية ☐ عالمية ☐ محلية ☐

11. يرجى الإشارة إلى عدد سنوات من الخبرة في البناء لديك

2-0 سنة ☐ 5-3 سنة ☐ 10-6 سنة ☐

20-11 سنة ☐ فما فوق 20 سنة ☐

12. تشمل تجربتك في مشروع البناء (ملاحظة: يمكنك اختيار أكثر من نوع واحد)

صناعي ☐ بناء ☐ الإسكان ☐

أخرى (حدد):..... ☐ البنية التحتية / الهندسة الثقيلة ☐

13. هل أنت مدير مشروع؟ نعم ☐ لا ☐

اذا (لا) الرجاء حدد .....

14. هل سبق لك أن عملت في مشروع بناء في بلد آخر غير الجزائر؟

نعم ☐ لا ☐

اذا (نعم) الرجاء حدد .....

ب. يرجى تحديد الخيار عن طريق وضع "X" في الجدول

	هل توافق على العبارات التالية؟	موافق بشده	موافق	عادي	غير موافق	غير موافق بشده
1	ينظر إلى المخاطر وإدارة المخاطر في مشروع البناء.					
2	تميل المخاطر إلى التغيير خلال دورة حياة المشروع.					
3	خيار الشراء المختار له تأثير على إدارة المخاطر.					
4	تؤثر متغيرات الخلفية - مثل العمر والتعليم والتدريب التكميلي - على إدارة المخاطر.					
5	الاختلافات الفردية أو الشخصية بين مديري المواقع والمديرين الآخرين في البناء تؤثر على إدارة المخاطر.					
6	يمكن تحليل عملية إدارة المخاطر بفعالية في مشروع البناء.					
7	من شأن التأثيرات الكبيرة لتطبيق إدارة المخاطر على مشاريع البناء أن تعزز إمكانية النجاح واستدامة المشروع في المستقبل.					
8	يؤثر الاحتفاظ بالمخاطر على أداء المشروع.					
9	وينبغي أن يلتزم قائد فريق المشروع بمسؤولياته؛ هل ينبغي له أن يراقب التقدم المحرز في المشروع عن كثب، وخاصة من حيث التكلفة والوقت والجودة؟					
10	ينبغي تسجيل المواد الموردة ورصدها عن كثب من أجل الحصول على إمدادات مستمرة وكافية.					
11	السيطرة على المخاطر (السيطرة على الخسائر أو تخفيف المخاطر) تؤثر على أداء المشروع في صناعة البناء والتشييد.					
12	يؤثر نقل المخاطر على أداء المشروع في صناعة البناء والتشييد.					
13	يمكننا ابتكار الأبعاد والخطوات الجديدة لعملية إدارة المخاطر في القطاعات العامة.					
14	يجب التقليل من التعديلات خلال عملية البناء لتجنب التأخير.					
15	* التتبع السريع يستخدم في مشاريع البناء الجزائرية.					
16	* التتبع السريع يحمل مستقبل صناعة البناء والتشييد في الجزائر.					

17	أنا اطبق إدارة المخاطر في مشاريعي.					
18	من الضروري تنفيذ إدارة المخاطر في مشاريع البناء.					
19	يرجى تقييم هذا البيان: "يتم تخصيص المخاطر في البناء الجزائري إلى الطرف الأنسب".					
20	إن التأمين على البناء ضد المخاطر مكلف بسبب ارتفاع أقساط التأمين في الجزائر.					
21	من الضروري تحديد مخاطر المشروع في مرحلة تخطيط المشروع.					
22	إدارة المخاطر مهمة فقط للمشاريع الخاصة مثل المشاريع الدولية.					
23	إدارة المخاطر ضرورية في إدارة المشروع من أجل مشروع ناجح.					
24	إن المحتويات والأهداف الرئيسية لإدارة مخاطر المشروع هي نفسها كأهداف إدارة المشاريع.					
25	الغرض من إدارة مخاطر المشروع هو الحد من أوجه عدم اليقين في المشروع.					

* التتبع السريع هو الأسلوب حيث يتم تنفيذ الأنشطة في موازاة ذلك. هذه هي الأنشطة التي كان يمكن أن يتم بالتتابع باستخدام الجدول الزمني الأصلي. في تتبع سريع، يتم العمل على الأنشطة في وقت واحد بدلا من انتظار كل قطعة إلى أن تكتمل بشكل منفصل.

ج. الكتابة

1 - ما هي العوامل الرئيسية التي تسهم في زيادة فعالية إدارة المخاطر في مشاريع البناء؟

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2. ما هي مصادر المخاطر التي يجب على مديري مشاريع البناء التعامل معها؟

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3. ما هي المخاطر التي تؤثر على مشاريع البناء في الجزائر وكيف يتم تصنيفها؟

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4. كيف تنطبق مفاهيم إدارة المخاطر المختلفة على صناعة البناء في الجزائر؟

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.5 ما هي أطر التخفيف من المخاطر القائمة، وأي من هذه الأطر يمكن استخدامها لمراقبة المخاطر في مشاريع المسار السريع في الجزائر؟

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6. ما هو متوسط حجم فريق إدارة المشروع؟

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7 - ما هو الحد الأقصى لحجم فريق إدارة المشروع؟

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8. ما هي آثار تجنب المخاطر أو منعها على أداء البناء؟

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9. ما هي الآثار الهامة "لتطبيق إدارة المخاطر" على المشروع؟

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